The Proceedings of GREAT Day 2020

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2020

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The Proceedings of GREAT Day

Geneseo Recognizing Excellence, Achievement, & Talent is a college-wide symposium celebrating the creative and scholarly endeavors of our students. In addition to recognizing the achievements of our students, the purpose of GREAT Day is to help foster academic excellence, encourage professional development, and build connections within the community.

Established in 2009, *The Proceedings of GREAT Day* journal compiles and publishes promising student work presented at SUNY Geneseo's GREAT Day symposium. The projects, presentations, and research included here represent the academic rigor, multidisciplinary study, and creativity of the students taking part in the SUNY Geneseo GREAT Day symposium.

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The Proceedings of GREAT Day

2020

Predicting Coronavirus Cases Using Curve-Fitting Techniques

Frank Addeo

sponsored by Ahmad Almomani

ABSTRACT

With coronavirus becoming an increasing global concern each day, it is obvious that we must understand what is truly happening. Using curve fitting techniques such as Fourier series, cubic splines and least squares approximation, an accurate model can be made to fit the data. Analyzing and comparing the three approaches, the best method to fit these data can be seen. We will also compare the fitting curve methods with the solution of the logistic model solution. *Editor's note: This paper was presented in April 2020, relying only on data and understandings about COVID-19 available then.*

The COVID-19 pandemic of 2020 has been one of the most significant recent events worldwide. It has impacted each and every American in one way or another. As millions of people contracted the lethal virus, it seemed the world as we know it took a turn for the worst. Intensive care units filled rapidly because of the need for ventilators. Essential items flew off of supermarket shelves, students of all ages were required to take classes online, working-class people were urged to work remotely, and sports venues, concert halls, and restaurants were all temporarily shut down. Consequently, the stock market crashed as panic settled in. Our lives were derailed and forced into a period of almost complete quarantine as thousands of Americans perished at the hands of the novel Coronavirus.

Due to the severity of the virus, it is important to analyze how the virus is spreading. For example, predicting how many Coronavirus cases there would be at a particular time in the United States could offer plenty of insight. Anticipating the number of sick people can enable hospitals to reserve ample intensive care units and ventilators for those whose lives depend on them. So, how could the number of cases be predicted? Using various curve-fitting techniques, the number of future cases can be accurately estimated. For the sake of this study, three methods have been used to create an estimate: Least Squares Approximation, Cubic Spline Approximation, and the Logistic Model. As a point of reference, April 22, 2020, SUNY Geneseo's GREAT Day, would be the date to predict how many Coronavirus cases there would be using each method.

In order to predict coronavirus cases over time using curve-fitting, previous data regarding the total number of cases must be examined. *Figure 1* is a representation created using MATLAB depicting coronavirus cases over time beginning on February 15, 2020. The total number of cases over time was reported from Worldometer. On the x-axis, days since February 15 are incremented. Points along the x-axis can be referenced simply by a number. For example, April 4, 2020, would mark the 50th day since the initial number of cases was recorded on February 15. On the other hand, the y-axis measures the total Coronavirus cases. Hence, as shown in the graph, there were 311,357 total cases on April 4. All data was recorded up until April 12 which is reference point 58 (the 58th day since February 15), at which final predictions for GREAT Day were calculated.
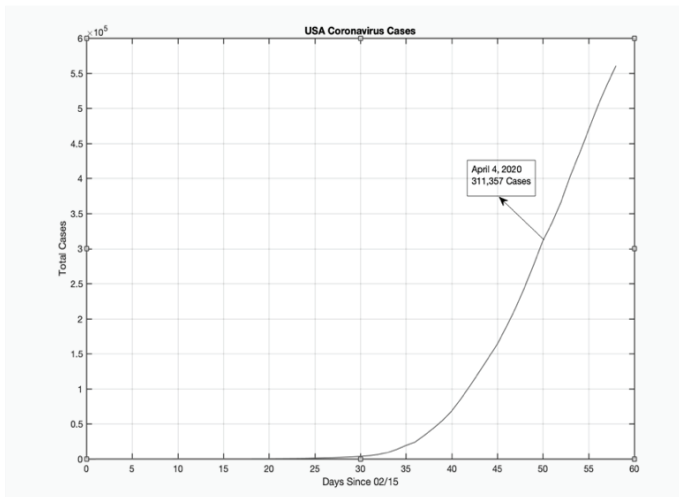
Figure 1: Coronavirus Cases in the USA from 02/15 to 04/12

The first curve-fitting method to be examined is the Least Squares Polynomial Approximation. The curve being observed is not linear. Thus, linear regression is not a suitable method to fit the data. Nonlinear regression will yield a higher-order polynomial and will be more accurate. The basic form of the nonlinear model is $\hat{Y}_i = f(\hat{X}_i; \hat{\beta}) + \epsilon$. The values $\hat{Y}_i$ refer to the predicted values along the *y*-axis. $f(\hat{X}_i; \hat{\beta}) + \epsilon$ is a function of x and beta where beta is the term which is the sum of squares error. Finally, epsilon is simply the error term for the model. To obtain this model, iterative procedures must be performed to minimize the sum of squares error, which is $\Sigma(Y_i - \hat{Y}_i)^2$. The model will be a simple function of and , and thus the only unknown parameters are the beta terms (Biran, 2019). To find the beta terms and find the general equation of the curve, independent least squares approximations are performed. Doing these iterations by hand would require a great deal of time and patience, so MATLAB code was created to quickly and efficiently estimate the beta parameters.

The method of Least Squares Regression does have strengths and weaknesses. For example, this method is appropriate for all kinds of datasets and should provide accurate

results each time. Furthermore, it is a rather efficient method and can produce a result quickly. The one potential downside to this method is the complexity of the iterative procedures (Biran, 2019). Displayed in *Figure 2* is the output of Least Squares Regression. In blue is the least squares approximation, and displayed in red are the actual reported values of Coronavirus cases. Running the code yields a simple polynomial that can be used to accurately predict the number of Coronavirus cases in the United States at a particular time. As mentioned before, GREAT Day is the 68th day since February 15. This means that 68 is plugged into the polynomial and the output is the total number of Coronavirus cases that we can expect. Using this model the prediction for GREAT Day was 825,570 cases, and the actual reported value was 854,385.
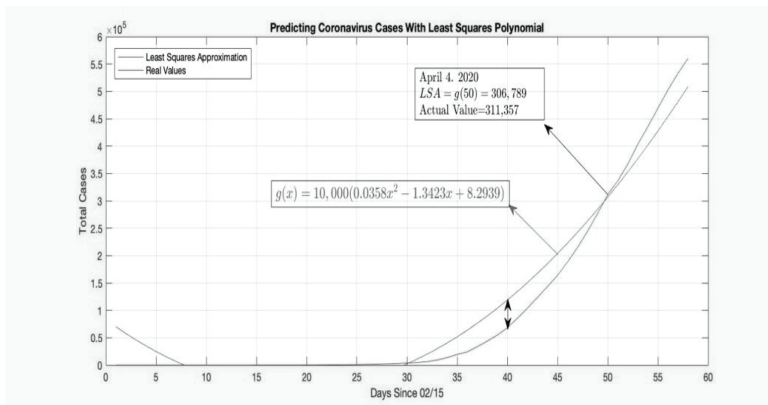
Figure 2: Output of Least Squares Regression

The next method is Natural Cubic Spline Approximation. The method of cubic splines constructs a piecewise defined function that fits many forms of data quite accurately. As previously discussed, this data is not linear and thus a smooth curve must be constructed to fit the data. Starting with points, intervals must be constructed to fit the data. For this data, there are 58 points (dates ranging from February 15 to April 12) and thus there will be 57 individually piecewise defined intervals. Using code in MATLAB, the coefficients , $s_{k,i}$, must be derived in order to create these intervals. The general form for a cubic spline is: $S(x)=s_k(x)+s_{k,0}+s_{k,1}(x - x_k)+s_{k,2}(x - x_k)^2+s_{k,3}(x-x_k)^3+\cdots$ *for* $x \in [x_k, X_{k+1}]$ *and K*=0,1,…,*N* - 1 (Matthews & Fink, 2005, p. 281).

In order to find these coefficients, there are a few properties that must be satisfied. First, the spline must interpolate the data points. Each node, x_k , represented in the spline matches the corresponding number of Coronavirus Cases at that given point. Second, the function must be smooth and continuous at each interval. This means that the second derivative exists implying that there are no corners or abrupt ridges in the curve (Newton, 2011).

Cubic Spline Approximation incorporates all datasets quite well. Essentially, this method creates a new approximation for each given interval. It modularizes the whole curve into smaller ones which create greater precision at points within the curve. Hence, this method is not greatly affected by irregularities and anomalies within a

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dataset. This method however can be a bit difficult to use when trying to predict future values. Since each interval is individually defined, there is no "best" approximation for future values. Therefore, the last defined interval can be extended in order to make predictions. In other words, the polynomial given in the last interval can be evaluated at a given value of *x*, much like that of the least squares method. This may cause a greater error.
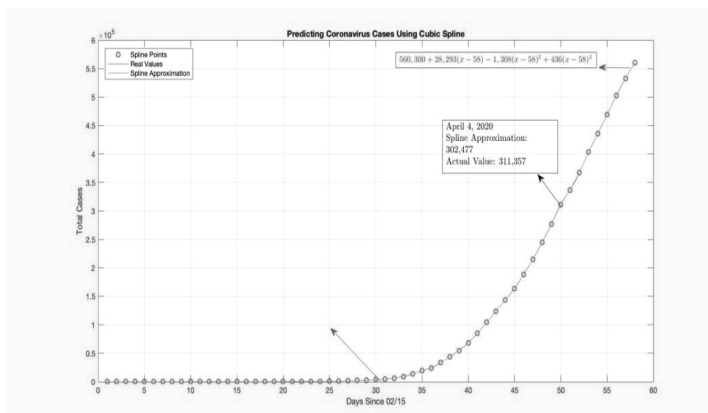
Figure 3: Cubic Spline Approximation of Coronavirus Cases from 02/15 to 04/12

Figure 3 contains the Cubic Spline Approximation fitted to the curve of Coronavirus cases over time. One may ask, where are the actual reported values? The Cubic Spline Approximation matches the data so precisely that it covers the actual reported values. Within the figure there is a small snapshot that shows the discrepancy between the spline and the actual curve between the 30th and the 31st day since February 15. Since the spline is so close to the actual reported values, the exact number of cases at a particular time during any given day can be estimated. In the right corner of the figure is the last interval of the spline which can be used to make future predictions. Thus, the value 68 can be plugged in for x to obtain the predicted future value for GREAT Day. Using this value of x, the expected number of Coronavirus cases is 1,149,230. This value is expected to be a bit high because only the last interval was used.

The third and final model used for this study is the Logistic Model. Coronavirus is extremely transmissible. Speculation has concluded that the virus could live on surfaces for days. Furthermore, scientists believe that the virus could travel a distance of six feet. For these reasons, the number of infected people was growing exponentially without bound through March and April of 2020. This rate of growth is not practical for the future however. It was expected that the curve would flatten out at some point. Due to government intervention requiring people to socially distance and wear masks, the rate of growth has decreased and the number of cases has approached an asymptotic value, or equilibrium solution. The logistic model accounts for this government intervention. Unlike the other curve-fitting methods, this method will

not grow without bounds and will at some point level out. Eventually, the number of cases will reach a carrying capacity (L) that cannot be sustained by the population, and thus will cause the curve to level out. In this circumstance, a suitable value for L would be the total number of hospital beds in the United States, which happens to be 924,147 (AHA, 2020). The only other unknown when constructing a Logistic Model is the rate of growth. In *Figure 4* the rate of growth at each day is graphed. After much consideration, the best approximation for a general rate of growth using this model is simply averaging out the rates over each day. Now that L, and R have been found, the values can be plugged into the general formula for the Logistic Model in order to create a realistic prediction for the future. The general equation for the Logistic Model is $y = \frac{L y_0}{y_0 + (L - y_0) e^{-rt}}$. So far L and R have been accounted for and is simply the number of cases that were initially present on February 15, 2020.
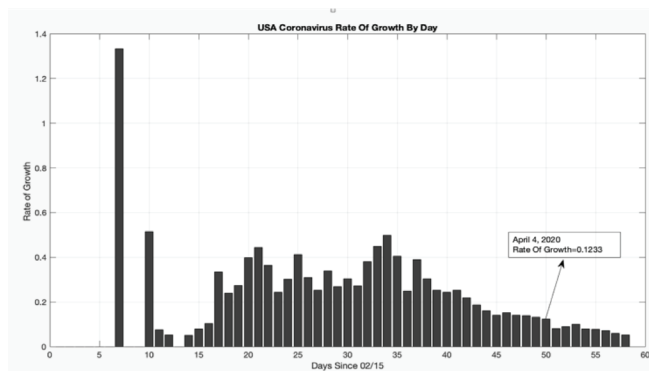
Figure 4: Rates of growth each day from 02/15 to 04/12

In *Figure 5*, the Logistic Model is represented by the values in blue and the real, reported values are in red. In order to make a prediction using this model, the value, t, represented in the general equation above is treated as x would be. Thus, 68 is inputted for t and the prediction is yielded. Using this method, the predicted number of cases for GREAT Day (April 22, 2020) is 897,490 which is relatively close to the actual value of 854,385.

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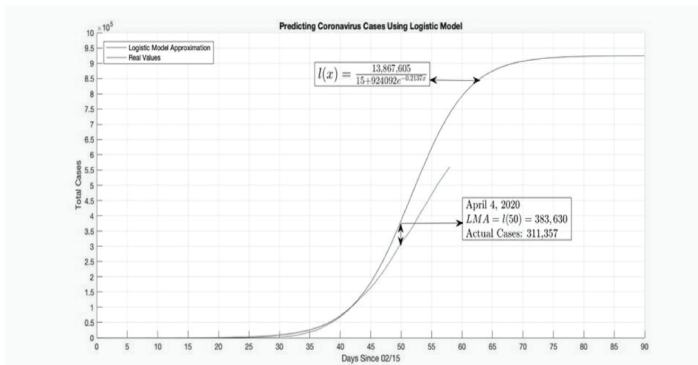
Figure 5: Logistic Model Approximation of Coronavirus Cases from 02/15 to 04/12

There are many factors contributing to error in this study. For example, approximately one of every four Coronavirus-positive patients is asymptomatic, and therefore may not be tested and thus will not be included in the total number of cases (Woodward, 2020a, 2020b, & 2020c). There has also been speculation of false reporting, which would indicate that these totals are wrong anyway. This is logical considering COVID-19 caused a time of crisis which may lead to faulty reporting. Additionally, in the United States, testing was quite hard to come by in the early months of the pandemic. As of March 8, only five people per million were tested for coronavirus which is significantly lower than per capita testing in South Korea, which had a rate of 3,692 tests per million people on the same date (Woodward, 2020a, 2020b, & 2020c). Obviously, people cannot be counted as having Coronavirus if they have not actually tested positive for the virus. Practically, this is the largest factor influencing the numbers in the United States.

As expected, the Logistic Model approximation and the Nonlinear Regression approach were the most accurate for predicting future Coronavirus cases. Generally, the Nonlinear Regression Approximation appears to be the most efficient method. It is quite flexible and can be easily changed to variance in the data. For example, making a prediction for October 2020 would only require incorporating data from April until late September. Using the Logistic Model to make the same prediction would be a bit more complicated because a new rate of growth must be established as well as a new carrying capacity. The Cubic Spline approximation was the least accurate result, but is not entirely useless because it fits the data best over the period that is already known.

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An Interview with Paige Closser

Jaime DeVita

Paige Closser ('20) has worked to support both in-person and virtual GREAT Day events.

How would you describe your experience as a Virtual GREAT Day student intern?

I would say it's been kind of rocky. Between last year having to switch to the online format so quickly and this year, just trying to put together, working with different things, we're still pretty kind of early in the process of putting stuff together at this point. With all of the unknown and the rockiness, things are still getting done, and we're learning a lot. Now at this point it's just been a lot of online stuff, we definitely are still figuring things out. I right now am in the process of creating informational videos about the process of submitting your work, once initial submissions are collected. That's in the works right now. It's been tough too because we used to meet all together and talk through things. We still meet, but now it's virtual which causes a little bit of disconnect amongst the group.

How would you compare your personal experience of Virtual GREAT Day with GREAT Days that have been held previously?

So I am a big fan of obviously the in-person GREAT Day, it was always very exciting for me to help run the day. Once I was a sophomore, I kind of took over the set up and the layout of the Union ballroom for the poster presentations, so that was kind of my specific area that I worked on for a couple of years. Just being there, I would pretty much stay there the whole day and it was just really awesome to be able to walk around and see everyone and their work and everyone being proud of the work that they had to show. I hope that we can still instill that kind of thing with virtual GREAT Day, I mean, there's still—especially in times like these, where it feels like nothing is going right, or we just want something to go right instead of wrong, I think it's still really powerful for people to be able to share what they're working on. Even though life sometimes seems like it slowed down or stopped, people are still doing things, people are still researching and sharing their talent with others. Even though we have to do that in a virtual way this year I think that people can still get a lot of fulfillment out of it.

What do you believe GREAT Day provides the Geneseo campus and the community?

Well I would say first off it's a day off from our usual going on of campus activities, you know I think in the Spring semester especially, that it is a really important thing. In the past, we would have the day off, however, it's not exactly the same this year now that

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GREAT Day is a week long. I think the point in the past was so that everyone could go and be more likely to go to the events and see their friends and see what their friends are performing or presenting, which I think is really important. It's a day to break up classes to go in and focus on what the Geneseo student community has been creating and focusing on for who knows how long for some people.

Do you believe that Virtual GREAT Day is comparable to in-person GREAT Day, and can the goals of GREAT Day be met virtually?

I think it can be comparable, I think one of the ways that it won't be this year is sort of the amount of interaction that will be happening, obviously, we don't have people in-person and in rooms of buildings giving presentations to people sitting there and listening. Even though we will have the opportunity to tune into a synchronous part of their presentation if they would like to. I think overall the amount of students who are participating will be less, due to the circumstances that we are living in. I don't think the quality of the work will be any different than in the past, where it will certainly be comparable. I am hoping to see a lot of spirit and excitement about what people have to present and to share on GREAT Day.

Were there any roadblocks experienced when trying to organize and plan for Virtual GREAT Day?

Yeah, it's just kind of the unknown and figuring it out as we go. We're trying to take what we've done in the past and find easy ways to kind of make it into the, work it into the virtual aspects of things. I would say just because of the circumstances that we're in and just trying to put something together that isn't last minute, and trying to make things better than they were last year. So, we're still trying to work through those kinks and things. We've got our list of things to do and what order we have to do them in and once we get going I think we'll get on a run and things will start flowing naturally. It'll get easier once we get things in the works.

There's More Than One Way to Skin a Hominin: An Analysis of Plio-Pleistocene East and South African Hominins as Prey

Carrie A. Daignault

sponsored by Barbara Welker

Abstract

This paper details the perilous world in which our ancestors evolved as a prey target for a significant number of carnivores. The first part details the predators that would have co-existed with ancient hominins in the highlighted geographic region and time and notable specimens that bear marks of having been the victims of carnivores. The second section shows how being hunted affected hominin behavioral and cognitive evolution. The final section discusses to what extent hominins may have been preferred prey for certain carnivores.

Homo sapiens, the only remaining hominin, is a breathtakingly self-centered species. Most are probably familiar with the popular image of a caveman wielding a spear to take down an animal several times larger than himself, and the more academic side of evolutionary study has provided a plethora of material discussing scavenging and hunting developments.

While meat consumption certainly has played a pivotal role in human evolutionary history, it is only one side of the coin. In relative terms, very rarely is the other side examined. Hominins evolved in a world where they were not only (ultimately) hunters but also hunted. Our ancestors were subject to many selection pressures, one of which was the presence of several terrestrial, aquatic, and aerial carnivores. This had a profound effect on behavioral and cognitive evolution.

This paper addresses three topics pertaining to Plio-Pleistocene predation on Eastern and South African hominins using available literature. The first section discusses the indications of carnivore activity on fossils, and describe the various taxa that posed a threat to ancient hominins. The second and primary aim is to determine what effect predator

presence had on hominin behavioral and cognitive evolution and any relevant adaptations. The third part consists of an analysis to determine what indications may exist that hominins were the preferred prey of any carnivore present in Eastern and South Africa during these time periods.

The parameters are as follows, the study focuses on hominin taxa present in East and South Africa between 5 million to 10,000 years ago. For the purposes of this analysis, East Africa is defined as the countries of Ethiopia, Kenya, Tanzania, and Uganda. South Africa refers to the country of the same name. References to outside regions will only be made with regards to the rest of Africa, or for the purposes of discussing modern analogues. Only confirmed hominin taxa (*Ardipithecus, Australopithecus, Paranthropus, Kenyanthropus, Homo*) are included.

Given that our ancestors evolved in an environment at the mercy of the elements, erosion, and a range of varying species, it is first necessary to specify how carnivory marks are distinguished on recovered remains. Developments in microscopy allowed for analysis to be conducted and a set of general criteria has been established to qualify marks on bones as predatory in origin. The canines of mammalian carnivores will produce sloping U-shaped puncture marks when viewed in cross-section. This analysis must be paired with contextual evidence from the site as microanalysis cannot confirm culprits alone. This is because other predators such as crocodiles may make tooth marks that closely resemble mammalian canines (Njau, 2012). Therefore, it is necessary to search for other evidence such as depositional clues: an ancient lacustrine environment, for example, will yield layers of siltstone and claystone, hence increasing the probability that any specimens with animal puncture marks were killed by a crocodile.

Extreme circumstances such as cases of cannibalism within the hominin fossil record are relatively rare and the known archaeological record only extends back to the Middle Pliocene site of Lomekwi 3, dated to 3.3 million years ago (Harmand, 2014). Still, it is crucial to distinguish carnivory marks from those of other sources. In contrast to carnivoran puncture marks, tool cut marks are V-shaped and tend to be elongated when viewed in cross-section. In addition, micro-striations can be seen within these marks. Though hammerstones produce a different shape in the form of a pit, they also contain these characteristic microstriations (Njau, 2012).

Evidence of carnivory from the Plio-Pleistocene can only be indirect, so there is a margin of error that complicates identification. Besides the previously stated fact that crocodiles and mammalian carnivores can make similar marks and hence complicate specific predator identification, other, more modern factors interfere as well. There are no formalized criteria or standardized methods for distinguishing carnivores and tool cut marks. Attempting to decipher the culprit of tooth marks through taphonomic context comes with controversy and lack of standardization as well (Njau, 2012). An example of this from a non-hominin case pertains to several fossil fragments found at Dikika, Ethiopia. Dated to 3.4 million years ago, these ungulate fossils (namely

a femur and rib) were claimed by McPherron et al. (2010) to feature stone tool cut marks due to the presence of microstriations and percussion marks. However, it has been pointed out that the marks appear on bones that would not typically be struck for marrow extraction. Furthermore, no tools were found at the site and indeed, there is a lack of widespread lithic technology from this period. Critics of the find contest that given the lack of tool evidence from the site, the marks on the bones are the result of taphonomic damage (Njau, 2012). Hence, the Dikika find remains unconvincing.

Before conducting an analysis of the effects of predation on hominins, it is important to first establish the carnivores that coexisted with them. Hominins evolved in an environment where they were subjected to threats from numerous predators. It is important to note that the temporal majority of hominin evolution occured without tool and fire technology and certainly the kind that would be effective against large predators. While pointy sticks, bones, thorny branches, and other makeshift weapons could have been used in defense, it is unlikely they would have worked well. The fact that these carnivores would have been accustomed to hunting large, horned animals and often rely on surprise attacks coupled with the fact that humans are victims of predators even today with sophisticated weapons supports the assertion that primitive tools would have provided little protection (Treves & Palmqvist, 2007). Members of the mammalian order *Carnivora* were quite diversified by the Plio-Pleistocene although there is evidence of a decreasing trend in the biodiversity of large-bodied East African carnivorans after 3.6 million years ago (Lewis & Werdelin, 2007).

The big cats and related animals likely posed the greatest threat to ancient hominins, both from extinct and extant taxa. This is due both to their physical prowess, abundance, and longevity in regions where hominins were present.

The three most notable extinct genera of Felidae were *Homotherium, Dinofelis*, and *Megantereon. Homotherium* lived from approximately 4.35 to 1.4 million years ago and could be found throughout East Africa (Lewis & Werdelin, 2007). They are often called "scimitar-tooth cats" due to their steak-knife-like canines (Hart & Sussman, 2006). They were quite successful due to their adaptations for open environments such as elongated forelimbs and shortened forelimbs in comparison to other saber-tooths. Their ability to take down large prey and the fact that they may have traveled in groups means that hominins faced stiff competition if they encountered them in either a predator-prey or scavenging situation (Lewis & Werdelin, 2007).

Dinofelis was a long-lasting genus, found in the fossil record dating from 7.91 million until 900,000 years ago (Lewis & Werdelin, 2007). These cats were quite large; one genus, *Machairodus* stood around 1.2 meters high at the shoulder and had powerful, elongated, and serrated canines (Hart & Sussman, 2007). The various species of *Dinofelis* lived throughout East and South Africa (represented by *D. petteri, D. aronoki, D. piveteaui*, and *D. barlowi*) The largest species, *D. aronoki* lived from 3.18 to 1.6 million years ago in Ethiopia and Kenya. Contrary to *Homotherium, Dinofelis* lived in dense or mixed forest as can be seen in their more robust build; they possessed short

forelimbs and the smaller species, *D. petteri* and *D. piveteaui* had crouched postures more adapted for stalking and pouncing through underbrush. However, the success of the *Dinofelis* genus suggests that they may have lived in more than just thickly vegetated places, especially given that one area was usually inhabited by two *Dinofelis* species. It does not seem likely that they cached their prey in trees like modern leopards because their forelimbs appear to have lacked dexterity. Also, it has been observed in remains of North American *Dinofelis* species that the enlarged canines were quite prone to breakage, but this injury is totally absent from any African remains. Since dragging a carcass into high boughs would put a lot of stress on the canines, tree caching does not seem likely (Lewis & Werdelin, 2007). Furthermore, the long canines of sabertooths were not powerful enough to sever the spinal cord. Rather, the knife-like downwards stabbing inflicted by these felids was meant to trigger massive blood loss by ripping into soft tissue (Hart & Sussman, 2006).

Megantereon were present in East Africa and have been found at Aramis, South Turkwel, Koobi Fora, Kromdraai, and at the Shungura formation in Kenya. Their remains show that they were an extremely muscular felid and were comparable in front end morphology to a jaguar, although they were substantially more muscled. Their preferred habitat was probably the same as *Dinofelis* and they too were a stalking and ambush predator. As the smallest of the sabertooths, they were probably less of a threat to hominins than the larger genera and the latter may even have contended with them at scavenging sites (Lewis & Werdelin, 2007). Still, at around 91 kilograms, they were larger than modern leopards and may have been more adept at climbing trees thanks to powerful, large front paws (Hart & Sussman, 2006).

Big cats have most definitely been a threat to hominins throughout the course of history. Aside from numerous anecdotal cases in the modern era, there is evidence of this on a microbiological level; it was demonstrated that the bacteria *Helicobacter* was transmitted from ancient hominins to felids (Bassoti & Müller-Lissner, 2015). It is not a question of if, but who of the extant big cats targeted African hominins.

The modern big cats of Africa belong to the genus *Panthera* and the oldest definitive evidence of lions and leopards comes from Olduvai Bed I in Tanzania. With the caveat of limited fossil and taphonomic evidence, it seems these ancient lions and leopards displayed the same behavior as their modern counterparts. There is certainly evidence of leopards caching kills in trees due to similar cranial morphology between fossil and modern leopards, the high risk of kills being taken by other predators, and the numerous bone piles found in caves that may have fallen from tree-stowed carcasses (Lewis & Werdelin, 2007).

Since there is nothing to suggest behavioral differences between ancient and modern African pantherans, a reasonable assessment of risk to hominins can be inferred. Leopards in particular are known to be quite stealthy and have been known to grab infants off sleeping mothers with the latter being none the wiser. Furthermore, they frequently prey on the other great apes: chimpanzees, bonobos, and gorillas. Both

leopards and lions are able to hunt prey larger than themselves based on their tactic of biting in a way that severs the spinal cord. Of course, the latter can also hunt large prey due to its permanent presence in a social group (Hart & Sussman, 2007). Since there is not a question of if these species are capable of eating hominins, modern case studies of such will be presented in the third section of this paper.

As for cheetahs, they differ from the true big cats in a number of ways; their claws do not sheath, their prey is typically smaller than that of lions or leopards, and their bodies are developed for high speed in a completely terrestrial environment. There are few modern records of cheetahs preying on primates (Hart & Sussman, 2007). The cheetah fossil record is also limited. *Acinonyx* specimens have been found in Omo dating until about 2.5 million years ago and were also found at Koobi Fora. After the specimens from the later site, there is a significant time gap; no members of *Acinonyx* have been found that date from between then until the present. These early cheetahs differ significantly in morphology from the modern animal and their lack of abundance seems to suggest they were never a main competitor in the carnivoran East African guild (Lewis & Werdelin). Much like other taxa that will be discussed below, this lack of remains makes it difficult to infer how much of a threat cheetahs posed to ancient hominins.

The oldest Canid fossils in East Africa were recovered from Omo in Ethiopia and date to approximately 4-4.5 million years ago. However, the evidence for large canids does not become clear until about 3.5 million years ago (Lewis & Werdelin, 2007). Hominins were an easy prey item for African wild dogs (*Canis pictus*) if they chanced upon one; this animal hunts cooperatively by trailing and chasing down the prey in a pack and then attacking from behind. However, it has been shown through modern primate analogues that with the exception of sprint-capable monkeys (such as patas monkeys), most primates are the victims of individual dogs in chance encounters. The prey capture rate for African wild dogs is quite high at around fifty to seventy percent (Hart & Sussman 2006).

Patterns of presence of large canids vary throughout the Plio-Pleistocene. There seems to have been a lack of large canids from 2.7-2.4 million years ago. From 1.8-1.5 million years ago, the landscape was dominated by *Canis lycaonoides* (a possible ancestor of the African wild dog). A low yield of fossils makes it difficult to hypothesize the extent to which ancient canids may have impacted hominins. Furthermore, many extinct species may not have filled the same ecological role as modern species due to tooth morphology differences; notably, a lack of specialization in comparison to modern forms (Lewis & Werdelin, 2007). While a sparse fossil records hinders conclusions that can be drawn about the extent of canid predation on ancient hominins, given the size, speed, endurance, and cooperativeness of modern species, they may have been a formidable presence and a sheer lack of presence from the fossil record has erased the full extent of their threat.

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Hyaenids first appeared around 17 million years ago and quickly adapted to be top carnivores within their ecosystems (Hart & Sussman, 2006). By the Pliocene, hyaenids were a worry to human ancestors. Remains from the genus *Chasmaporthetes* were found in Allia Bay, Marsabit County, Kenya and dated to 3.7-3.9 million years old. By 3.5 million years ago, the diversity of hyaenids in East Africa was substantial (Lewis & Werdelin, 2007). Given this fact, hominins present in the region would have faced a high risk of predation.

Over one hundred extinct species have been identified in the fossil record and the hyaenids seem to have taken two evolutionary directions. The first was a lineage developed for speed. *Chasmaporthetes* may have filled the long-distance hunting role seen in modern African wild dogs and seems to have had locomotor capabilities similar to cheetahs. *Euryboas* was present in South Africa and has been found in association with australopiths (Hart & Sussman, 2006).

The other evolutionary direction produced a more robust lineage that contains extant hyaenid members (Hart & Sussman, 2006). *Parahyaena howelli*, *Parahyaena brunnea* (the modern brown hyena), and *Hyaena hyaena* (the striped hyena that first appears at 1.9 million years ago) all possessed the bone-cracking abilities now seen in the two latter, extant forms mentioned (Lewis & Werdelin, 2007).

While much is still to be determined about the behavior of *Chasmaporthetes*, it seems that an individual hunter was not a great threat to even the most petite of early hominins, but if they did indeed fill the niche of modern African wild dogs and hunted in packs like that animal, they were far more dangerous (Lewis & Werdelin, 2007). Specimens belonging to the cave-dwelling *Pachycrocuta* have been found in Hadar, Ethiopia and date to 3.5 million years old, making them contemporaneous with *Australopithecus afarensis*. Furthermore, its weight of around two hundred kilograms (the largest hyena to ever live), huge and powerful jaws, and evidence from China of its hunting of wooly rhinoceros and giant elk, meant it could very easily have taken down an australopith. *Pachycrocuta* was present in much of East Africa during the Pliocene as evidenced not only by the Hadar fossils but also by specimens from South Turkwell, Kenya. They seem to have hunted in packs and brought pieces of their kill back to their dens where they could easily crack open the skull to ingest the fatty brain tissue (Hart & Sussman, 2006).

The need for East and South African Plio-Pleistocene hominins to live within close range of water presented another predatory risk. Crocodiles have not evolved much in the 200 million years they have existed and are still a well-known threat to modern *Homo sapiens* due to multiple documented attacks. Unfortunately, no direct evidence of crocodile predation on ancient hominins is known from the fossil record so their impact on ancient hominins can only be inferred from circumstantial evidence. Nile crocodiles have coexisted with hominins for a long time and can reach up to almost 6.5 meters in length. Sadly, the lack of studies identifying Nile crocodile stomach contents makes it difficult to determine how threatened ancient hominins were. The

only published study took place in the 1950s and indicated that humans are not preferred prey; only one percent of the stomach contents was identified as human (Hart & Sussman, 2006). However, it could be possible that the smaller size of ancient hominins such as Australopiths coupled with their lack of complex technology and protections (boats, spears, etc.) made them a more vulnerable target and hence, they may have made up a larger percentage of the diet. Intriguing as it is, there is no way to test this idea.

Nile crocodiles were not the only crocodilian with which ancient hominins contended. A crocodile called *Crocodylus thorbjarnarsoni* was discovered in the Lake Turkana Basin of Northern Kenya and reached up to 7.5 meters in length, making it the largest predator of that ecosystem. Hominin remains were also found in the deposits, making it very likely that they were a prey item (Brochu & Storrs, 2012).

As for other reptiles, again, the fossil record is quite poor concerning their association with ancient hominins. There is an apparent predator-prey relationship between snakes and mammals, though, as snakes began ecologically radiating at the same time as mammals. However, as with crocodiles, there is a lack of direct fossil evidence (Hart & Sussman, 2006). Thus, the degree to which early hominins fell prey to large snakes remains speculative.

Avian predation is not as prevalent as other carnivore activity due to the lack of abundance of predatory birds large enough to subdue a hominin. However, both modern records and fossil preservation yield cases of this activity. For instance, the crowned hawk-eagle is native to East Africa and with a 1.8-meter wingspan, their feet 19.05 centimeters wide, and claws up to 6.35 centimeters in length, they could have easily taken down small adult australopiths or their young. This eagle has been known to snatch at young children with the Zambian Department of Veterinary and Tsetse Control Services, noting a 1983 account of a crowned hawk-eagle attacking a seven-year-old, approximately twenty-kilogram boy on his way to school. The boy's uniform prevented the claw marks from fatally injuring him but he still sustained large gashes on his head, chest, and arms. It was noted that no nearby nest was present so this, coupled with the method of attack being consistent with hawk-eagle hunting behavior, made this very likely a predation attempt (Hart & Sussman, 2009).

The ability of large birds of prey to hunt primates of a similar size to early hominins is corroborated in other accounts. Skepticism behind the consistency of black eagles hunting baboons (seen an anomalous number of times in South Africa) was rebuked when documentation of a black eagle hunting hamadryas baboons in Eritrea four times in four days was published (Hart & Sussman, 2009). It should be noted that male hamadryas baboons may weigh between twenty to thirty kilograms and females ten to fifteen; males may reach a body length of eighty centimeters. Hence, it is feasible that large, carnivorous birds preyed on adult and young australopiths of a similar size.

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In addition, the fossil record contains notable instances of avian predation. Most famously, the skull of the South African Taung child bears marks that heavily suggest she was the victim of a large eagle (Hart & Sussman, 2009). Thus, while birds of prey may in general have not had the diversity or size capable of taking down hominins with the same frequency and capability as terrestrial and aquatic carnivores, it is still apparent both from modern records and fossil traces that our ancestors at least occasionally fell prey to large avian predators.

The odds of a deceased animal being preserved as a fossil are incredibly low. Thus, it follows that the odds of an animal that was a victim of predation being preserved as a fossil with specific taphonomic marks needed to distinguish carnivory are even lower. Even if a felled hominin is not completely devoured by the carnivore that killed it, the exposure to scavengers and the elements, especially with the body in an already mangled state, will make it more than likely that the unfortunate hominin's remains will be lost to time. That stated, there exist a few uncovered fossils that display evidence of fatal predator injuries or scavenging activities.

Perhaps the most famous example of this, as noted above, is with the Taung child. This fossil consists of the skull of a female *Australopithecus africanus* juvenile dated to approximately 2 million years old. Though discovered in South Africa in 1925 by noted paleoanthropologist Raymond Dart, it was seventy years before Berger and Clarke proposed that the Taung child was the victim of a predator. This was put forth due to the presence of large gouge marks in the orbits of the skull that appeared to resemble damage from an eagle's talons. Comparisons with marks on the bones of monkeys killed by eagles in the Taï Forest, Ivory Coast revealed a high degree of similarity. In addition, there are punctures on the braincase and scratches in various places on the skull. An examination of Dart's notes pertaining to the skull's excavation ruled out the possibility that the scratches were produced during extraction from the encasing breccia (Berger & McGraw, 2007). As discussed in the section on avian predators, it is completely possible for crowned eagles to attack, maim, or kill young children so this, coupled with the trace marks on the fossil suggest the Taung child was a prey item for a large bird of prey.

Although not from the key African areas of analysis for this paper, a femoral diaphysis recovered from the Grotte à Hominidés near Casablanca, Morocco provides another rare, well-preserved example of human predation by carnivores. The shaft's isolation as a fossil and its condition make it difficult to determine to which species this individual belonged. However, *Homo rhodesiensis* was known to frequent the area so it is likely from this hominin. Dated to around 500,000 years old, fossil ThI94-UA28-7 features chew marks at both ends of the femoral shaft, specifically numerous punctures, scores, pits, and furrows. The marks are present on an area of thick cortical bone and five pits are greater than four millimeters in length and two millimeters in breadth, demonstrating that a large carnivore was responsible for these marks. The most likely candidate given its presence in the area during the Pleistocene and marks on the bone that correspond to its activities. Furthermore, the bone was found in a

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cave, suggesting that hominins were often killed and cached in caves by various predators, most notably hyenas. There is not sufficient evidence to prove this individual was a victim of predation. Rather, they may have been dragged into the cave post-mortem and scavenged (Daujeard et al., 2016). Again, although ThI94-UA28-7 falls outside the regional zone of discussion, it is still a valuable specimen for the African hominin fossil record relating to predation.

Millions of years spent as a prey item caused hominin behavior and cognition to be altered significantly. This can be seen in the changes in brain structures as determined by reconstructions from endocasts and skulls as well as archaeological evidence for certain behaviors. Another key to understanding these changes is using modern analogues of extant great apes and their responses to predator threats. As discussed above in the profiled predators, leopards and lions hunt gorillas and chimpanzees respectively so there is pressure for these genera to develop strategies to deal with the risk.

Along with bonobos (*Pan paniscus*), the common chimpanzee (*Pan troglodytes*) is the closest extant relative of humans and thus serves as the best available analogue for how ancient hominins may have dealt with predator presence. Chimpanzees in the Taï Forest are at a high risk of predation by leopards, compared to chimpanzees in other African populations, such as the Gombe Stream chimpanzees of Tanzania. In the Taï Forest, leopard density may be as high as one per square kilometer and thus, resident chimpanzees have molded their behavior around the risk of predation; one study during a five-year period in the 1980s concluded that the actual mortality rate from leopard attacks on chimpanzees was relatively low, where only four were killed during the study time. However, the fact that chimpanzees took up numerous defenses indicates that it was the possible threat of predation rather than the actual rate of successful predation that caused changes in behavior (Boesch, 1991). This is an activity that is clearly observable in humans today; our chances of being mauled by a grizzly bear in a national park are quite low, yet we still take precautions like bringing bear spray. Observations of the Taï Forest chimpanzees revealed that individuals often utilized makeshift clubs and chased off leopards. These spontaneous weapons were not kept though; if they drove the leopard into a space too small for the chimpanzees to fit through, the latter would throw the club into the opening. It was also observed that there were more all-male bands in the Taï Forest population compared to the apes in the lower-risk Gombe Stream group. As male chimpanzees are known to display dramatic aggression, this configuration makes sense given the danger from leopards (Boesch, 1991).

Besides the genetic similarities chimpanzees and humans share, there are other similarities between the two species; one of the most notable is the presence of fission-fusion groups in both. In chimpanzees, females are the predominant sex to leave their natal group upon reaching maturity while in humans, where both sexes partake in this. It was suggested that this form of social behavior in chimpanzees may have been taken up in the distant evolutionary past as a response to predation (Boesch, 1991). While more evidence from the fossil record is needed, it may be possible that ancient

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hominins adopted this group structure for the same reason, given the similar African environmental conditions in which the two evolved.

While greatly understudied in comparison to *P. troglodytes*, bonobos observed in this study had a lower risk of being hunted than many groups of chimpanzees. This could be explained by the fact that bonobos more often demonstrated sheltering in trees. While leopards are adept climbers, hiding in the canopy would give the cats fewer opportunities to spot and stalk the bonobos. This low risk of predation is borne out by the observation that, in contrast to common chimpanzees, female bonobos are the ones that tend to form same-sex groups (Boesch, 1991).

Gorillas are the other non-human African great ape and face many of the same dangers as chimpanzees, notably leopard attacks. A number of similarities and differences can be observed in how gorillas deal with predators. Like chimpanzees, they often show displays of aggressive defense and have even been known to partake in mobbing. One fact that differs gorillas from all other primates is that they do not take shelter in trees in an effort to escape carnivores (Isbell, 1994). This makes sense, given their massive size, coupled with their stocky build more suited to knuckle-walking.

While obviously only inferable in ancient hominins, predation may have been a factor behind the adoption of several behavior habits and tendencies in modern humans. One notable habit is selectivity of defecation areas. In modern society, this serves functions of hygiene and public decency, but in more primitive times, defecating in certain areas may have served as a way to mask the scent of feces from predators. Stalking carnivores often use olfactory cues as a means of tracking prey, so either hiding waste or defecating in an area far from the rest of the prey group would be at least somewhat effective in confusing potential predators (Bassotti & Müller-Lissner, 2015). This strategy can be observed in many species such as domestic cats (who are carnivores but can be prey for larger animals) as well as certain primates. Segregated areas for excretion are utilized for a number of reasons such as territory defense and demarcation and mate attraction, so it is not a stretch to think that hominins may have adopted selective areas for protection (Bassotti & Müller-Lissner, 2015).

As obligate bipeds, hominins are physiologically suited to fecal continence; the anorectal angle in bipeds is sharper and there are higher demands on the pelvic structure for support in upright stances. This serves in contrast to quadrupedal primates such as gorillas that have poor control of defecation due to the lack of demand for strength in the pelvis (Bassetti & Müller-Lissner, 2015).

With regards to technology, the factor of predation may have been an important impetus. The oldest evidence for fire control in South Africa comes from Swartkrans in early Pleistocene sediments. Analyses by Brain (1995) of fossils recovered from the area show that hominins were frequently the victims of predation by large felines. In Member I, the oldest layer, hominins make up 20.3% of the individual predatory victims found, and in Member 2, this percentage is only a little lower at 16.7%. However, in the youngest layer, Member 3, hominins represent only 5.1% of animals

killed. What is notable is that this layer formed after the first evidence of fire at the site; two hundred seventy non-primate bones in Member 3 show evidence of being heated to a temperature consistent with those found in the average campfire, suggesting that by this point, hominins learned to control fire.

Given this evidence, it appears that fire was first utilized not as a means of cooking food or for warmth, but rather as a protection against a carnivorous threat. With regards to the stages of fire control, fire-tending likely preceded fire-making as hominins appear to have grabbed naturally lit sticks and branches. Lightning-induced fire was probably common in the highveld environment of northeastern South Africa at the time, realizing that other animals avoided them. In addition to the thermal danger of fire, its illumination would unmask any nocturnal predators taking advantage of the nighttime darkness, thus adding credibility to the theory that fire was originally a deterrent (Brain, 1995).

The advent of hunting and the ability to cooperate to take down large game is seen as a triumph of human cognition. However, the development of cooperation amongst hominins (not just their congregation into social bands but also their ability to share labor and work together) more than likely came about first as a means to curb threats of predation and mount defensive attacks. It has already been discussed above that chimpanzees will often join together to chase off a leopard or other carnivore and this great ape analogue coupled with ecological and paleontological evidence implies that Plio-Pleistocene hominins may have developed cooperative ties at least in part for protection.

During the Plio-Pleistocene, East Africa had mostly converted into open grasslands and was home to *Homo* ergaster, the first hominin known to have completely lived on plains. In an environment where they coexisted with numerous solitary and social mammalian (and occasionally avian) carnivores, fight may have taken precedence over flight. As an animal that could not effectively outrun prey, whether by exhaustion or to a tree, a defensive attack may have been the only viable option. Group life allowed for two types of anti-predator defense to be exploited; heightened vigilance through surveillance by select group members or a mobbing defense by chasing off a directly threatening predator (Smith et al., 2012). While once again, most inferences about ancient hominin behavior can only be made indirectly through modern primates, appropriate analogues suggest many parallels in response to predators. A study of various primate responses to predators revealed that counter-attacks are observed in far greater frequency in terrestrial primates than in canopy-dwelling ones. Accompanying this trend is the fact that males tend to be the main participants and work together to drive off the predator (Willems & van Schaik, 2017). As *H. ergaster* was smaller and slower than the carnivores it encountered, a group effort was necessary.

Another correlation observed in the study was group size. Among studies of *Pan* and *Papio* (baboons), it was found that populations that live in the open tend to live in larger fission-fusion groups than do the ones in more closed, forested environments.

It should also be noted that both are known to counter-attack. It is logical that life on open savannahs could only have developed in full once cooperation, especially between males, was established across early *Homo*, so adaptation should be seen as a response to the rich variety of carnivoran taxa in East Africa. While it is impossible to know for certain how large *H. ergaster* groups were, neocortex analyses (based on correlations between the ratio of this structure and group size) imply a size of about one hundred ten. While this inference is highly debatable, given numbers seen in chimpanzees and the low energetic cost of bipedality compared to quadrupedalism (hence lower stress on resources), it appears that group numbers for *H. erectus* mirrored the upper limit seen in chimpanzees: around one hundred (Willems & van Schaik, 2017).

One more factor that is important to take into account is that by the time of *H. ergaster*, hominins had developed effective, if primitive weapons. Given this, it can be argued that their counter-attacks against predators were more effective than those seen in extant primates (Willems & van Schaik, 2017). Whatever the specifics of counter-attack were, it can reasonably be deduced that the development of cooperation within hominin groups came about for protection against predators and only later morphed into activities such as cooperative hunting.

During the course of Plio-Pleistocene human evolution, East Africa experienced tectonic and climatic changes that resulted in a thinning of forests and woodland. The result was a more open grassland environment with sparse tree cover. In this region, hominins were more vulnerable to predators with natural selection favoring an animal that could react to predatory threats on a more cognitive level.

While a number of factors likely play into the encephalization of hominins during the Plio-Pleistocene, predation risk certainly played a role in ancient hominins evolving the cognitive capacity required to perform the risk-mediating behaviors discussed previously. The main driving factor for this is that across the mammalian class, predators tend to show a preference for small-brained prey. Hence, there was a selective pressure for hominin individuals to possess greater cranial capacities; large brain size reduces the risk of becoming prey. While the mechanism for this association is not fully understood, it may be in part due to larger-brained prey's ability to devise more elaborate defense and escape plans (Shultz et al., 2012). This could in part explain why the australopiths ultimately went extinct; while large-brained, they did not undergo the same encephalization as the *Homo* genus and may not have been as effective in out-witting predators as the latter.

A cognitive ability that may have been favored due to the presence of predators was the ability to plan and predict. According to behaviorist John Endler, predation acts occur in six stages: encounter, detection, identification, approach, subjugation, and consumption. Across primates, species have defensive strategies that can stop the process at the "approach" stage. As discussed earlier, great apes such as chimpanzees respond defensively before the predator approaches. Preventing a carnivore's approach at the earliest possible time reduces both the odds of a successful hunt and the ex-

penditure of energy in defense (Hart & Sussman, 2011). On an open grassland, early detection and thwarting of predators was especially important given the inability of hominins to take shelter in trees.

Speech is a relatively new development in human evolution and is dependent on the presence and position of anatomical features. However, the use of communicative calls is well-established in primate populations. Most notably, vervet monkeys have distinct alarm calls for leopards, snakes, and eagles. Rhesus macaques and Japanese macaques also have predator-specific calls. Across primates in general, alarm calls are the most frequently observed defense strategy. Given this utilization of communicative sounds amongst primates, it is likely that the most primeval mutterings of language were used to warn others of a predator's presence. At later stages in evolution, vocal communication allowed hominins to plan defense strategies (Hart & Sussman, 2011).

As mentioned above, the development and communication of complex ideas is a recent phenomenon in human history. Even Neanderthals, with a cranial capacity exceeding that of modern humans, had a skull-base angle between *Homo sapiens* and chimpanzees. The high position of the larynx made their speech sounds limited in comparison to humans (with regards to vowel pronunciation range). *Homo erectus*, which lived until tens of thousands of years ago, had a skull base angle more similar to modern humans, meaning they were probably capable of pronouncing a greater range of sounds. The linguistics of such distant ancestors are still controversial so any ideas of articulate speech in ancient hominins are speculative (Hart & Sussman, 2011). Due to the murkiness of language development, it cannot be concluded with certainty that language evolved because of a need to communicate about predators. But given that other primates have warning calls specific to certain carnivores, the idea that language may have evolved from this base purpose cannot be discounted.

While the fossil record can provide only limited evidence of predation due to preservation biases and other taphonomic factors, modern analogues of human predation can be useful for determining the degree to which humans are preferred prey. While humans may not traditionally be the prey of certain animals, changes in ecological factors and other variables may make humans more susceptible to being hunted. Thus, modern accounts and case studies serve a useful purpose in determining what makes humans preferred prey.

Perhaps the most famous case of predation on humans in modern history is that of the Tsavo man-eating lions. Between March and December 1898, two males ravaged the area in which the Uganda Railway was constructing a line to the coast. Over this period, at least twenty-eight people were killed and devoured by the pair. At the time, this area of southeastern Kenya was covered in thick, nearly impenetrable thorns that would have aided the efforts of the lions to hide and ambush (Kerbis Peterhans & Gnoske, 2001). However, there are other ecological and physiological factors that help to explain why these two lions selected humans as their preferred prey.

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At the time the attacks began, it was noted that several large ungulate species were not present in the Tsavo area, a phenomenon directly correlated to the elimination of elephants from the area, which allowed the thorny thickets to spring up. In addition, the 1890s saw anthropogenic activities introduce the rinderpest to Africa. This is a virus that infects bovines and other artiodactyls and at the time, it devastated the populations of wildebeest, buffalo, and other bovids that lions typically hunt. With their traditional preferred prey wiped out, lions would turn to one of the larger animals now present in the area: humans (Kerbis Peterhans & Gnoske, 2001).

Additionally, study of the skulls of the man-eaters indicates that both lions were missing the apical end of the lower left canines, injuries sustained earlier in life. The first man-eater shot (FMNH 23970) also displayed a severely damaged lower right canine with an exposed pulp cavity, also an antemortem injury (likely from a kick by a prey animal). Mal-occlusion meant that the mandible and incisors in particular were lopsided. This hindered the individual in his ability to hunt down preferred prey. The second man-eater killed (FMNH 23969) had a broken upper left carnassial (P4) and broken lower right canine, the latter of which was worn, indicating it was sustained many years before the lion was killed. It is doubtful, however, that the specific injuries to FMNH 23969 greatly affected his carnivorous behavior if at all. Further evidence for this lies in the fact that the lion with the greater dental injuries (FMNH 23970) was slain first and no human kills were reported by the still-living man-eater in the twenty days until the lion was killed. This makes it likely that FMNH 23970 was the primary man-eating culprit (Kerbis Peterhans & Gnoske, 2001). This assertion makes sense given the lion's dental trauma.

It should be noted however that despite the legends, these lions were not obligate man-eaters. Analysis of their teeth has revealed traces of warthog, eland, oryx, porcupine, zebra, and impala DNA, making it clear that they were still devouring other prey during their tenure as "man-eaters" (Kerbis Peterhans et al., 2001).

While it is clear from multiple ecological surveys that humans are not the preferred prey of lions under normal circumstances, ecological strain by anthropogenic activities and disease can drive large carnivores to seek out prey outside their typical preferences. In addition, the Tsavo lions were unique in their display of traumatic injuries so this case can lead one to conclude that weaker (or possibly older) individuals will target humans as the latter may be less risky to hunt than traditional prey; humans are both slower and lack the physical defenses seen on bovids. While the Tsavo case is certainly an isolated one, it provides insight as to what may turn otherwise occasional consumers of human flesh to a more amplified threat.

Man-eating can still be observed in many parts of the world. Although it is outside the geographical bounds of the ecological and direct evolutionary analysis of this paper, North America serves as an excellent example of a place that sees a fair number of humans as prey. Attacks on humans by large predators is increasing, and it is worth

observing what factors play into these attacks as they may be applicable to Africa and the rest of the world.

According to a 2017 study (Penteriani et al.), during the past sixty years, humans were killed in forty percent of attacks in North America, and these kills were attributable to felids (*Puma concolor*) and canids (*Canis lupus* and *Canis latrans*) as well as ursids (*Ursus arctos horribilis*, *Ursus americanus*, and *Ursus maritimus*). From these attacks, it was concluded that the most common victims were alone and were ten or under in age. Time of day also played a factor as ninety-four percent occurred during the day or evening. Of these attacks, fifty-three (fifty percent) were caused by the cougar, a large solitary cat similar to what ancient hominins encountered in Africa.

Humans are increasingly becoming preferred prey for these large carnivores in areas of North America. This is primarily due to growing encroachment onto the traditional territories of these carnivores, putting humans directly in a path to be hunted. Compounding this is relaxation of risk avoidance behavior; the fact that increasing integration into a technological world has made humans less knowledgeable on how to practically defend themselves against such attacks. Other factors that increase the numbers include leaving children unattended in high-risk areas (Penteriani et al., 2017).

Although it cannot be concluded yet that humans are preferred prey in these regions, a lack of vigilance shaped by decades of relatively predator-free living and coexistence with large carnivores are likely to influence an uptick in human casualties. Large carnivores do not randomly target (Penteriani et al., 2017). Therefore, if the human population increases in high-risk areas, predators will specifically target them more.

Finally, Northeast Africa provides an interesting case study. Hyenas are known to be both voracious scavengers and adept hunters, so it is no surprise that they target humans in highly anthropogenic areas. Given that spotted hyenas (*Crocuta crocuta*) are the apex predator in the arid region including Eritrea, Ethiopia, and Somalia, humans living there are more likely to be targeted as food (Gade, 2006). Hence, this region serves as an excellent case study for humans as preferred prey.

Surprisingly for an animal maligned in many cultures, hyenas are tolerated in anthropogenic environments within the countries mentioned above. They are seen as an efficient form of waste removal through their scavenging activities so allowed to wander into garbage dumps near human settlements. In addition, the presence of much armed conflict as well as disease and famine in this region has unfortunately provided opportunities for hyenas to devour human corpses. The allowance of hyenas for waste removal as well as the attraction of human remains has led to an increase in hyenas attacking livestock and killing people (Gade, 2006).

Given that humans and hyenas have co-existed in this region for centuries, it is likely that humans have developed coping mechanisms such as practicing a higher degree of risk avoidance behavior.

Looking into the fossil record, few assertions can be made. Due largely to preservation biases, it is difficult to draw conclusions as to whether and what ancient hominin species were. preferred prey for various carnivores. However, South Africa with its fossil-rich caves offers some insight.

The Swartkrans site has yielded at least eighty-eight specimens of *Paranthropus robustus*, the most common prey item found there in association with leopards. The Drimolen site's remains tell the same story. The genus *Homo* is not represented in this context nearly as much, leading to the conclusion that it was better at defending itself against leopard attacks than the Australopiths (Kerbis Peterhans & Gnoske, 2001). In addition, *Paranthropus robustus* is thought to have been a habitat generalist, living both on open grasslands and in more vegetated areas. Analysis of fossil assemblages of this species with regards to abundance profile show it to be more similar to woodland-adapted taxa. Patterns of predation by carnivores are indicative of prey habitats so analysis of this type is useful for examining hunting preferences (de Ruiter et al., 2008). If *Au. robustus* frequented a woodland-like habitat, it makes sense for them to be targeted by leopards given the latter's tree-caching and climbing activities.

For certain, hunting has played a significant role in the evolution of humans. However, more scholarly study has been undertaken with humans being on the conducting end of the hunt rather than the receiving end. The ways in which the millions of years that bipedal hominins spent as prey (including after they began hunting) influenced their behavioral and cognitive evolution cannot be discounted. That primordial state still clearly resides in humans and it comes out whenever they watch a spine-chilling horror film or walk in the woods at dusk. In multiple ways, being the hunted rather than the hunter shaped who humans are mentally and, despite their largely modern technological existence, keeps them very much a part of the natural world.

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Foundation and Change of Water Inequality in South Africa

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Abstract

Water is a scarce resource in South Africa, a country dependent on water for agriculture, yet plagued by droughts. This is an examination of the developing understanding and control of water in South Africa, as well as the societal impacts that control had on a conflicted society. It examines the responses to water in the early twentieth century, being a foundation period that sets up later water concerns in the following decades, and the period from the 1990s to the present, as a time of change in water use.

Water in South Africa is central to the struggles of the country. Since the earliest days of human habitation in South Africa, water has defined where people live, how they survive, what they eat, and why they move. As water is crucial to all aspects of human existence, water history touches on all spheres of life from governmental to environmental to economic. The most recent drought, brought to a pinnacle in 2018 with Cape Town's Day Zero, has drawn interest to the long history of water scarcity in the country. This ongoing water crisis in South Africa was caused by environmental factors and worsened by human actions. Responding to this crisis has been of paramount concern for the country since the rise of colonialism, specifically since the time of British control, which problematically sought to establish the area as an agricultural colony despite water shortages. During this time, there was also a rise in racial prejudice implemented by the government. Therefore, the responses themselves take on racially divisive characteristics. The actions taken by South African governments at the turn of the twentieth century grew water inequality based on race and created deeply entrenched water problems for the post-apartheid South African government to solve.

The time periods examined are the early twentieth century, from approximately 1900 to 1920, and 1994 (the end of apartheid) to the present. I occasionally mention events outside these time frames to provide background information on a certain topic, or to illustrate an ongoing trend. The early period was chosen because it contains the early responses to and understandings of water and water shortages, in the geographical region that is now South Africa. It represents a foundational period for irrigation and water con-

trol. The principles it establishes, as well as the consequences of the events contained within the time frame, continue throughout the century. The later period coincides with the end of apartheid, and thus a dramatic shift in South African society, including its relationship with water.

A Brief History

South Africa is a diverse country inhabited by an array of indigenous cultural groups, many of which are still present today. These include the Zulu, Xhosa, Khoekhoe, and San speakers. The Khoekhoe and San in the Western Cape region were semi-nomadic herders and hunter gatherers, respectively. The Nguni groups (connected by a Bantu ancestry and related culture) practiced agriculture, but never to the extent seen after colonization. Their method of agriculture was small scale subsistence farming. European contact first arrived in 1652, when the Dutch East India Company sought a refreshment station near the cape to help its ships sailing to Indonesia. European arrival was not without violence. San peoples experienced a near genocide at the hands of Europeans from being shot by raiding parties and the encroachment of cattle herders on their land. The Khoekhoe integrated into the European economy set up in the Cape and many converted to Calvinist Christianity. Zulu peoples continued armed resistance against European control until as late as 1900, increasing tensions within the area. The early colonial period was a time of intermingling of races. As African women frequently bore children with European men, and slaves from other parts of Africa and Southeast Asia continued to enter the area, South Africa developed a complicated system of race classification that could be very arbitrary (Heribert & Moodley, 2005, p. 48-58). This haunted the prejudiced governments of the twentieth century as they struggled to find a way to classify people based on race.

Later, the British would take an interest in the colony and spend years fighting for it with the Dutch. Settlers from Europe continued to enter the area, including Germans, Dutch, and French Huguenots. Around the beginning of the nineteenth century, Great Britain sent skilled workers with their families to inhabit the colony. The influx of British settlers and abolition of slavery pushed the Afrikaners inhabitants inland. The result of this 'Great Trek' was two separate Afrikaner Boer Republics, the Transvaal, and the Orange Free State. With British control came waves of immigrants from the then British colony of India. Originally hired as indentured servants, many stayed after their contracts expired. The group faced discrimination from both white and black South Africans (black South Africans criticized them for taking jobs) (Heribert & Moodley, 2005).

Natural resource extraction began in the mid-nineteenth century. Quickly, money poured in from Europe to build an infrastructure in South Africa that revolved around the extraction of diamonds and gold. The industrialists, such as Cecil Rhodes, who pioneered such ventures, gain wealth and considerable influence throughout all Southern Africa. Populous, long-term settlements allowed money to stay in the region and promote economic growth, instead of being immediately taken back to Europe.

This allowed for the area to industrialize earlier than other colonized parts of Africa. Industrialization also brought about more interest in the country's interior, and the growing European presence there forced native South Africans into denser communities. The strain from colonization collapsed most of the pre-colonial economy, forcing native populations to mines and slums to look for work (Heribert & Moodley, 2005).

Increasing activity and desire for control over precious resources brought the British back into conflict with the inland Afrikaans. The Boer republics fought a guerrilla war against the British with international support but lost after suffering heavy casualties (Heribert & Moodley, 2005, p. 48-58). By 1902 the Transvaal and Orange Free State republics were forcibly joined with the British Cape and Natal areas. With imposing British rule came white authority over the colony, further disadvantaging the non-white inhabitants. This was most poignantly seen with the 1913 Native Lands Act, which established the homeland areas as "Native reserves" for native African inhabitants. The area allocated for them made up only 7 percent of the country's total area (Heribert & Moodley, 2005). British cruelty during the war, including the use of concentration camps and attacks on rural non-combatants, sparked a flourishing of Afrikaner nationalism. The sentiment grew after the fighting, when British continued to discriminate against all non-English populations. A high percentage of Afrikaans gained the reputation of being "poor whites" without land or jobs, as the English preferred African workers to Afrikaans because they thought Africans were more obedient and accepted lower wages (Heribert & Moodley, 2005, p. 48-58).

In 1948, the Afrikaner National Party gained control of the government because most of the (white) voting population was Afrikaans, not British. After the election, the Afrikaner National Party implemented the apartheid system with a focus on separate development. This system frowned upon assimilation into European culture and instead categorized black South Africans into a few different "tribal" groups that rested below a unified white population on the social ladder (Heribert & Moodley, 2005, p. 48-58). Originally eight of these groups existed, with two more created in later years. Reinforcement of this system came with the creation of Bantu Authorities in 1951, just a few years after apartheid began, and was furthered by nominally giving the homeland areas self-governance (Southall, 2015). Public encouragement of cooperation between Afrikaans and British helped form one white minority population that kept control over all non-white groups. "Coloreds" and Indians, populations originally left out of the system, later gained a place somewhere in the middle of white and black, as they possessed voting rights but did not have a power equivalent to whites (Heribert & Moodley, 2005, p. 48-58).

Apartheid included segregation of peoples based on race. It achieved this by implementing racial practices in different spheres of life. These included physical separation (including the formation of homelands or Bantustans and the separation of cities into white and non-white living areas) and differentiation of services and facilities (distinct hospitals, schools, universities, bathrooms, etc., for whites and non-whites). Those in power crafted an illusion of equality by establishing homelands as quasi-independent

states, justifying the exclusion of rights to black South Africans throughout the country. Policies intentionally heightened social divisions; for example, passing laws created barriers to entry into urban workplaces for rural blacks, and different ethnicities possessed unique education systems (Heribert & Moodley, 2005).

By the end of the 1980s, apartheid was becoming visibly unsustainable. The collapse of the Soviet Union left resistance fighters without an arms supply and therefore willing to negotiate. The compromise reached shifted political power to new demographics but kept the economic system intact. The democratic elections that followed in the year after 1994 showed promise for the country, though it may be too soon to tell how successful the new government will be over a longer time period (Heribert & Moodley, 2005).

HISTORIOGRAPHY

Texts revolving around water in the pre-apartheid era in South Africa often focus on a specific public works project, including dam building and other irrigation schemes. They designed these projects to ease water issues in a small area of the then British colony, such as the Kamanassie irrigation scheme in the Western Cape and the Buchuber irrigation scheme near the Orange River (Visser, 2018). Previous works highlight the proximate purpose of the water projects, to ease the suffering of the rural, poor, white South Africans. They accomplished this goal in two ways: by improving the water situation, and by providing construction jobs for unemployed persons. Few articles mention how the projects affected non-white citizens, probably because few projects concerned themselves specifically with people of color. The agricultural sector was almost exclusively white (Visser, 2018). The sources that deal with the role of black and colored South Africans frequently discuss how governmental projects were hostile towards those people, or how they were under-prepared for the roles they sought to fill (Holbrook, 1998).

The creation of these projects were not only to improve drought, some projects, such as the Winterton Irrigation Settlement (1902-1904), served an additional purpose. They broke up sizable chunks of land for redistribution. With the Winterton Irrigation Settlement, this was not to assist the poor, but to increase the productivity of the land, as the large farms proved inefficient (Whelan, 2019). A similar concept, noted by Holbrook (1998) when explaining the 1976 Tyefu Irrigation Scheme, involved communal land being voluntarily surrendered, and irrigated land being redistributed. However, this redistribution seems to be primarily to aid the rural poor. If the other projects involved land distribution, it was not noted. Why some projects included land redistribution and not others is unclear. It might be because of the unique concerns of the region in which the project was being implemented. As it seemed foolish to underutilize land, even as a large landowner, it may have been a problem specific to the Winterton area. And the voluntary succession of communal land may not have been possible, or well received outside of Tyefu.

Visser (2018) notes the impact of climate change as a cause of drought and as a motivation for creating long lasting water projects. This is consistent with concerns expressed by government officials and other powerful figures in the primary literature. Interestingly, considering the prominence of the topic in primary sources, this is the only secondary source to mention climate change as a cause for water issues. The rest of the early twentieth century texts focus on cyclical droughts, common in South Africa, occurring every few years for interminable stretches of time. Climate change plays a greater role in post-apartheid water issue sources, probably because of increased scientific knowledge and the compilation of decades of climatological data.

Post-apartheid research on water in South Africa does not focus on specific projects, but on the influence of water through different lenses, be they social, scientific, or governmental. In their articles, Julia Brown and Philip Woodhouse both document the hopeful, yet plagued water reform initiatives throughout the country. Such reforms were needed because the distribution of and access to water was certainly tainted by the systematically racist apartheid government. Brown (2013) deals with the implications of entrentched white power and how it prevents change from occuring. Woodhouse discusses the necessity of water reform, as well as land reform. He also mentions hindrances to water reform, including multiple governing bodies attempting to control the same sources (Woodhouse, 2018). These two authors describe why and how water remains a racial issue, despite the formal end of apartheid.

This is another trend in the literature of water in post-apartheid South Africa: a greater emphasis on the social aspects of water shortage. Marcelle Dawson expands on the relationship between people and water with an article about water use in Soweto. It examines how, even after apartheid, water access and control remains an issue with serious social implications (Dawson, 2010). Karen Piper pursues a similar theme in her article about water during apartheid. This article examines the systematic water inequalities put in place to subdue non-white populations (Piper, 2014). In place of the discussion of specific irrigation schemes, authors on this topic cover why water is a social issue. Texts dealing with the early twentieth century hint at this, for example, by noting the beneficiaries of water projects or documentation of those hired to complete the projects, but never discussed as its own topic (Whelan, 2019). Once again, lack of sources for this topic may have caused this. The story of non-white South Africans and water was seldom told because the agricultual sector and water projects exhibited racial biases, that kept non-white groups away from water discussions (Whelan, 2019). Yet, their lack of presence in documents related to irrigation and dam building projects, may itself tell a story of exclusion. Here, recent literature has a distinct advantage. The people who have experienced apartheid and post-apartheid in South Africa can speak about their thoughts and experiences. There is no documentation of how South Africans felt about water issues before and after the shift in government, but there are firsthand accounts about the country's current water crisis and its impact on individuals. For example, Dawson's (2010) account of water use in Soweto includes the opinions of residents and officials who dealt with the change in government and post-apartheid water access issues.

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The scientific sources about water in post-apartheid South Africa compared to pre-apartheid South Africa, vary in content and use of scientific data. As mentioned earlier, they recognized climate change in pre-apartheid South Africa, and Wessel Visser briefly touches on this subject. However, in pre-apartheid literature the topic is seldom mentioned, compared to the post-apartheid literature. The advancement of science and technology, and a compilation of South African weather and climate trends, allowed Piotr Wolski to scientifically study water in the country (2018). Wolksi and others use these sources to offer explanations for droughts, model possible futures for a water scarce country, forecast the economic effects of water shortages, and offer potential solutions. They offer an analytical view of water in South Africa, which can create an accurate representation of the ongoing crisis facing the country.

Elizabeth Mettetal, Angea Mathee, and Tichantoga Gonah use scientific data to examine other water trends. Mathee (2011) examines the relationship between water and health in great detail. Mettetal (2019) focuses on infant mortality, and makes connections between infant mortality rates and clean water access. Gonah (2016) uses a different data set to examine acid mine drainage and its implication for water, health, and the environment. These authors benefited from emerging science to show various trends relating to the South African water supply. These trends are missing from earlier texts because writers and scientists lacked the data they needed to draw meaningful conclusions.

WATER INEQUALITY
IN THE EARLY TWENTIETH CENTURY

At the core of all water issues in South Africa is rainfall. Drought has proven to be one of the country's central environmental issues. South Africa, which besides being largely arid, is prone to cyclical droughts. In 1901, *The Times* identified water as one of "South Africa's chief needs," necessary for expanding agriculture and attracting investment and immigrant laborers (South African Irrigation Colonies, 1901, p. 4). In 1902, William Willcocks, best known for his creation of the Aswan (Low) Dam, crafted a report on water in South Africa. In his report, he noted that one of the major issues facing South Africa was drought. The country could not continue to expand with an economy reliant upon agriculture, without a way to control and distribute water. In his words, "the long winter and spring drought and the uncertain summer rains absolutely prohibit agriculture of any advanced kind," meaning the country needed irrigation (Irrigation in South Africa, 1902, p. 11). He identified both winter and spring as being times of water shortage and summer as a time of water uncertainty.

South Africans knew of the seasonal water shortages facing South Africa, but multi-year droughts, like the one that plagued Cape Town around 2015-2017, posed another problem (Wolski, 2018, p. 26). In 1883, rainfall levels fell to 19 inches. The following two years saw "no rebound" in rainfall (*The Christan Express*, 1917, p. 5). Both 1899 and 1904 experienced droughts that continued throughout the entire year (*The*

Christan Express, 1917). In 1914 a drought began, continuing into 1916, at which time the rainfall was 18 inches below its former level (*The Christian Express*, 1916). 1916 appeared to be the worst year of this drought, though it continued into 1917 (*The Christan Express*, 1917). In *The Christian Express* review (1920) of *The Kalahari*, it writes about five "lesser droughts" and three "bad droughts" occuring in South Africa between 1875 and 1896 and ten "lesser droughts" and six "bad droughts" between 1897 and 1918 (p. 127). These numbers illustrate that South Africa had a water problem, and drought was at the center. This single precious resource in the arid country caused water inequality between people of distinct races (Review, 1920). It made people question why the rain was not falling and if there was anything they could do to stop the drought (Our Rainfall: Drying up of South Africa, 1909). It spurred different government initiatives and public works projects (South African Irrigation Colonies, 1900).

Soil played a role in water scarcity, both for its impact on farming and its ability to retain water. Inconsistent rainfall necessitated expansive irrigation projects throughout South Africa because nothing grew from under-watered soil. There would be no farms in the plains of South Africa, no people trying to extract wealth from it, no agriculture at all. "The soil comes next to the water in importance," (Irrigation Problems, 1910, p. 3). When there was insufficient rain, the soil suffered. If soil was not treated properly, it contributed towards water scarcity. This idea was recognized by early twentieth-century South Africans who suggested soil remediation as a way to alleviate water shortages and reduce the water used for crops (Irrigation Problems, 1910). Water during drought years did not saturate the soil and grass, causing crops to shrivel and die (Irrigation Problems, 1910). Without enough rain, the vast swaths of land without irrigation in South Africa were worthless. To even think of farming land, a reliable water source had to be present such as the Orange and Vaal rivers. They believed these rivers to be key to expanding agriculture in the country as the basis of irrigation projects (South African Irrigation Colonies, 1901).

The final environmental factor that affected water levels was climate change. While climate change has received much attention in recent years, the idea has existed for decades. In 1916, *The Christian Express* reported, "South African climate is changing," specifically regarding rainfall levels (*The Christian Express*, p. 34). Two years later, the newspaper described the possibility of long-term soil erosion detrimentally shifting the course of rivers and rain shortages, decreasing atmospheric water levels and increasing ground evaporation (*Review*, 1920). To find out with finality whether or not the country was drying up, and therefore experiencing climate change, South Africans called the government on to study climate in South Africa by recording weather trends such as rainfall. They also suggested for the government to compare the data collected with climatic trends from other countries, specifically those with a similar climate to South Africa. This would hopefully provide a definitive answer to if South Africa was drying up (*The Christian Express*, 1916). South Africans knew that climate change was a potential cause of their water problems. However, unlike how climate change is often conceptualized today, it was generally thought to be beyond human

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control, with some exceptions. These included raising cattle and creating more run-off (*Our Rainfall: Drying up of South Africa*, 1909). They grasped that there were long-term climatic patterns that contributed to their lessening rainfall.

Even before apartheid officially began in 1948, segregation and inequality marked South African society. This extended to the placing and access to water, and the effects of drought on people. Drought in the early twentieth century created shortages of mealies, an important food source in native communities. Additional mealies could be bought but only at inflated prices, too high for struggling native communities suffering from a lack of water and poor harvest. Despite the drought, the surplus and import of food should have been enough to keep prices low. They attributed high prices to the greed of Europeans (*The Christan Express*, 1917). Those of European descent were better able to escape some of the worst effects of the drought. They had a buffer of wealth and privilege that native South Africans did not have.

Recurring drought left a void that needed to be filled. Water control needed to be implemented, either by the government or others. Interested parties suggested plans to expand irrigation and infrastructure in new areas of the country. South African land, if properly irrigated could support a thriving agricultural sector to the benefit of poor whites and "progressive natives," (*Review*, 1920, p. 127). This plan, unlike many other irrigation schemes, mentioned indigenous South Africans. They were potential beneficiaries, but only those considered "progressive." This presumably refers to the wealthiest, most agriculturally productive, and assimilated black South Africans. The plan illustrates no intention of helping natives. This view of native South Africans as lesser than their European counterparts is a theme in this newspaper. In the previous article mentioned, it asked of the inflation of prices, "Does it seem that Europeans wits and capital should be pitted against the Kafir's improvidence and short-sightedness?" (*The Christan Express*, 1917, p. 5). Though *The Christian Express* argued on behalf of black South Africans, it viewed them as handicapped beings when compared to whites. The newspaper displayed paternalistic behavior towards black South Africans.

There was obviously a water problem. People both in South African and in England knew of it. So, what was being done about the water crisis? Quite a lot. By 1900 there were thirty-one private and public South African colonial irrigation projects known to the Public Works Department. By the early twentieth century the Cape Colony region had attracted several project ideas, but other areas of the country, such as in the Transvaal and the Orange River State (as it was known at the time) were largely forgotten. Yet, the implementation of a few minor projects showed that irrigation projects were both possible and profitable throughout the country. In 1879, an irrigation canal was dug at Upington off the Orange River, which successfully irrigated the land and increased its value to fifty pounds per acre. There was a similar project off the Vaal River at Warrenton, which allowed for earnings of up to £100 per acre from the produce it grew. These were not British government schemes, they were local projects, undertaken and maintained by those that enjoyed them. Private projects existed at a larger scale too. For example, the Smartt Syndicate created a dam near Britstown that

could irrigate 1,000 acres and a man named Weingarten constructed a complicated water pump system to irrigate 7,000 acres near Upington (*South African Irrigation Colonies*, 1900).

The government projects tended to be more expensive, and sometimes poorly done. In later years, they had a significant racial element. Their aim was two-fold: to increase the profitability of the country and to settle it with white Europeans (as a way of maintaining their control over their territory). By the turn of the century they had undertaken several throughout the colony. At Van Wyk's Vlei they built a dam to hold 35 million gallons of rain and river water, and off the Vaal River the Douglas Irrigation Canal was dug (South African Irrigation Colonies, 1900). These are both examples of early governmental irrigation projects that established a framework for all future projects. This framework included creating projects that assisted poor whites, with minor concern for the native South Africans whose lands they were inhabiting.

It is important to note that in 1900, when *The Times* published this article, South African society encouraged private irrigation projects. The success of previous irrigation projects, such as Upington and Britstown, proved their usefulness. They hoped these early small successes would spur on more companies to begin irrigation projects throughout the colony. Yet, these projects were not expected to stand on their own. Experts and writers recommended the government provide aid, specifically government subsidies and free use of land. This would ensure that work began and continued until complete, to the economic benefit of the colony (South African Irrigation Colonies, 1900, p. 3). However, the government's role in irrigation projects quickly changes, based on how desperate the water crisis seems.

In 1901, the British brought William Willcocks to South Africa to do a survey of the irrigation potential of the colony. Famous for his work on water public works projects throughout the British Empire, Wilcock's work on the Aswan Dam, pleased the British so much that they sent him to South Africa to assess the water situation of the colony. His report earned him a knighthood. Willcocks was a vital tool of the British empire, used to shape and modify their colonial landscapes to whatever they wished. In South Africa they wished to transform the arid landscape into something suitable for large-scale agriculture. His projects helped solidify colonial rule in South Africa and across the British Empire (Ozden, 2014).

In his report about water in South Africa, Willcocks suggested that all rivers in the country become public property, citing the failure of private projects elsewhere as the reason (Irrigation in South Africa, 1902). He did not mention the same projects the earlier article mentioned, perhaps because, despite his research on the country, he remained unaware of their existence and successes or perhaps they were not at the scale he imagined future South African irrigation projects to be. He lamented that the land was chronically underutilized, except for a minor part of the Cape Colony, and it needed intense water development to become profitable. Another aspect of his reasoning against private projects was that those who pay for them become impatient

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to see a return on their investment and preemptively overuse their water resources. Wilcocks' notes that he looked to other countries to draw this conclusion, not the projects already attempted in South Africa (Irrigation in South Africa, 1902). If he had looked at previous works, which projects had succeeded and which projects had fallen through or become an economic burden, he may have made other recommendations. His plan involved using money from mining taxes to fund various irrigation projects (Irrigation in South Africa, 1902). He also believed land and water taxes were also to be crucial. These would encourage large landowners to make their land more productive. Not only would this help cultivate and irrigate the land, but it would also provide an opportunity to settle poor whites along the irrigation waterways (The Irrigation Report, 1902). This report spurred the next wave of irrigation projects in South Africa.

These projects sought to irrigate South Africa on a grand scale. Irrigation would allow agriculture, as well as mining, to support the country's economy. Irrigation schemes also had the immediate benefit of employing poor, white workers who could farm the land they irrigated. Native South Africans and other non-white people (namely Indian immigrants or people of Indian descent) also took part in the construction of some of these projects. However, they were not the demographic that the projects sought to aid, and they thus received poor treatment while working on the projects. They worked as a source of cheap labor because project managers did not view them as equal to their white counterparts (The Irrigation Report, 1902).

The Lifford Irrigation Scheme off the Fish River was one project that used people of distinct races as sources of labor. As suggested by William Willcocks, this project featured high government involvement. Though constructed on privately owned land, the Lifford Irrigation Scheme (1908) received government financing through the loan system, and Irrigation Department assisted in surveying the project. The Mooi River dam exemplified Wilcocks vision in its fullest form. It was a government irrigation project in its entirety, created not directly for irrigation, but to conserve the water supply of the river. This would make the Fish River more suitable for future irrigation. Unlike the Lifford Irrigation Scheme, this project only employed between 100 and 400 white people, depending on the stage of production (Irrigation: The First Big Dam, 1908).

A few years after the Lifford Irrigation Scheme, the government started work on the Hartebeespoort Dam. This irrigation scheme was in construction from 1916 to 1925 near Pretoria. This project, too, was highly racialized. It emphasized relief on poor whites, through use of white labor and resettlement of white people onto the land after construction was completed, to increase government support among the white working class. Projects, such as this one, created a barricade between people of color and the agricultural sector. Resettlement especially was detrimental because it blocked colored people from having access to arable land (Visser, 2018). The 1913 Land Act did something similar. It blocked black South Africans from owning land outside of "constitutionally defined 'tribal' reserves" (Woodhouse, 2018, p. 1-2).

The Kamanassie Dam near Oudtshoorn in the southwestern Cape mirrored the social aspects of the Hartebeespoort Dam a few years later in 1919. Besides creating a lasting water supply, they designed the project to employ and then settle poor whites. The Kammanassie Dam project had non-white workers employed during construction, but the treatment they received was underwhelming. They remained socially and physically apart from their white counterparts. Black workers lived sequestered in the black labor camp, across the river from the white labor camp that included improved facilities such as recreation areas and schools for children. Unlike white workers, management rarely allowed black workers to bring their families (Visser, 2018, p. 50). Before completion of the project in 1925, the government created a "civilised labour" policy which led to an even greater preference of white workers over black (Visser, 2018, p. 52).

Conversely, the Lower Tugela Irrigation Scheme in the Natal area aspired to aid African farmers, who had provided locally grown food to the area before the Langalibalele Uprising scattered the "market gardeners" (Whelan, 2019, p. 42-47). This scheme involved bringing water and infrastructure to a remote area of South Africa to develop and diversify the agricultural sector in the area. The irrigation scheme sought to dam the river and create canals on either side to increase the irrigated area. Unfortunately, creating the irrigation scheme involved breaking up large land ownings where African "squatters" lived. The Upper Tugela Irrigation Scheme was a similar project tailored to help poor whites. Together these projects make up the Winterton Irrigation Settlement on the Little Tugela River in what is today KwaZulu-Natal (Whelan, 2019).

The Winterton Irrigation Settlement project experienced moderate success. Despite setbacks such as food shortages in 1903 and 1904, droughts and intense rain in 1904, and tough terrain, the project continued until complete. It continues to operate to this day. It was also socially successful. It allowed for small communities to control their water supply, increasing "social and cultural cohesion" in settlers (Whelan, 2019, p. 63). This project was successful because of excellent planning and follow through. Before starting, developers considered the social aspects of the project. During the construction they adhered to that plan, even when faced with difficulties (Whelan, 2019). This project was almost unique in its success. Many other early twentieth-century irrigation projects were unsuccessful. They fell through or cost more money than they could ever hope to make. Rather than ease water issues in the country, the failure of these projects made problems worse.

Irrigation in early twentieth-century South Africa frequently failed to ameliorate the country's water shortage. Officials proposed these projects with good intentions, to help poor farmers and bring water to the dry areas of the country, but the projects suffered from poor planning and follow through. Projects began preemptively, before the proper research on the project and area had been conducted (Farm Irrigation, 1907). The Kammanassie Dam, for example, provided jobs to poor whites, but failed to provide a consistent source of water to the area because "the land was unsuitable for permanent irrigation" (Visser, 2018, p. 57). A similar project, the Buchuberg Irriga-

tion Scheme, constructed from 1929 to 1934 in the midst of the Great Depression, displayed similar results. It provided short-term employment, yet, because of low water levels, it partially shut down soon after completion (Visser, 2018).

Even before 1900, the government in South Africa had a history of failed projects. One project in 1882 at Van Wyk's Vlei cost £18,000 and failed to reach the necessary water level of 10 ft. They diverted a river to fill the dam for an extra £900. The project was almost a complete failure because of the poor understanding of the area. Very few settlers moved onto the land after the diversion, and the project produced limited profits (South African Irrigation Colonies, 1900).

The 1890 Douglas Irrigation Canal also failed. Work on the project began without sufficient surveying being done. During construction, the Public Works Department declared the area to be unfit for the project. Construction restarted elsewhere at a substantial cost. Before the shift, the Public Works Department suggested buying more land for the project to increase profitability. The suggestion went ignored and the interest the project paid was 5% instead of the possible 12% (South African Irrigation Colonies, 1900). The Sutherland Dam, from the same time period, was also a disaster. An engineer warned against the project, though the municipality began it anyway. The dam reportedly broke open almost immediately after completion (South African Irrigation Colonies, 1900).

Governmental failures to ease water concerns in South Africa extended beyond failed irrigation projects. In Johannesburg in 1909 millions of gallons of water went unaccounted for. Engineers present could not discover where the water was going. Miners and household gardeners were both suspected of stealing it. However, these were only rumors. Excessive rainfall inundated the city with water, instead of a drought, presenting another governmental failure in water control. It could deal with too much water, no better than it could deal with too little. In this instance, the walls and carpets of Johannesburg residents were soaked through (The Water Problem, 1909). Water contamination was another public concern. In Johannesburg, residents drank whisky or soft drinks in place of water, because of fears of contamination (The Water Problem, 1909). Misinformation about South African rivers and rainfall presented a unique complication in that it inhibited well-functioning irrigation schemes from being planned (Farm Irrigation, 1907). Without correct information about water levels in an area, irrigation projects were susceptible to drying up. Some dams held water, but rarely enough to become useful (Visser, 2018).

Other types of irrigation experienced mixed success. In some areas non-governmental projects from earlier years were in place and available, needing only to be properly used to be beneficial (Farm Irrigation, 1907). Other regions saw small scale irrigation developed in places of government irrigation projects. These projects made use of "flood irrigation and earthen furrows," but irrigation of this nature was inefficient and water costly (Visser, 2018, p. 57). Irrigating their land forced farmers to take out loans they could not afford. Crushing debt made it difficult for farmers to properly tend to

their land and crops which contributed to water use issues and poor crop yields (Visser, 2018). There were also alternative measures proposed to aid the water crisis such as well sinking. Well-sinking was an alternative option promoted by the government. This method involved drawing water from the ground instead of open water sources such as rivers. While it proved useful for providing water for stock, it was not effective for large-scale irrigation (The Irrigation Report, 1902). Some presented reforestation as another solution to drought. They viewed reforestation as a natural method of water conservation and as an idea with the potential to increase rainfall. Forests could act to prevent transpiration, locking water in the soil, as windbreakers, hindering evaporation from dams, canals, and other surfaces (Our Rainfall: Drying up of South Africa, 1909). A way to achieve this would be to plant hearty vegetation across surfaces that could not be irrigated, but could receive sufficient rainfall. To encourage this, some proposed that the government implement a tax on all landowners, which allowed the possibility of tax reduction if they forested a certain portion of their land (The Christian Express, 1916).

Education to combat the crisis was suggested. *The Times* noted how few farmers used modern scientific methods to water their crops, creating poor quality produce and excess water use. If educated on how to care best for each type of crop, farmers could reduce their dependence on irrigation projects. It also noted that if farmers focused on the quality of their crops over the quantity, expansion into European markets would become a possibility, increasing economic prosperity without straining water demand (Farm Irrigation, 1907). For education to improve the efficiency of irrigation and agriculture, professionals and farmers needed correct measurements of rainfall (The Christian Express, 1916). As stated previously, false measurements of rainfall and water levels led to the failure of dams and canals. It made it difficult to implement modern, location specific farming practices. If this information were accurate, farmers could alter farming practices and irrigation projects to suit the area, maximizing their usefulness. Another strategy was to make focus on soil remediation, targeting the ground during irrigation, not the crops. This improved the quality of the crops while reducing water usage. However, to do this also required the proper education. Farmers not only needed to know about their lands, but also how much water was the right amount, how much was too much, how to grow healthy crops, and instead of just plentiful crops, what were the newest ideas in agriculture. They needed the most recent information on the mechanics of water to improve the condition of agriculture throughout the country (Irrigation Problems: Treatment of Soils, Best Use of the Water, 1910).

Curiously, William Willcocks also suggested educating farmers on how to set up and maintain irrigation projects in his early twentieth-century report, though it never appears to have been implemented. In it he suggested creating "model irrigation farms" to send farmers to work as apprentices. Willcocks does not specify if the education would have been for all South Africans or only those of European descent. However, given the racially biased attitudes expressed during his evaluation it can be presumed he meant white, British-descended South Africans. These apprentices would learn

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their craft under the supervision of experts in the field, then return home, educated on proper irrigation methods and ready to apply them to their own lands (The Irrigation Report, 1902). Why no one implemented this idea is uncertain. South Africa and Britain carefully heeded Willcocks' report in many aspects, but this suggestion received little attention. Perhaps they thought it economically unfeasible and the profits it would bring were not so great that they warranted its creation. This seems in keeping with the government's attitude towards irritation. As seen previously, there was great emphasis on quick, cheap projects, preemptively started before conducting proper research. The state remained unconcerned with irritation in the long term. Irrigation dealt with providing short-term relief to the poor and water-stressed areas. Irrigation schooling would not have immediately provided the same results as dam building or canal digging, the benefits of education took years to manifest, when apprentices had completed their education and applied it to their own lands.

Water inequality plagued South Africa during the early twentieth century. An arid climate and increasing water demand contributed to water scarcity. Access to water varied among people of different races. White populations possessed a distinct advantage over non-white populations when seeking water. White South Africans also benefited from public works projects aimed at increasing water security. Such public works projects included dams and canals and aimed to both protect against water scarcity and alleviate white poverty by hiring white workers and settling them near the finished projects. As apartheid began in the mid-twentieth century, water inequality remained stark and racially divided. Separate development increasingly marginalized black South Africans in their own, underdeveloped, and under resourced communities, whether in homeland areas or in segregated communities outside cities. Limiting water access became a popular technique for controlling restless populations (Piper, 2014). Droughts remained frequent and the climate arid, with little significant change (Wolski, 2018). The issues created by colonialism continued to cause issues for the country and its inhabitants throughout the 20th century. These include the reliance on large-scale agriculture, requiring the use of enormous volumes of water, in a primarily arid climate, and mining, which involved many ecological repercussions, and racial inequalities in almost every sphere of life.

Change and Continuity in Recent Years

Irrigation projects, well-sinking, reforestation, and government control of waterways, did not solve South Africa's water problem. For example, a severe drought in 1992 and 1993 cost seventy thousand jobs and shrank the country's GDP (Piper, 2014). In 2017, Cape Town faced a drought so severe that it had a "Day Zero," when tap water would be shut off and water rationed (Wolski, 2018, p. 24). Citizens would be forced to go to "military guarded standpipes" for water rations (Cotterill, 2018, p. 7). Despite the efforts to secure water at the beginning of the century, water security was still an issue when apartheid ended, and continues to be so into the present day. This section examines the role of water in South African society in the years following apartheid, including its environmental concerns, continued droughts, water inequal-

ity, and how modern South Africans view the ongoing crisis. I also restate why water is a social and environmental issue in South Africa, incorporating modern evidence to explain the water crisis. While discussing the underlying causes of water shortages throughout the country, there is a greater emphasis placed on scientific research because of the technological and methodological enhancements made since the early twentieth century. However, the most important underlying feature of drought has not changed: South Africa does not have a stable, continuous source of water, enough for both its people and its economy.

The fall of apartheid in 1994 ushered in a new era in South Africa, one where they would collectively address the inequalities of the past, including extreme water inequality. In the last days of apartheid, 70% of South Africans had access to a meager 11% of the water supply (Piper, 2014). The equalization process took many different forms when addressing social and political water concerns, such as the 1963 laws that pushed black South Africans to the "homelands" that struggled to maintain a regular harvest because of inconsistent and low levels of rain, educational and legal restrictions that favored white people, and lack of water control infrastructure in black communities (Brown, 2013, p. 274). Unfortunately, reforms were not always successful. Despite living in a nominal state of equality, marginalization of certain groups continued, forcing them to compete with those who had superior resources and understanding. The struggle for water equality is ongoing. Even during the most recent Cape Town drought, cries of inequality rang out. The situation is constantly developing as the country struggles for both equality and a sufficient water supply.

Initially, Nelson Mandela's new government created the Reconstruction and Development Program to guarantee access to clean water for all. The plan was to occur in phases, the first being to provide at least twenty liters of water a day to every person within a radius of six hundred feet. Future phases planned on increasing the quantity of water and bringing it into homes. It also included economic initiatives to remove some burden placed on poor black communities marginalized during the previous system (Piper, 2014, p. 105). In 1998, the National Water Act addressed similar issues. This act developed logical goals, established water as a "national asset" and did away with previous "riparian rights" (Brown, 2013, p. 271-279). These goals included equal water access, sustainable water supplies, water control, protection of irrigation works, maintaining a clean and healthy water supply, and more (Woodhouse, 2018). Whether these goals have been met yet or will ever be completely achieved is up for debate. However, the chronicling of these desires shows that the country is both recognizing and taking steps to change its past water inequalities.

Despite a shift in government, some of the country's most vulnerable view newly implemented water control measures as a new apartheid. Instead of discrimination based on color, it featured discrimination based on wealth. The poor consistently went without, while the rich enjoyed their luxuries. Water was accessible in rural areas and informal settlements, but only to those who could pay. While certain individuals found this tolerable and an improvement, others could not afford it. Instead,

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they walked to rivers or watering holes, knowingly collecting dirty water because they could afford nothing else. The change in policy, brought about by apartheid's end, signaled vast social changes. The government promised everyone access to basic services such as sanitation and clean water, but the government wanted the poor to pay for these basic services. Water, specifically, was brought to new areas under the impression that the price paid by users would be enough to cover all costs, if not make a profit (Thompson, 2003).

Water payments became the standard for all South Africans after apartheid. With the shift to democracy, the country gained access to loans from the International Monetary Fund (IMF). South Africans needed the money to forge the new democratic society Mandela had dreamed of, but there were drawbacks. One condition for accepting the loan was paying back the debts of the old government, including those generated by water. After making the deal with the IMF, businesses entered black communities to extract the owed money. It privatized water. A company called Suez took control over Johannesburg water supply in 2000, raising prices by 55%. In the new system, townships faced consistently higher price increases. Companies gave some residents massive bills for past water use they had no hope of paying, others could not even afford to pay the initial connection cost. They added additional expenses to cover the cost of the Lesotho Highlands Water Project. This project was one of the largest water diversion projects in the world. It takes water from the water rich Lesotho and supplies it to South Africa. When it displaced many Lesotho residents they protested, until the South African military was brought in to end the resistance, killing at least seventeen people. The project is believed to have further impoverished the country. The added costs of the Lesotho Highlands Water Project had disastrous side effects. The World Bank recommended threatening to cut the water supply if people did not pay. Suez did so without warning. After water payments joined with housing payments, Johannesburg was able to use a violent security company to evict those who did not pay. The result of placing the weight of old debts on the poor was that, following apartheid, up to ten million South Africans went without water and the number of people with access to water decreased (Piper, 2014).

When water payments continued going unpaid, Suez introduced a meter system. This system involved placing meters in homes and communities which would turn on the water supply when paid for at the meter (using tokens). Britain banned the same system because of the public health concerns involved, such as not flushing toilets. Meters also posed a safety hazard, as house fires could not be put out if they did not own enough tokens (Piper, 2014). Soweto residents felt discontentment with this system and resisted the commodification of water in their community. The community was given water infrastructure but expected to pay for it after an individual used a certain amount. The water meters installed generated animosity from the residents who saw them as new tools of control. The idea behind them was supposedly less malicious. The government believed that part of being a dutiful citizen included contributing money towards the public good, therefore water was a right for those that were dutiful citizens. Meters also encouraged residents not to waste water needlessly, believing that

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if they used it smartly, they would not go over the free limit. This encouraged water saving practices unfavorable for the community including less bathing and cleaning, and water reuse (Dawson, 2010). The environmentally friendly nature of these meters is questionable. However, this was how Suez marketed them, though it is unclear if they produced any environmental benefits (Piper, 2014). After gaining access to new rights and services after apartheid ended, not being able to afford the services frustrated the community. As some of the country's poorest, they did not have the financial means to bear this additional burden. It did not help that post-apartheid governmental policies designed to create more jobs, primarily created low-wage ones, where the workers could not make enough to sustain a healthy lifestyle. It also excluded them from fully enjoying their newfound citizenship. Indeed, the reality for many of the non-white poor was that the end of apartheid did not affect them strongly. Where once they faced exclusion because of race, they now faced exclusion because of money. They could not afford to pay the price of citizenship (Dawson, 2010).

Institutionally, water management suffered under the new government. The Water Users Association (WUA) disagreed about its day-to-day operations, preventing it from creating much needed change. Sometimes, control of local water supplies rested with multiple governing bodies. The overlap between groups caused tension between them and confusion all around. The Inkomati area saw this when the Department of Water Affairs and Forestry and irrigation boards argued over the purpose of the WUA. The result was that the irrigation boards did not deliver the funds to the Catchment Management Area, which hindered water management (Woodhouse, 2018). Often, this separation allowed for the exclusion of marginalized groups from water discussions (Woodhouse, 2018). Likewise, the organizations involved with water allocation created an at least seven-year hold on new allocations to black farmers because of a disagreement about whether the water supply could support a greater demand. Such a disagreement occurred despite there being evidence that aspiring black agriculturalists from homeland areas face greater challenges to receiving water than those with pre-existing claims to it. In other words, the system in place makes it easier for people with water access to keep it than for those seeking new water access to gain it (Woodhouse, 2018). The restitution process also suffered because of issues with farm ownership changes. Of the redistributed areas, many of the farms set up on the land could not endure the turbulence of the time and ultimately collapsed (Woodhouse, 2018).

Socially, the country was not ready for such a big shift. As previously mentioned, diversity initiatives struggled to meet their goals and relevant parties in water decisions faced exclusion. Issues also arose because of misunderstandings between those trying to share water control, and those being introduced to it. Central to this topic is that for many black South Africans, their primary concerns involved daily necessities, such as jobs, housing, food, and water, which the privileged elite in government were liable to overlook. Uncommon life experiences between the two groups created ideological rifts in inclusivity initiatives. The greatest obstacles in participatory water control was reconciling the ideas of experts with the needs of the people (Brown, 2013). When blacks were incorporated into the decision-making process, they remarked upon their

confusion with the discussions and how they felt out of place (Brown, 2013). Legally now allowed into powerful spaces, the environment remained hostile to their presence. Poor communication between governing bodies and the communities they were trying to help heightened tension in this situation (Brown, 2013).

Efforts to provide a voice to black farmers could be abused. Instead of creating outlets for them to list their concerns and demands, the situation allowed for governing bodies to speak for them (Woodhouse, 2018). There was also the possibility that water redistributed could end up back in the hands of white farmers. This was a possibility because the legal framework of water control did not adequately protect black farmers (Woodhouse, 2018). The difficulties in revising a decades old system that supported racial separation made immediate equality measures tricky. Conflict existed between the immediate desire for greater equality and the harsh reality that dismantling the system in place would take time. This was a central problem of water reform in the years after apartheid. The entrenched white power over water control, established during apartheid, continued afterwards. It limited the amount of progress possible, while creating a confusing environment for those that sought the basic right of water access. The efforts to implement participatory control over water failed because of prior power imbalances. Those who gained power during the apartheid era used it to stay in control afterwards (Brown, 2013). Beyond direct control of water, power over other resources, such as water specialists, remained with a primarily white population (Brown, 2013).

The continued water inequalities throughout the country created many social repercussions that strongly affected non-white communities. In 1992, at the end of apartheid, *The Times* published an article detailing South African's concerns and issues that came with a strained water supply. As people realized the population and standard of living, including water use would continue to rise, fears grew about the water supply drying up, predicting it would be completely gone by 2010. In homeland areas, residents relied on water trucks to supply water, which often involved waiting in lines and made communities reliant on fickle governmental institutions. Years of low rainfall created drought refugees, hoards of people fleeing their homes in search of water. These conditions heightened social tensions, with urban and suburban whites fearing their cities would become overrun with refugees in search of water (South Africa fights "water apartheid," 1992, p. 7).

Water inequality extended beyond simple access to water, following apartheid. The safety of the water varied from place to place and was more likely to be "unimproved" in homeland areas, impacting the health of the residents (Mettetal, 2019, p. 18). Pollution from dams, specifically, seeped into the water supply to the detriment of homeland communities. The tainted water supply caused an increase in infant mortality of up to 20% (though the prevalence of HIV/AIDS in the communities may increase this number) (Mettetal, 2019). Curable diseases are common in makeshift communities with deplorable living conditions. Among the more common causes of death of South African children is easily curable illness such as diarrhea or pneumonia

(Mathee, 2011). A 2001 cholera outbreak demonstrates the impact of water access on public health. Cholera, a disease transmitted through impure water and food, is fatal when the infected cannot retain enough water in their body, making it especially dangerous for communities that must walk long distances to reach potentially contaminated water. It was devastating in the poorest areas of the country, including rural areas with limited access to clean water and people living in very close proximity (Kline, 2000). Poor sanitation practices on behalf of water service companies facilitated disease outbreaks. Suez, the company that controlled water in Johannesburg, was also responsible for water treatment. It implemented unsafe sewage systems that allowed waste water to contaminate the rivers. It also required users to unblock their own sewage systems by removing waste with their own hands (Piper, 2014). Access to clean water for drinking, cooking, cleaning, and sanitation, could limit the prevalence of these diseases, as well as helping the ill recover.

Water safety is also compromised in areas that were the site of large mining operations. Mines can lead to acid mine drainage, which compromises a region's water supply. This problem is experienced all over the world, though is particularly problematic in South Africa, which experienced extensive mining during the colonial period, and is a water scarce country. Acid mine drainage occurs when metals exposed by the mining process mix with water and air to form sulfuric acid and dissolved iron. Once these chemicals have entered the water supply, they facilitate the dissolution of other heavy metals present in mines. To prevent flooding, early mines relied on gravity drainage, allowing for water to become contaminated as it ran through the rubble and then entered the water supply (What is Acid Mine Drainage, 1994). In South Africa, acid mine drainage occurred not just from the mines themselves, but also from the piles of debris created when gold was removed from ore (Gonah, 2016).

Acid mine drainage correlates with a host of water problems. The most direct is the elevated levels of sulphates and heavy metals. It hinders growth of plant (aquatic and otherwise) life, and subsequently animal and human life. At the level detected in some areas of South Africa the water is not safe for any use at all, from drinking to cooking to bathing. When the contaminated water flow reaches carbonate aquifers, the reaction of the two induces sinkholes, destroying precious aquifers in the water scarce landscape. It may also increase the rate of water contamination (Gonah, 2016). The cumulative effects of acid mine drainage make it one of the greatest threats to water security in South Africa. The combination of water scarcity and water pollution is potentially deadly to many of the country's most vulnerable including those in homeland areas. Those in water strained situations may face the choice of either drinking contaminated water or surviving with no water at all. Drinking the contaminated water may cause serious health concerns that are difficult to fix for those with limited access to the proper resources.

To address water inequalities required significant water reform. Woodhouse lists four major areas of water control in need of reform in the years following the end of apartheid, that sum up the obstacles the country must overcome to achieve equality. These

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included systematic inequality of access to irrigated water supplies, "institutional dualism" that separated water access (specifically regarding large-scale farming) between white farm lands and 'homelands,' effects of land restitution claims on racial makeup of water and land access, and lack of diversity in the governmental organizations that controlled water (Woodhouse, 2018, p. 14). These areas of concern cover the most deeply rooted issues with water inequality that the country faces. Without addressing these issues, water equality is impossible. To fully overcome them will take years of work that continues to this day.

Fixing the first two areas of concern required the country to examine water and land access. Water reform came tied with land reform. People could not question the racial divisions of land without also considering water distribution between people of distinct races. Some suggest that water inequality was greater than income equality, though it would be more difficult to create water reform than land reform. A first step towards land, and therefore water reform, was to address the 1913 rules about land owning. In this new era, the country strove to give land back to its original inhabitants by providing government help in buying it. It also tried to improve "tenure security" for those on the "homelands," (Woodhouse, 2018, p. 5). The Land Reform Act and Extension of Security of Tenure Act of 1996 and 1997 respectively, both aimed to "protect farm workers from eviction from houses and land they occupied on the commercial farms where they worked," (Woodhouse, 2018, p. 5). The Extension of Security of Tenure Act (1997) acknowledged previous legal inequalities concerning tenure and land owing. It prevented unreasonable evictions off of tenured property because such evictions harmed individuals and society. While these measures did not directly address water issues, the land that was being redistributed most likely had access to greater water resources. The white farmers could have been the descendants of those who had built and settled along irrigation projects, reaping the rewards of water control. They had greater access to water than existed in the 'homelands.' Providing for land and housing security on the homelands protects a vulnerable population from homelessness and from losing meager water sources they have access to.

White farmers took part in solving land restitution claims, the third area of water concern, by willingly selling their land to the government who gave it to black South Africans who made claims to the land. This process saw initial success (meaning that redistribution of sizeable portions of land occurred) with later setbacks, such as the failure of farms on redistributed land and decreased land productivity (Woodhouse, 2018).

Water control diversity, like land distribution, saw both successes and failures. Governing bodies made efforts to be more inclusive, but misunderstandings and general confusion prevented true inclusivity. For example, for years the Water Users Association fought about its governance, membership, and its role, slowing diversity initiatives. Misunderstanding between specialists' ideas and local needs existed. They recognized small scale agriculture as important but received no actual help in getting the water needed for it to succeed. These factored into the lingering water inequality

issues and illustrate one of the fundamental themes of water use after apartheid: the nation nominally sought to provide fair water access, but struggled to make any real change. At every step there were setbacks that delayed or derailed promising initiatives. Even matters as basic as quantifying water use and availability in specific areas required more resources than provided. The Inkomati area saw a similar issue. The Inkomati Water Management Area struggled with the mandatory reporting of water use (including the amount used and its source). To verify the data, it used satellite imaging to estimate the amount of irrigated land on a property. However, this process was financially draining and slow. It was so ineffective that in seven years (from its beginning in 2004 to 2011) the project redistributed absolutely no water "from existing commercial agricultural use" (Woodhouse, 2018, p. 15-22).

In some areas, there was tangible evidence of change. Rural regions of the country slowly gained access to running water, a desirable alternative to community members trekking to local sources. By 2000, new water infrastructure for distribution and filtration throughout the countryside of the Eastern Cape brought water to over 600,000 new users. Water still came from the river, only cleaned, filtered, and available in the community for the first time. Education about how to use the system and what they were paying for allowed for the indoctrination of the system, proving that education can be successful in instigating change. Explaining what the purpose of the payment was critical as during apartheid the few people with access to running water during apartheid would often not pay to express their frustration with the government and the services provided them. Retaliation came when the government shut off the water supply to misbehaving communities. Under the alternative system the installers explained that the charges were maintenance costs, not taxes. The benefits of local clean water sources were many, including saving people time by not having to walk to rivers and carry water back and preventing disease stemming from impure water consumption (Kline, 2000).

Following apartheid, South Africa struggled to achieve water eqaulity. While some efforts were made, including implementing new laws and allowing for diversity in water management, the situation saw little improvement. Maginalization of non-white groups continued, only now based on financial status instead of race. Efforts to correct the wrongs of the past, by either resdistributing land or incorporating non-white groups into water discussions failed because of miscommunication, confusion, or legal difficulties. The government failed to protect the intersts of all its citizens in the years following apartheid, and so water inequality remained.

Drought in the Present Day

Consider two recent rainfall records for Cape Town. In 2013, 1,100 mm of rain fell, while 2014 experienced less than half of that, only 500 mm. This is not a normal drop in the amount of rain received. Combined with poor water management and "over-exploiting most of its river systems" the country is in a precarious situation, needing to balance its water needs with a dwindling water supply (Cotterill, 2018, p. 7). This

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type of shortage is an exceptional instance. The country had seen droughts before, but none this intense, and not in recent memory. Rainfall levels in 2017 may be the lowest seen since 1933 and the three-year period from 2015 to 2017 collectively received the lowest rainfall of any three years ever recorded in the 87 years of data collected. Statistical analysis of rainfall levels suggests that this period displays the lowest levels in 311 years (Wolski, 2018). By mid-2018, there was enough of a recovery to push "Day Zero" off until 2019 (Stoddard, 2018). But it never came. Imposing strict restrictions on water use (each person was to use only 50 liters of water a day) seems to have paid off (Stoddard, 2018). The crisis seems to have been averted. There is no longer a "Day Zero," though water remains a concern. Readings of dam water levels for early February 2020 have shown a significant increase from the same time in 2019, yet with a drop in levels from earlier in the year (Head, 2020).

The unusually strong El Niño occurring in the Pacific is one of the immediate causes this drought is thought to be linked to. Yet, the impact caused by this heightened El Niño appears to be greater than the impact caused by similar strength El Niño events of the past. Low planetary current circulation from surrounding oceans worsened the drought by preventing moisture from reaching South Africa, as well as a strengthened circulation from northern parts of the continent (Blamey et al., 2018). Besides drier than normal conditions, the area experienced unusually high temperatures (*El Niño*, 2016). These factors influenced all of southern Africa, from South Africa to Madagascar and Swaziland. They all faced drought during these years, which wrought havoc on the agricultural sectors of their economy and the people who did not have the water they needed. Cape Town receives much attention because of its unique situation as a large, urban area without the resources to water its population. The extreme shortage in Cape Town may also be linked to its comparatively small (800 square km) water system that feeds it, making it susceptible to local climate conditions, and prone to drought (Muller, 2018).

Climate change is a popular explanation for the recent water crisis. Early analysis of South African weather patterns suggested this was a cause of their troubles, and that thinking remained throughout the century. There is some evidence that South Africa is experiencing gradual desiccation, with meteorological models expecting Cape Town to experience a decrease in rainfall levels by 2050. The fickle weather patterns that accompany climate change could prove detrimental to the situation (Muller, 2018). The South African Department of Environmental Affairs expects the country's water supply to be the most sensitive area to climate change, causing powerful storms and unpredictable rainfall, as well as shifting runoff and soil conditions. In its 2016 report on National Climate Change, it dedicates an entire chapter to drought, the only weather conditions to receive such recognition (South Africa Department of Environmental Affairs, 2016).

However, climate change is not the only factor that led to "Day Zero." It may not even be the most significant. South Africa has experienced severe droughts consistently throughout its history. In the early 1900s the government reacted to water shortages

by implementing irrigation projects, such as dams and canals. But these projects were poorly designed and carried through. Many of them failed to ameliorate water shortages. They forsook long-term benefits by hastily starting projects they could not use or complete, for short-term gains such as employment of poor whites. More recently, efforts to maximize water resources to meet demands from expanding industry and population shifted their focus to conservation of water and management of demand. Consequently, dam building in the early 2000s slowed, leaving the country vulnerable to water shortages. In 2009, the possibility of a drought in Cape Town received attention along with possible solutions, yet nothing occurred because of the cost associated with the projects (Muller, 2018, p. 175). One culprit that received blame was the Western Cape Water Supply System, which was accused of "poor planning and mismanagement," and failing to take the steps necessary to prevent drought on such a scale (Wolski, 2018, p. 24).

AN EQUALIZER OR PERPETUATOR OF INEQUALITY?

Individual views of the drought and water security varied. Some Cape Town residents insist that the drought has brought the experiences of the poorest to even the wealthiest parts of the city. Others suggest that it has increased the gap between the haves and the have nots. To answer whether water shortages are equalizing, one must consider South Africans' "normal" relationship with water. Experiences with water shaped what people determined to be water security or water scarcity. What was water scarcity for some, was security for others. For example, when water restrictions began, some felt it harshly, while others did not suffer. Those dwelling in temporary settlements or in townships regularly used less water than the amount allotted to the public during restrictions. Water scarcity is also a matter of how it affects people's daily lives. It is determined by how much or how little water is accessible to those who need it (Meissner, 2018).

In the most unequal country in the world, water access varies dramatically. One source estimates that out of the 4 million inhabitants of Cape Town, one fourth of that (the poorest and most vulnerable) use 4.5% of the water resources. These are the people living in temporary settlements who had limited access to water to begin with. The ones most impacted by the drought are the middle class or the wealthy, who live in suburbs and can normally afford pools and gardens. Wealthy families are used to water always being there, they turn on the tap and the water flows. But the drought changed that. They could still turn on the tap, but only for a few brief seconds. Water was a national issue, not a household one and water conservation a priority. This strongly contrasts those who lived in informal settlements, like the townships. Inhabitants did not have the luxury of individual faucets. When they need water, they visit communal taps. Instead of using showers or bathtubs which rain down a seemingly endless supply of water, they use the water they collect in kettles and basins. One resident recalled having to switch from cleaning herself with two kettles to one kettle of water (Janssen, 2018).

The equalizing nature of this drought is brought to light when considering the racial intricacies of water access that existed before it began. As mentioned earlier, informal settlements use far less water than wealthy urban and suburban areas. These informal settlements, or townships, are predominantly composed of black residents and people of mixed race. Houses do not have running water inside them, so cutting back becomes less drastic. While wealthier areas must adjust to not flushing toilets or taking long showers, the inhabitants of townships never had those luxuries accessible to them. They also are used to lining up and waiting for water at communal sources that they then must carry home. Included in the plan for water use, if Day Zero ever came, was for water sources in townships to remain open, meaning that township residents never risked having no water at all (Seemungal, 2018).

Drought as an equalizer is illustrated by the social implications of the country's most recent drought. The people of Cape Town have seen a host of social changes since the drought began, impacting people of all races and statuses. The restrictions put in place to reduce water use were severe. The original water limit for every individual was 23 gallons per day, which changed to 13 gallons as the situations worsened (Janssen, 2018). The expectation was for the limit to fall to six gallons a day if nothing improved, though it never came to such extremes. To meet these requirements, residents of Cape Town had to forego washing dishes, using showers, baths and washing machines, and flushing toilets. They have been creative with using and reusing the precious water they have, including flushing the toilets with "gray water" collected from bathing or cooking. One resident noted that they had not flushed the toilet with tap water for over three months. Water wasting activities including washing cars and watering gardens were prohibited and anyone found violating these restrictions would be fined. The only way to continue with these activities was to buy water from elsewhere (Seemungal, 2018). But, residents of townships have faced similar restrictions for years, without drought restrictions being in place. When metered water came to Soweto, part of the education that came with it included water saving methods frequently used in the drought. A booklet distributed suggested measures like washing children together, turning off showers between rinses, and watering plants with recycled water (Dawson, 2010). These methods aspired to help save water and save money for the residents, unlike later restrictions which were only to help save water.

Unfortunately, water scarcity has changed cultural practices and weakened ties among kin groups and close friends, even while improving inter-class relationships. Insufficient water access left certain cultural practices in question. Communities had to choose between participating in cultural events such as festivals and weddings that used water, or foregoing events altogether. One option included water loss (through washing and cooking) and the other a cultural loss (giving up cultural practices for many years risked losing that practice altogether). Also, constant dissatisfaction with government and society over water issues appears in community life. It seeps into how people treat their friends and neighbors, tainting relationships based on who seems to have more than others. Even when the differences in water use between people are marginal, that the people who are involved in getting water to underdeveloped areas

are inaccessible and unable to listen to complaints creates bitterness throughout the community.

Individual relationships also experienced strain when community members turned away friends or extended family members in need of water, in order to keep their own family satisfied. Water costs and low supply made water too scarce to share among too big a group (Dawson, 2010). Withering of social networks was a process that began far earlier than 1994. With the rise of industrialization in South Africa, hoards of landless, unemployed, wandering masses changed community structure, as did the growth of slums (Heribert & Moodley, 2005). High levels of competition for work and few resources separated individuals from those around them. As with water shortages, the result was that households and individuals in a normally very social, interconnected community, turned inward, reducing their social presence to keep their needs met. This was a serious loss for poor South Africans, who often relied on extended social networks in times of crisis and demonstrates the expansive impacts of water shortages.

Tight water restrictions have caused rippling effects in South African society. Organizations installed tanks all over the cities and countryside to collect as much rainwater as possible. They were placed everywhere from malls to universities. Residents have been turning to natural springs, such as the Newlands Freshwater Spring near Table Mountain to supplement their water supply. They come with buckets and trucks to fill with water, though the possibility of overuse is always present (Seemungal, 2018). The drought brought about unprecedented water equality. Everyone had to adhere to restrictions, everyone took part in saving the city from Day Zero. When South Africans stood in line for water, they stood with the rich and poor, people of all races, backgrounds and social class. The primal need for water transcended all other differences.

Conclusion

Day Zero was the culmination of years of rain shortages throughout the country of South Africa. The drought that cultivated it was the latest in a series of droughts that stretches back far into South African history. While the cause of this drought is arguable, the pattern of drought seems to result from the country's arid climate. This climate promotes prolonged periods of dryness, with intermittent rainy seasons that do little to improve water problems. The drought that caused Day Zero is also the result of an arid climate, though the severity incorporates other factors. These may include an unusual El Niño effect, poor water management, and an increased water demand from an increasing population and standard of living. The exact cause is nearly impossible to determine, but it is likely that all three of the aforementioned factors played a role in bringing about Day Zero.

Day Zero and the accompanying drought highlight certain aspects of water control that have survived in South Africa since 1994. The impact of water restrictions put in place to prevent Day Zero have been felt more strongly in wealthy, often white, sub-

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urban, and urban areas than in informal townships and rural areas (including home-lands). This is because the South African middle and upper class used more water be-fore the drought, for gardens, pools and lengthy showers, which they no longer have access to. Conversely, the lower class, including those in townships and homelands, may not have had access to clean, running water before the drought. Even a thirteen gallons a day water limit, may not have been unusual in such areas. An explanation for this involves a historic look at the location of water and its cost. Before and dur-ing apartheid, distribution occurred along racial lines. White areas benefitted from government provided water services more often than non-white populations. In the early era of dam building, they were the targets of settlement projects where they were expected to settle land alongside the dams and canals they were employed to build. The 1913 act that pushed native black populations to the undesirable homeland ar-eas heightened water inequality, as it kept comparatively fertile and irrigated lands in white hands. Areas that possessed access to clean, running water from taps, felt frustrated by them. They saw them as a method of control, something for the apart-heid government to shut off until communities fell back into line. This relationship changed little after 1994 with the privatization of water. The companies given control over water may have built more water infrastructure, but they turned it off as soon as people could not afford the expensive costs. These costs disproportionately impacted black populations in homelands who consistently saw a greater price increase than other areas. These factors have contributed to rural and informal settlement commu-nities using less water than suburban and urban areas.

It is possible that the lower class is more vulnerable to water shortages. They may suf-fer if they cannot transport themselves to a spring or buy water from outside sources. They may also be more dependent on it if, for example, they run a small car washing business or rely on a small garden. These are real reasons that suggest that, while the drought impacts everyone, it does not impact everyone equally. Despite such intrica-cies, the general opinion is that water restrictions have provided a measure of equality across all social classes. This illustrates a point many have made, that drought has been an equalizer in a historically unequal country. Water shortages, though unfortunate, have brought people of all races together in an unprecedented way. Saving water is a struggle everyone is engaged in.

The water shortages seen in the most recent drought are tied to decades of govern-mental policies. Historic records show that the natural process of climate change was suspected of causing water shortages, though the primary cause may be more closely linked to human activity. Human activity in this case relates governmental policies of how they controlled water and how used land. Key water policies arose in the early twentieth century while Britain was consolidating its power over the country. The decision to turn South Africa into a source of mineral and agricultural wealth created a lasting impact throughout the region. Intensive mining for gold and diamonds had long-term health consequences when heavy metals contaminated the water supply in a process called acid mine drainage. Large-scale agriculture applied permanent stress on the water supply. Before British control, people living on the land were pastoral,

nomadic, or used small scale farming. The primarily arid climate seen in South Africa was (and still is) not suitable for such intensive farming without extensive infrastructure to control the needed water. Other solutions for water scarcity included planting forests to hold water in the ground and educating farmers on efficient farming methods, but few saw large scale implementation and success. Many water public works projects began but remained incomplete or were unsuccessful. They faced issues because of poor planning, lack of understanding of the terrain, and insufficient funds. These projects were implemented with racial biases in mind and benefited white populations while further disadvantaging non-white residents. One of the most influential government actions was the 1913 act which created homeland areas for black South Africans, pushed them onto undesirable land to give white settlers better access to arable, irrigated farmlands. Other actions included hiring only white workers to work on projects and giving the irrigated land from the projects to prospective white farmers. These actions resulted in a racially divided South Africa with high levels of water inequality and an inadequate ability to supply its residents with enough water.

Early 20th-century, racially-biased governments created a framework of inequality and prejudice that limited non-white access to clean water. This era saw the establishment of prejudiced policies, such as the preferential treatment of white workers and enhanced water access to white farmers, that created a lasting impact throughout the country. In 1948, the apartheid government inherited this racially biased framework and continued to expand upon the precedents it set. This included limiting non-white population's access to water and further maginalizing indigenious populations onto undesirable, water scarce land under the guise of separate development, a policy that had its roots in the 1913 Land Act which created "homeland" areas. Water inequality continued throughout the century until the fall of apartheid in 1994 suggested change in the country. However, change has been slow and the past inequalities and ongoing water difficulties (such as droughts) hinder water equality amongst different races. In the future, the country will continue to struggle with the legacy of colonialism and apartheid. The growing population and standard of living will continue to strain the water supply. Water control measures are of paramount importance to protect against these factors and reduce the chances o future water scarcity.

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A Comparison of Native and Invasive Plant Species Microhabitats in Western New York

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sponsored by Suann Yang

ABSTRACT

Across the United States, invasive plant species have had significant negative environmental effects due to certain unique characteristics they possess. Extended leaf phenology allows invasive plants to retain their leaves longer during the late summer and fall months, outcompete native plant species and provide cover for seed predators that would be vulnerable under its absence. Our past research concluded that the extended leaf phenology of invasive plant species *Lonicera maackii* (Amur Honeysuckle) reduced seed predation, which may be due to cooler and less favorable microclimates for invertebrate seed predators. In Fall 2019, we conducted a field experiment to observe the microhabitat preferences of snails. Snails consume leaves, fruits, and seeds, as well as being sensitive to the temperature, moisture, humidity, and light of their surrounding environment. In our study, we selected six pairs of invasive *L. maackii* and native *Cornus racemosa* (Gray Dogwood) throughout the Roemer Arboretum located in Geneseo, New York. Pairs were selected so both native and invasive species were in close enough proximity to receive the same environmental conditions (within 1 m of each other). Twice weekly, we recorded temperature, relative humidity, air velocity, light, soil pH, and soil moisture along with the number and size of snails found on the plant and within 0.3 m of its surrounding leaf litter. Preliminary results suggest that snail microhabitat preference was nonrandom with respect to the extended leaf phenology that *L. maackii* exhibits. We conducted a follow-up experiment to observe snail habitat preference in indoor enclosures. The snails were given the options between native and invasive leaves and branches, leaf litter from the field containing a mix of both native and invasive leaves, and individual leaf species litter (native and invasive separate). The snails moved from the native to the invasive environment and vice-versa, their movements appearing to be complex and variable but suggest preferences may be present. Thus, plant leaf traits appear to be an important factor in shaping microhabitat preferences for snails in invaded plant communities. As the

overall vegetative diversity decreases due to invasive plant species, increased shifts in microhabitat preference is likely to occur.

Across the United States, invasive plant species have had significant negative environmental effects. Extended leaf phenology allows invasive plants to retain their leaves longer during the late summer and fall months, outcompete native plant species, and provide cover for seed predators that would be vulnerable under its absence (Smith, 2013). My past research concluded that the extended leaf phenology of invasive plant species *Lonicera maackii* (Amur Honeysuckle) reduced seed predation, which may be due to cooler and less favorable microclimates for invertebrate seed predators. This led me to my research question: Do native and invasive plant species provide novel microclimate conditions and does this cause preferential habitat selection by invertebrate land snails? I predicted that there would be more snails found on invasive plant species due to their extended leaf phenology providing coverage later in the fall and conducted two experiments in Fall 2019 to test this prediction. A field experiment comparing the number of snails observed as well as the environmental conditions of six *L. maackii* and *Cornus racemosa* (Gray Dogwood) throughout the Roemer Arboretum, located in Geneseo, New York, followed by a cafeteria experiment—observing free-choice feeding—in environmentally controlled enclosures to observe snail preference of native and invasive leaf characteristics.

Methods and Materials

The field experiment was conducted in the Roemer Arboretum located on the south end of SUNY Geneseo in Geneseo, New York. In the fall of 2019, six pairs of invasive *L. maackii* and native *C. racemosa* were selected and flagged throughout the Roemer Arboretum. Pairs were selected so both native and invasive species were in close enough proximity to receive the same environmental conditions (within 1 m of each other). Two mornings each week, we recorded temperature, relative humidity, air velocity, light, soil pH, and soil moisture along with the number and size of snails found on the plant pairs and within 0.3 m of their surrounding leaf litter. An Extech 45170 Four in One Environmental Meter was used to record the temperature, relative humidity, air velocity, and light. While an Atree Soil pH Meter was used to record the soil pH and moisture. Microclimate conditions, snail presence, and snail size were all recorded in a spreadsheet, where a snail ID was assigned if a snail was repeatedly found on the same plant. Snails found were measured using a caliber, painted with nail polish, and numbered using a permanent marker for identification purposes, due to a concern that the leaf characteristics may be causing preferential behavior rather than novel preferred microclimates. A cafeteria experiment was conducted in which the environmental conditions remained constant and the leaf characteristics themselves were isolated. The snails were chosen at random and placed in enclosures inside SUNY Geneseo's greenhouse to provide more stable environmental conditions. The snail's enclosures had plastic bottoms lined with soil, with mesh walls and tops.

The enclosures were kept moist daily by spraying them with water after the data was collected. Three weeks of testing and observation for snail preference were conducted with a different variable being tested each week (*Table 1*).

Table 1.
Cafeteria experiment variables being tested

Date	Variable Being Tested
Week 1: 10/22/19-10/26/19	Native and invasive leaves on branches
Week 2: 11/2/19 – 11/6/19	Organic native and invasive leaf litter collected from the field
Week 3: 11/9/19 -11/13/19	Individual native and invasive leaf litter (native and invasive leaves kept separate

Enclosures were divided by cardboard walls, fitted to the enclosure with five "windows" cut in them to provide separate native and invasive leaf options. Snails could move freely between the two sides of the enclosure via openings in the divider. At the beginning of a test week, four yellow-painted snails numbered 1 through 4 were placed on the native side of the enclosure. Similarly, four red-painted snails numbered 1 through 4 were placed on the invasive side. Based upon their starting enclosure side, each snail's location was recorded every morning for a week to observe any movements between the "native" and "invasive" sides of the enclosure. A total of four enclosures were used per experimental week for replication.

Results and Statistical Analysis

Based on the field experiment data, of the plants observed with snails on them, a logistic regression revealed that snails are 2.44 times more likely on *C. racemosa* than on *L. maackii* (*Figure 1*, graph on left; $x2 = 5.14$, $df = 1$, $p = 0.023$). Of the total snails counted, there was roughly the same number of snails on *C. racemosa* as on *L. maackii* (*Figure 1*, graph on right; $= 0.52$, $df = 1$, $p = 0.4724$).
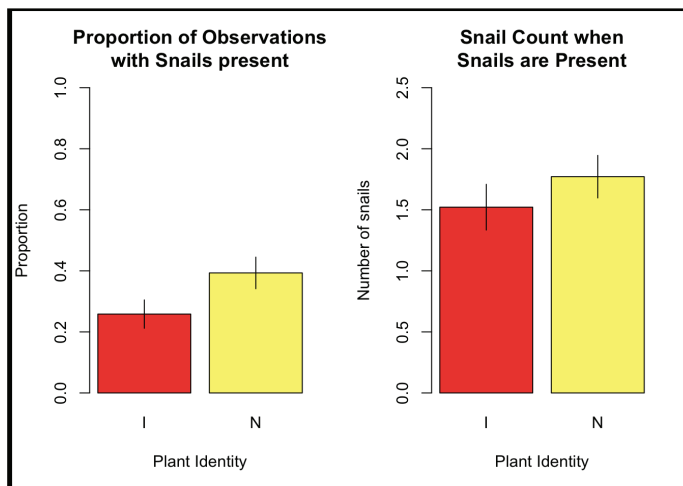
Figure 1. A logistic regression of the field experiment data

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A two-dimensional plot of the field experiment data shows 95% confidence ellipses of the six environmental components of the native and invasive plant pairs. Axes in the same quadrant are positively correlated, while axes opposite of each other are negatively correlated. The alignment of the native and invasive ellipses indicate that the environmental microhabitats are not novel, but very similar (*Figure 2*).
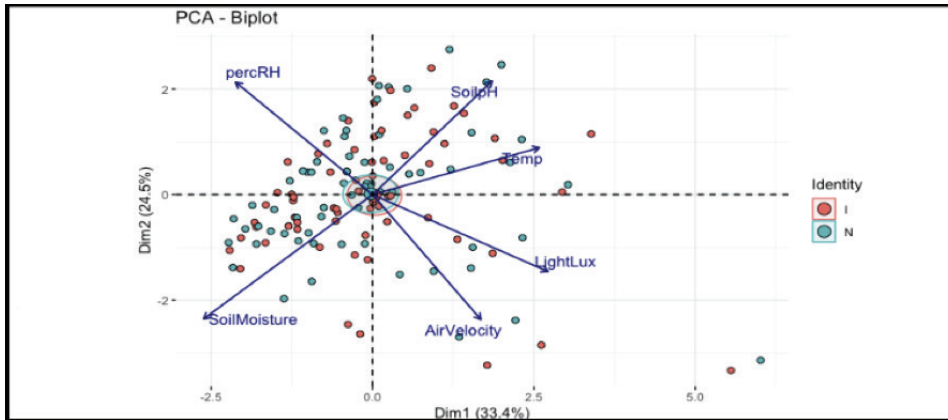
Figure 2. 2-D plot of the field experiment data

The cafeteria experiment data revealed an interaction between the original side of the enclosure the snails began on and the side the snails were later found on (x2 = 16.8, DF = 1, p <0.0001). The bar graph representing the cafeteria experiment data indicates that the snails generally did not leave the side where they started. This demonstrates that the snails did not show any preference for the leaf characteristics, regardless of the trial type for either the native *C. racemosa* and invasive *L. maackii* (*Figure 3*).
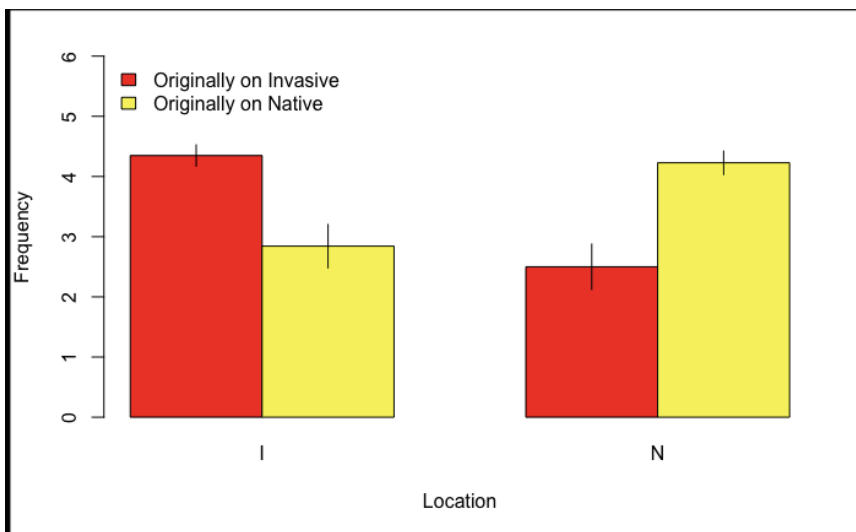
Figure 3. Logistic regression of the cafeteria experiment data

Both the cafeteria and field experiment were analyzed using generalized linear mixed effects models with binomial or Poisson errors. For the field experiment, plant identity (native, invasive) was a fixed effect, with date and pair as random effects. For the cafeteria experiment, original location and plant identity (native, invasive) were

fixed effects, with date and enclosure as random effects. The generalized linear mixed effects models were conducted using the *lme4* package (Bates et al., 2015) in R (R Core Team, 2017). Tests of fixed effects were obtained using the *car* package (Fox & Weisberg, 2011). To test for novel microhabitat conditions, we conducted a principal components analysis in R using the *prcomp* function and generated a biplot using the *factoextra* package (Kassambara & Mundt, 2020).

DISCUSSION AND ECOLOGICAL IMPLICATIONS

In the field experiment the snails displayed a significant preference for native Gray Dogwood (*C. racemosa*), only when observing both the presence and absence of snails. Of all the snails found on plants, there was not a significant difference in the number of snails found on either plants. The statistical analysis of the environmental conditions revealed native *C. racemosa* and invasive *L. maackii* do not create novel microclimate conditions. The cafeteria experiment revealed when environmental factors such as sunlight, temperature, wind speed, and moisture are kept constant, snails do not display a preference. This indicates that the specific leaf characteristics of the native *C. racemosa* and invasive *L. maackii* do not influence snail preference. These results show there is a preference for native *C. racemosa* demonstrated by snails, for reasons other than novel microclimates. I alternatively hypothesize that this preference may be due to the overall structural differences of the native and invasive plant, including how the snails are able get on the plant, the presence of a predator or competitor present on an invasive plant, or preference dependent on the snails being native or invasive themselves. This research experiment demonstrates that invertebrate seed predators exhibit plant preferences, in the case of snails for native plants. As invasive plant species continue to spread, they dominate the natural plant community and decrease the overall vegetative diversity, creating a less favorable habitat for most wildlife species (NRCS, 1996). A decrease in native plant species may lead to changes in microhabitats. This study demonstrates the importance and consequences of these changes for smaller animals. In the future, a repetition of this experiment during early summer months may reveal different preferences, as observations have shown that snails are likely more active during warm summer months.

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Taking Flight Reflection

Cooper Breed

sponsored by Mark Broomfield

Abstract

Taking Flight was originally choreographed by Mark Broomfield over fifteen years ago. The piece was solo work created for a young man exploring his place in this world and titled *La Pasion Coje Vuelo. Editor's note: This reflection gathers the thoughts and impressions of one of the dancers for the 2020 restaging.*

In the 2019-20 academic year, Mark Broomfield restaged *La Pasion Coje Vuelo* for the spring performance of the SUNY Geneseo Dance Ensemble. He reimagined and recreated this piece after casting Sonia Bartolomeo ('20) and me, Cooper Breed. Broomfield was able to take a piece he once created and rework it as *Taking Flight* to fit the current dancers.

Throughout the restaging process, we discussed the piece's original meaning and how the movement explores risk-taking and determination in pushing yourself to new heights. In addition to this, we were encouraged to form our ideas and messages. I interpreted this piece to surround this idea of taking in the environment around you and incorporating it into who you are, learning from it, and letting it make you stronger.

There were two distinct yet symbiotic parts when it came to developing and indulging ourselves in this piece. The first was creating a personal connection: How are we interpreting this piece and its movement? Further, how are we bringing ourselves to it? To facilitate finding answers to these questions, Broomfield asked us to bring in three artifacts from our lives that we felt represented who we were as individuals. The three artifacts that I chose were Buddhist prayer flags, a ceramic elephant that I had painted as a child, and a photo of my sister and me as young children. The Buddhist prayer flags are an homage to my Chinese heritage and they bring forward their many meanings. The ceramic elephant represents a playful and simplistic view of life. Last, the photo reflects the importance of family in my life.

The second part was to create a character to portray to bring that personal connection to life. How can we portray our personal connection through the movement? The development and creation of characters would allow for an emotional disconnection between

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ourselves and the piece. It allows for the vulnerability of the piece to fall on a fictional character, not on your own well-being.

One of the most powerful preparation exercises was to review the entire piece and assign motivation and purpose to each movement. We asked ourselves why the character moved in a certain way, and what caused them to do so. I was able to incorporate the meaning of my personal artifacts by applying them to my character and letting them influence the motivation. I let serenity guide my character and allow for those qualities to seep into my movement.

The solo performance and the film, shot and edited by Keith Walters and Mat Johnson, also became symbiotic parts. The solo work could be seen as the power of the individual, showing challenges and triumphs. In contrast, the film is a reflection of collaboration and friendship. Together the two parts bring forth a deeper meaning to the overall project. They are pieces that both challenge and complement the other.

I am very thankful to have had this experience during my time at SUNY Geneseo and to have an artifact such as this. I am also very thankful to be able to share this with one of my very first friends at SUNY Geneseo. As much as this piece was a solo work, it became a collaborative process between myself, Sonia Bartolomeo, and Broomfield. Sonia and I share a lot of similarities, not only in our interests, but in our values and lived experiences. I think it is these qualities we share that make the video artifact so beautiful and relatable to our audience.

A recording of Taking Flight *is available in the online edition of Proceedings of GREAT Day 2020, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/6.*

An Interview with Paul Schacht

Ethan Owens

Paul Schacht is Assistant to the Provost for Digital Learning & Scholarship and founding Director of the Center for Digital Learning

What you do as the director of the Center for Digital Learning?

The Center for Digital Learning is a new enterprise this year whose purpose is to help coordinate the work that has gone on at Geneseo over a long time across several different offices and departments. The aim of the Center is, first of all, to be engaged with all aspects of digital learning: online learning, what we might call digital pedagogy—which is where students in classes may use digital tools—and digital scholarship and creative activity, especially in the humanities and social sciences. Also, we convene conversations among people from all of these different offices, to get on the same page, to brainstorm, to plan professional development and events, to put on workshops.

How has the pandemic influenced digital learning at Geneseo? Has it made it more necessary or has it forced it into a campus-wide situation a little bit too soon?

If there is a silver lining in the pandemic—and I hesitate to even use that term—but if there's a silver lining, I think it's that it has made all of us realize how necessary it is for every higher education institution to be prepared to use digital tools in teaching, and to prepare students to be able to use digital tools in their learning. We've had to learn the hard way how to figure out things like ensuring that our students' online course experience is one where they don't feel that they've been set adrift to just learn on their own. Now that we're figuring that out, we will be much better positioned for the next emergency, but also better positioned to give students more choices in their learning when the pandemic's done. What if we still were offering some classes online so that a student would have a little bit more flexibility in their schedule? We haven't done that historically, and we ought to be doing that.

Do you think that our confronting these challenges with online learning has opened the door for maybe other digital learning opportunities in Geneseo? And if so, in what way?

Absolutely. I think there's a lot that faculty are learning to do in this online environment that they can bring into their in-person classes. Let's say you're teaching a hybrid course and you've got some students in the classroom, but other students who, because you're

alternating days of the week, are not in class. You don't want to leave out the ones who are not in the classroom, so maybe you figure out how to use Google Docs to have the students in the classroom and the students who are in their dorm rooms collaborate on something during the scheduled meeting time. Now, when the pandemic's over and maybe you go back to teaching entirely in person, you've got another incredibly powerful tool that you can use in the classroom with your students.

How do you think, or do you even think, that something like a virtual GREAT Day can impact digital learning opportunities?

A feature of in-person GREAT Day has always been the poster session, where you stand there next to a poster that you've created in the ballroom, and people come by and you talk to them about it informally. But you're only talking to a few people at a time, and you're repeating yourself over and over and over again. A huge benefit of that is the mix-and-mingle part of it. But we're not going to have that available to us in the virtual GREAT Day. What students *could* do, though, is, instead of creating large posters that stand on an easel, they could create some sort of experience online. They could create a deck of slides, they could create a video, they could create a website. And that could contain the same sort of information that before was on a poster. Now the question is: Well, so how do you do the sort of Q&A dimension of it? You have a scheduled time and you invite anybody who wants to at that time and maybe you get fifty people at once that you talk to in Zoom sharing your screen. The people you talk to, if you've got ten people in a Zoom, it might actually feel like they're more of an audience and they're closer to each other than ten people sort of congregated around a physical poster and some are up close to you and other people are kind of hanging back. I think there are opportunities to actually, with some sorts of events, create more of a sense of intimacy than you would think possible in a digital environment, maybe even more of a sense of intimacy than you would have had in an in-person encounter.

Do you think this kind of accessibility and intimacy can be used in other projects and if you can, could you give some examples?

So, imagine if in your in-person class you have a day where you're asking your students who have worked on some presentations to share them with the rest of the students in the class. So, three or six or eight students in the course of a class meeting, each come up to the front of the classroom, take the adapter, try to get it plugged into their computer, try to get the thing to show up on the screen on their computer, and they talk about it. What if, instead, you put all the students in a Zoom meeting and when it's your turn to talk about your slides you just share your screen with me. Everybody sees it on the projector. Only one computer has to be hooked up, and we can make our way around the whole group of people. That's an application of the kind of thing

that we might do in a virtual conference in GREAT Day that could carry over to our ordinary classroom interactions.

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Technology in Teaching Mathematics: Desmos

Cristina Gulli

sponsored by Melissa Sutherland

ABSTRACT

This paper centers on research-supported ways of implementing dynamic geometry software into mathematics courses, specifically into high school geometry. The Next Generation Standards state, "For scaffolding purposes, the use of a variety of tools and methods for construction is encouraged. These scaffolds include compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc. Dynamic geometry environments provide students with experimental and modeling tools that allow them to investigate geometric phenomena using visualization, reasoning, and geometric modeling to solve problems, in much the same way as computer algebra systems allow them to experiment with algebraic phenomena. Students can create geometric models and ideas to solve not only problems in mathematics, but in other disciplines or everyday situations." I discuss an overview of the research that supports the implementation of such mathematical technology to further student learning and achievement, as well as criteria for effective implementation of such technological activities. Moreover, this paper addresses the obstacles educators face when implementing technology, as well as suggestions to overcome said obstacles. Finally, I share a sample lesson plan (see Appendix B) using Desmos, a computer application created according to the research criteria that engages high school geometry students in exploration of transformations using dynamic geometry software.

Technology is constantly advancing and growing more and more prominent in our lives. Today's students are growing more fluent in technology. Schools have been trying to increase the incorporation of technology into classrooms for many reasons, motivation being one of them. Student achievement, attitude, and motivation are improved by proper incorporation of technology. Mathematics lends itself particularly well to the use of technological aids. Manipulatives are crucial to developing understanding in mathematics, as they allow for multimodal learning, which helps to build deeper conceptual understanding. Although not with handheld manipulatives, technological exploration is a useful way to explore mathematics. Technology gives the ability to look at multiple examples in a short period of time and manipulate the examples on the screen

to draw conclusions similar to handheld manipulatives. The issue surrounding implementation is that often teachers do not fully understand the technology themselves. The purpose of this project is to discover how to properly implement technology into mathematics classrooms and evaluate the resources available to teachers. After extensive research, we have come up with a comprehensive list of criteria for picking mathematical technology to implement and incorporating it into lesson plans and created a sample lesson using Desmos that meets these criteria (see Appendix C).

Importance of Technology in the Classroom

School boards are making a push to implement technology more purposefully into classrooms. The New York Next Generation standards states,

> for scaffolding purposes, the use of a variety of tools and methods for construction is encouraged. These scaffolds include compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc. Dynamic geometry environments provide students with experimental and modeling tools that allow them to investigate geometric phenomena using visualization, reasoning, and geometric modeling to solve problems, in much the same way as computer algebra systems allow them to experiment with algebraic phenomena. Students can create geometric models and ideas to solve not only problems in mathematics, but in other disciplines or everyday situations. (NYSED, 2019, p.125)

In other words, technology is essential to helping students look for mathematical patterns and develop problem solving skills. According to Sarama (2009), using computer tools, especially for geometry, makes students aware of the motions that are being performed (i.e. transformations). Moreover, the abstract nature of mathematics lends itself to the use of manipulatives so that we may develop concepts and understand said abstractions (Roschelle et al., 2010). Specifically, geometry concepts such as transformations are difficult to visualize without some form of representation, which cannot be given by textbooks (Adelabu et al., 2019). Since geometry is such a visual area, it naturally lends itself to the use of technology to create, view, and manipulate visual representations of the objects involved (Hollebrands & Dove, 2011). Moreover, Dynamic Geometry Software (DGS) provides new opportunities for students to engage in reasoning and sense-making activities (Hollebrands & Dove, 2011). When given time to explore with technology, students are guided to focus on the mathematical processes involved rather than the answers. The students are able to more clearly recognize patterns in the motions and develop a stronger conceptual understanding of the mathematical processes involved in the content being studied (Erlwanger, 2004). When exploring transformations with DGS, students can perform transformations with more accuracy, explore their properties, and consider what happens when two or more transformations are composed. Thus, students are discovering important properties on their own through investigation, which is essential to student learning (Hollebrands & Dove, 2011).

There are different types of knowledge: sensory-concrete, which is the need for sensory material to make sense of a concept or procedure, abstract, which is generalized and often symbolic knowledge, and finally integrated-concrete, which is a combination of the two (Sarama & Clements, 2009). Technology allows us to develop a combination of these types of knowledge, making the student's understanding of the material stronger. Moreover, computer manipulatives tend to be more user friendly because they are more manageable and precise for students. Additionally, computer manipulatives such as Desmos and GeoGebra provide immediate feedback, which allows students to monitor themselves and gauge their understanding as they go. Using such manipulatives allows students to replay, alter, and immediately reflect on a sequence of actions, and truly see how changes affect the transformation as a whole. The study conducted by Sarama (2009) showed that students with computer manipulatives outperformed their peers who were restricted to physical manipulatives or paper and pencil. Utilizing multiple modes of teaching, combining physical, technical and traditional methods will allow for more effective learning by the students (Roschelle et al., 2010). This ties back into the idea that fully integrated concrete knowledge is a stronger form of knowledge to have because it leads to deep conceptual understanding.

As Sarama's study showed, technology helps increase student achievement and attitude in the classroom. Technology helps learners and teachers in multiple aspects in the mathematics classroom, which allows permanent and effective learning (Adelabu et al., 2019). Using a different method of learning yields more permanent learning because it represents fully integrated concrete knowledge. The nature of educational technology such as Desmos and GeoGebra "helps teachers create learning contexts that were not previously possible with traditional teaching methods" (Eyyam & Yarata, 2014, p. 32). Technology opens doors for new paths of learning that facilitate creative and imaginative thinking. Students have an opportunity for individualized and flexible learning when technology is utilized in the classroom. Additionally, according to Eyyam's study, when technology is implemented properly and appropriately, it is guaranteed to have a positive impact on student achievement. In addition to positively impacting student achievement, technology has been shown to positively impact student attitude. Technology enhances students' motivation and helps make learning more engaging. It is important that students are familiar with technology before it is implemented into lessons, as this will make the lesson more enjoyable for the students (Eyyam & Yarata, 2014).

The Case for Dynamic Geometry Software

Often, teachers will try to fill the technology requirement with calculators, however research has shown that in order to truly benefit students, geometry teachers should incorporate Dynamic Geometry Software (DGS) into their classrooms. Adelabu and colleagues define Dynamic Geometry Environments as, "particular technology tools that have been used in the teaching and learning of geometry to assist learners in moving beyond the specifics of a single drawing to generalizations across figures and

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shapes" (2019, p. 54). The defining characteristics of DGS programs include a set of primitive objects, the ability to construct parallel and perpendicular lines, tools for performing transformations and calculations, ability to drag, measure, animate and hide objects, and finally an ability to create procedures (Hollebrands & Dove, 2011). Based on these criteria, Desmos can be defined as a form of DGS. GeoGebra is one of the most popular forms of DGS, partially because it is a free resource, and research has shown that it is more effective at enhancing the learner's performance and under-standing than traditional pencil and paper (Adelabu et al., 2019).

As stated previously, technology positively impacts learners' achievement and attitude in the classroom. Specifically, DGS is important to incorporate in the classroom be-cause it serves as an object of education, which affects learning objectives and serves as a medium to improve the teaching and learning process (Arbain & Shukor, 2015). They found that students enjoyed using DGS, especially when they were familiar with the technology being used: "Students in the 21st century are computer-literate and the opportunities to learn using technology support will attract major attention" (Arbain & Shukor, 2015, p. 212). Technology, when implemented properly, can sig-nificantly improve students' engagement and learning in the classroom.

The DGS primarily studied in this research was GeoGebra. GeoGebra is an action technology that provides new mathematical tools and scenarios that engage students in meaningful mathematical activity and problem solving (NCTM). Although I used Desmos to create the activity, most research available exists on GeoGebra. Desmos is essentially the same as GeoGebra, except instead of the activity being a worksheet, it is presented in slide form. With Desmos, the students can progress through the slides at their own pace in order to complete the activity and learn at a rate proper for them. The benefits of both GeoGebra and Desmos are that these websites are free, so schools can use them without having to purchase subscriptions, and students can access them outside of school. Due to the easy-to-use nature of GeoGebra, there is an online com-munity surrounding it, which allows educators to share ideas with ease. "The use of GeoGebra encouraged the [students] to take a more active independent role in their learning by answering a series of questions…fosters experimental, problem oriented, independent learning, and discovery learning of mathematics" (Getenet, 2018, p. 223). When interactive technology is incorporated into classrooms, research shows that students begin to take control of their learning.

Criteria for Implementing Technology

One of the key components to incorporating technology into the classroom is making sure that it is done effectively. Multiple studies presented criteria for effectively im-plementing technology. We will discuss the different guidelines presented and create a compilation of criteria that should be considered while creating technology-based lessons. Additionally, technology is versatile. It can intensify instruction, covering the basics of the material as well as more advanced topics all depending on the mode of implementation (Roschelle et al., 2010).

Beginning with the National Council of Teachers of Mathematics (NCTM) guidelines, when planning, one must first identify the learning objectives for the lesson. After this is done, a task must be created or modified that provides the students with opportunities to meet the objective and engage in reasoning and sense making to support learning as they progress through the task. Once the task is chosen, one must decide how to implement the lesson, this includes organization of students, presentation of the task, and time allotted to the task. At the end of the lesson, the teacher should manage class discussion regarding students' observations and conjectures and help them draw significant connections that they may have missed (NCTM).

Getenet recommends another checklist on how to evaluate the implementation of technology. This checklist is based on seven categories of the TPACK (Technological, Pedagogical, and Content Knowledge) model. First is knowledge needed to use a particular technology. This includes ensuring students have the skills necessary to properly use the technology, as well as ensuring that the knowledge and skills gained from the technological activity can be transferred to new situations. In other words, when implementing technology, teachers must make sure that they themselves and the students can use said technology, and that the proper supports are implemented throughout the lesson so that students can effectively learn from the activity. Next the teacher must have all students' learning styles in mind, i.e., knowledge about process and practices of teaching. Teachers should be able to incorporate real-world issues and solve authentic problems using teaching resources, address diverse needs of all learners by using learner-centered strategies, and provide equitable access to appropriate resources. A more self-explanatory criteria is that teachers must demonstrate knowledge of the subject matter to be taught. The teacher must have a solid understanding of the core principles and procedures involved with the subject matter in order to ensure that the technology being implemented in the lesson is appropriate to the overall learning goals. Thus, the teacher should include a clear introduction to the topic and learning goals, have sufficient knowledge of the lesson, demonstrate confidence in mathematical concepts related to the lesson, and use appropriate materials in relation to the lesson being taught. The teacher must next ensure that they have knowledge of how pedagogical approaches are suited to teaching the content. That is, the teacher must possess the ability to integrate teaching approaches that arouse creativity and apply teaching approaches, which give more authority to students in solving mathematics problems. Next on the checklist is reflecting on how technology and content interact in effective teaching. The teacher must understand how the subject matter can be changed by use of technology. There is a clear link between technological and mathematical knowledge. Teachers should design relevant learning experiences that incorporate technology used to promote learning and introduce fundamental concepts through exploration. Again, teachers must have knowledge of how to use the technology with different pedagogical approaches. Last, teachers must have knowledge that is more than the sum of the other three components. To make a proper choice of technology in relation to mathematics concept and pedagogy, teachers should integrate the components of the TPACK model in order to promote creative

thinking and apply TPACK to promote reflection and to clarify conceptual thinking. This full checklist can be found in Appendix A (Getenet, 2018).

The last evaluation method to be discussed is Kovacs' method for evaluation online educational materials. This is based on four general principles, from which he derives sixteen quality identifiers. The first principle is the *multimedia principle*. The educational activity should utilize both words and graphics rather than just words. Next is the *contiguity principle*, which requires that corresponding words and graphics are placed near each other on the page. The *coherence principle* requires an element of simplicity. Although it is tempting to add interesting material such as detailed textual descriptions, entertaining stories or background music, this can ultimately hurt the students' learning and should be avoided. Finally, we have the *personalization principle*, which states that the activity should address the students directly using a conversational style. These four general principles yield the three groups containing the sixteen quality identifiers. The first group is *layout*. The layout of the activity should avoid scrolling, have a brief explanation, require few tasks, and avoid distractions. The next group is *dynamic figures*. This group names a quality activity one that is interactive, easy-to-use, appropriate size, has dynamic text placed close to corresponding objects, avoids the clutter of static text, and is readable upon first appearance (is not overwhelming). Finally, the last group is *explanations and tasks*. All explanations and tasks should have a small number of specific questions that refer to the applet and vocabulary reflecting that the audience is the learners, as well as tasks, which include demonstration figures with no additional tasks or questions attached (Kovacs & Cole, 2019).

A comprehensive guideline blends these three guidelines (NCTM, TPACK, and Kovacs' method) together and includes mathematical viewpoint, pedagogical viewpoint, layout, dynamic elements, and instruction and text. It is important to keep everything that the NCTM, Getenet, and Kovacs discussed in mind when creating and selecting technological activities for the classroom. Doing so will ensure that the activity fits properly into the lesson, is used effectively, and is conducive to students' achievement of the lesson objectives. Additionally, there are some key steps to success when implementing technology. When learners have prior knowledge of how to use technology such as GeoGebra, the full potential of the discovery approach may be effectively realized (Getenet, 2018). Thus, the first step to successfully integrating a technology-based activity is having students familiarize themselves with the program. Next, one should go through the various check-lists and ensure that the technology will aid students in achieving the objectives for the lesson, that the activity satisfies the TPACK model, and that the activity is built effectively so that it will not be distracting to the students. Additionally, effective technology will "aid students in building, strengthening, and connecting various representations of mathematical ideas" (Sarama & Clements, 2009, p. 146).

As discussed in detail previously, DGS lends itself nicely to exploration. Additionally, DGS can be used for the pedagogical strategy called delayed scaffolding, in which

teachers do not immediately provide scaffolding to students. Instead, the students work independently while the teacher circulates the room. The teacher can ask guiding questions to lead students in the right direction. With this strategy, students can use the technology to explore what they have already learned in order to discover a deeper meaning. This is a metacognitive strategy because it puts students in charge of their own thinking and encourages them to become aware of their own learning.

Obstacles and Solutions

Since we have discussed effective ways to incorporate technology into a lesson, we now provide warnings about possible constraints or obstacles to achieving this. One more obvious obstacle is a lack of necessary equipment. Semenikhina suggests the BYOD (bring your own device) approach. With this, students can bring in their own cloud-based devices. Since GeoGebra (and Desmos) are accessible on any device, if only a handful of computers or iPads are available to the class, students may use their phones to complete the selected activity. Although this is not ideal, it is a solution for schools that cannot provide a personal laptop for each student, or for when a teacher simply cannot get access to a computer lab. Another obstacle is a lack of training for teachers (Eyyam & Yaratan, 2014). It is important to train teachers in these new technologies so that they can expertly and effectively incorporate technology into their classrooms (Kovacs, 2019). Lifelong learning and professional development can solve this problem. Providing teachers with the necessary information, aids, equipment and opportunities for professional development will ensure that they master the technology (Eyyam & Yaratan, 2014). Additionally, teachers should be fully aware and involved in the integration process to prevent problems. To avoid obstacles to implementing technology, teachers should practice "good teaching," which requires "an understanding of the representation of mathematical concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn, and how technology can help reformulate some of the problems that students face" (Kovacs, 2019, p. 137). Teachers must think through the application of the activity to the topic, why is the technology being used and how will it advance student learning. Finally, teachers must be able to identify the cause of student errors, since errors may simply be due to lack of understanding the technology rather than lack of understanding a concept (Kovacs, 2019). Additionally, students should be very familiar with technology as well, as this will help prevent errors in their work.

The Lesson and Activity

My research project culminated in an example lesson plan that incorporates DGS. While technology can be useful for all subjects of mathematics, for the purposes of creating a lesson, the topic I chose to focus on is transformation geometry. This lesson is an exploratory introduction to translations. Before considering an activity, I formulated the following objective for my lesson: Given Chromebooks, previous instruction on how to work Desmos, and an introduction to translations, students will

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explore this transformation as a function on geometric figures in order to complete an online task on Desmos which demonstrates how this transformation works and its various properties. The lesson focuses specifically on translations, so the key properties are preservation of orientation and size, slide by a vector (specific line length and slope), and that image segments are congruent and parallel (to each other and to the vector of translation). Once the objective was established, I began to create an activity on Desmos. Desmos was used instead of GeoGebra because it is also a free form of DGS, however it provides the teacher and student with immediate feedback, which is beneficial for a classroom. Additionally, the teacher can pause the slides, in order to emphasize a property for students if needed or simply grab the students' attention. Moreover, the data from the students' work is stored on Desmos, so the teacher may go back and see students' results later to evaluate their understanding.

This exploration-based activity is linked in the lesson plan under the "Materials" section and can also be found in Appendix B. There are opportunities for students to explore, make conjectures, explore more and adjust their conjectures and so on. The lesson design allows students to develop a deep understanding of the inner workings of translations. There are also slides that test how well students understood what they were doing, by asking them to fix a mistranslated object by adjusting the image to the appropriate location. Additionally, there is a question asking students to determine the vector of translation when given the preimage and image. Students can use their understanding of the image segments, as built during the beginning of the activity, to apply and advance their understanding to a different scenario in order to solve the given problems. These two questions also embody the problem solving that exists within the lesson. This activity allows for productive struggle with the material, which in turn will help students develop a stronger understanding of the material.

I created this Desmos activity for the lesson according to the guidelines discussed in this paper. The activity is to be implemented such that students can explore, but are given the appropriate support when necessary, and there is time built in after the activity for a class-wide discussion in which the students can verbalize their conjectures in a precise manner, and critique each other's ideas. Additionally, during this whole class discussion, the teacher can prompt students with questions to help draw out connections they might have missed during the activity. For instance, if a student did not recognize that the image segments are congruent and parallel to each other and the vector of translation, the teacher can go back to a slide and ask more directed questions focusing on this missed connection. During this whole class discussion, students can also raise any concerns or ask any unanswered question they may have from the activity itself.

Conclusion

Overall, this research helped me to better understand the importance of using technology in mathematics classrooms. Technology, when incorporated effectively, is proven to have a positive impact on student motivation, attitude, and achievement.

Dynamic geometry software is especially beneficial to student learning and should be incorporated where applicable. Additionally, I learned the criteria to use to evaluate and effectively incorporate such technology into a lesson (NCTM, Kovacs, TPACK). Keeping this research in mind will allow you to create a worthwhile mathematical task whose impact may be enhanced through effective incorporation of technology.

Appendices

All appendices are located in the online edition of *Proceedings of GREAT Day 2020*, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/8/

Appendix A: TPACK Guideline

This Appendix contains the TPACK Guideline for implementing technology into the classroom. The guideline provides a checklist for educators to consider when creating their lesson plans that incorporate technology. This checklist will allow educators to determine if the technology they are implementing is appropriate, as well as ensuring that it is incorporated in a way that promotes creative thinking, reflection, and clarify conceptual thinking.

Appendix B: The Lesson

This Appendix has a sample lesson plan which demonstrates how to integrate technology into the classroom. In this lesson plan, a sample anticipatory set is provided to lead students into the exploration of translations. Before implementing the activity, the teacher should set clear expectations, but after that the work is left up to the students. In the last few minutes of class, it is important to bring the class together for a debriefing of what knowledge they gained from the activity. The teacher should hold a discussion that is led by the students and their discoveries, and simply prompt responses when necessary. In this Appendix, there is also a sample homework assignment that can be given to the class as a follow up activity. The answer key is also contained here.

Appendix C: The Desmos Activity

This Appendix contains the slides from the Desmos Activity (which is also linked). There are screen caps of each slide that are contained in the activity. In order to work with the activity and implement it, follow the link that is in this Appendix. The activity has students make conjectures and scaffolds students understanding of translations on and off of the coordinate plane. By the end of the activity, students are able to construct the vectors of translation and translate polygons.

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The Effect of Culture on Parenting Styles: Are There Similarities Between Latinx & Working–Class Parenting Styles?

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sponsored by Steve Derné

Abstract

Arlie Hochschild (2003) claims that a person's class standing affects how they parent their children. This study was performed to determine if a culture affects parenting styles, with a fixed lens on Latinx parents, to see if the parenting styles are similar to those of working-class parents. Through sociological introspection, it was found that the parenting styles of Latinx and working-class parents are fairly similar, therefore showing that culture is another aspect that can affect parenting styles.

M any people base how they parent their children on different influential factors. One of these factors is class. Arlie Hochschild (2003) finds, through her research, those from different classes perform different degrees of emotional labor. She focuses on the middle-class and the working-class and says that typically, middle-class people perform more emotional labor than working-class people. Middle-class workers have jobs that tend to have more contact with the public. These individuals hold jobs working in schools, hospitals, or restaurants. In these occupations, workers interact with the public at a more personal level, meaning they have to learn different ways to manage their emotions to complete their tasks. This leads to these individuals teaching their children about emotions. People who hold these jobs as well as being a parent habitually teach their children that their own emotions as well as the child's emotions matter, and that emotions can be changed. This is different from working-class individuals who typically hold jobs that may be considered "behind the scenes" in the sense that they do not have to work with customers. This allows them to have less emotional labor because they do not have to control their emotions as much. This behavior is very likely to be passed on to their children. Working-class families are less likely to teach their children

that their emotions matter. These parents tend to have more of a "because I said so" way of parenting which is different from middle-class families.

Besides class, there can be other factors that may affect how people's parenting styles. Hochschild only discusses parenting styles based on class. What she misses is that culture may also play a part in parenting styles. Latinx parents are historically known as strict and overbearing with their children. Being strict has many different meanings depending on the culture and societal expectations of different countries and groups of people. In the United States, those of Latinx backgrounds tend to be more strict with their children than those of White. This behavior from parents can occur for a multitude of reasons. This behavior is enhanced depending on the status of the parents. If parents are undocumented immigrants, they may be more strict to keep their families safe and together to prevent deportation. Latinx parents may keep their children from playing in other people's homes, walking home alone, and accessing social media to keep their children safe. This rigorous behavior can be seen as extreme by many White parents because their expectations and their societal background gives them an advantage that families of color do not possess.

Latinx households often have a very strict hierarchy within the home. Fathers hold all or most of the power over their children and wife. This comes from the societal rule that men are overall superior and should be treated as such when compared to women. They are seen as the breadwinners of the household and they are to be respected by their children. Mothers still hold power, but they are still aware that their husbands are the deciders. Mothers will be in charge of the house and making sure that tasks like cooking, cleaning, and raising the children are taken care of. Children are expected to respect their parents no matter what without asking questions.

Hochschild says that emotional labor "affects the various social classes differently" (2003, p. 20). She indicates that "parents who do emotional labor on the job will convey the importance of emotion management to their children and will prepare them to learn the skills they will need for the jobs they will probably get" (p. 20-21). She says that since middle-class people are more likely to work with other people and working-class people are more likely to work with "things," that it is a common pattern that middle-class people will know more about emotion management and can teach this to their kids.

What Hochschild fails to mention is the other factors besides class that can affect how someone parents their child. In Latinx culture, children are taught, from an early age, that they are expected to follow their parents' orders and listen to their every command. Parents expect their children to immediately come to them when they are called. They expect that their children will help with household chores as soon as they are told to. This is instilled in a child early so that they learn responsibility and can assist parents in the house to ease the stress of maintaining a house while working. This is most prominent in working-class families because parents would be too tired or overwhelmed to keep up with their tasks. Passing tasks off to their children will

lighten the load and give them more free time. Oftentimes, misbehavior, insubordination, and failure to follow directions resulted in physical punishment. Once a child is aware of the consequences of bad behaviors and experience what happens if they misbehave, they are less likely to do so. If a child is told to sweep and they do not do it or they do not do it in the time their parents wanted it done, they will get a spanking as a result. After doing this multiple times and seeing what happens, they are less likely to repeat the behavior. This demonstrates to children that their parents are in charge and makes not listening to them is equivalent to disrespecting them. Parents show this authority by performing certain actions that give them power over their children. This essay discusses these topics as well as explains the reasons behind the actions. These expectations are something that have been placed upon children for generations, making it culture. This way of parenting is not based on class; it is typically seen in all Latinx families because respect is very important in this particular culture. Children are taught to be "good kids" and listen to their parents no matter what. Despite her belief that the only factors are class, it is possible to question that cultures such as the Latinx culture can affect parenting style.

Methodology

To answer this question, the use of documentary evidence is necessary. As a Latina raised by Latinx parents, I believe I have a lot of experience with parenting styles based on how my parents raised me. I was able to use documentary evidence using journals I wrote in as a child. I reread the entries, looking for my emotions, such as anger and displeasure after my parents would reprimand me. It is key to look at these specific entries after arguments because emotions are typically heightened at this point by both the parent and the child. Researchers are more likely to find their subjects with more negative emotions because of their parents' authoritarian parenting style. I looked at a total of three entries from three different years of my childhood to see if my Latinx culture affected how my parents raised me. In the journals, I looked for feelings and the emotions I felt after being reprimanded by my parents. The journals shared specific arguments that my parents and I would get into and they also included my emotional mindset at the time of the event. I decided to look at five different years because I wanted to see if there was a difference as I aged, whether it was a change in the emotions I wrote about or how I expressed how I felt.

Findings and Results

Growing up with my mother, a nurse who works with people daily, and my father, a manager for a company, they should have taught me that my emotions matter and that my emotions can be changed. This is what Hochschild says my parents should be doing since they are considered middle-class. However, if the journals show the opposite, that when trying to communicate with my parents, my emotions do not matter, this phenomenon will serve as evidence that parenting styles can be influenced by culture. If there is no evidence of negative emotions, evidence of me believing that my emotions do not matter, or evidence of my parents using the authoritarian ("because

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I said so") parenting style, then this will serve as evidence that culture has no impact on parenting style.

When analyzing my journals, feelings of anger and displeasure were found in all five journal entries, especially in the more recent entries. In all the journals, feelings of anger were detected. The anger was focused on my parents who were reprimanding me and insinuating that what I had to say and how I felt was not important and that what they were saying was important and had to be abided by.

In the first journal, I had described an argument I had with my father about being able to sleepover at a friend's house. The entry says, "He won't even listen to me. Everything always has to be his way or the highway. I just wanted to sleep at her house and he won't even let me do that and it's not fair. He didn't even explain why I couldn't go over" (Journal entry: 3/12/10). The use of angry language in this entry makes it clear that my emotions were heightened. I did not understand why my father would not let me sleepover at my friend's house because he did not give reasons. He felt as though he did not need to express why he felt the way he did. He just knew that he was in charge and his word was the be all and end all; I knew it too.

In a different entry, I wrote about an argument I had with my mother three years later. We had been arguing about me wanting to get a phone and her telling me no which led to an even bigger argument. This entry says, "She did not say why I couldn't get a phone. All she kept saying is that I was not old enough and to stop asking questions and being ungrateful. I am so frustrated because no one listens to me in this house" (Journal entry: 8/4/13). Again, I referenced the fact that my parents do not explain why they say things. This is an important pattern to notice because it is popular in Latinx culture. Parents do not explain themselves because they feel as though this is not necessary and children should not ask their parents for reasoning, they should just blindly follow their every command. This shows positional parenting rather than personal parenting. My parents believe that since they are older than me that they know best and the rules they make should always be followed. This is not personal parenting because never do they explain why they have the rules that they do. The only thing they say is that their rules should always be followed.

One final example comes from a few years later when my parents found out I had a boyfriend and they did not approve. "They want me to break up with him because they think I am not old enough to date yet. They don't understand that I like him. It does not make sense to me because all of my [white] friends have been in relationships before and their parents never got mad at them" (Journal entry: 4/22/16). This entry shows the cultural significance behind my parents' method of raising children. It was clear to me that because I was Latina, certain rules apply to me that do not apply to everyone. Again, this shows positional parenting rather than personal parenting. Here, my parents are using their power and age over me to tell me what is best for me. They do not explain why they believe it is what is best for me, which is why it is not personal parenting.

These results show that there is a connection between culture and parenting styles. Latinx parents are more likely to have authoritarian parenting styles than white parents not based on what social class they fit into. This indicates that a person's class does not determine positional parenting.

LIMITATIONS

The findings of this research may be limited because they were based solely on my own experiences. The study did not involve other Latinx children which could have led to different outcomes. This is probably because not everyone's family is the same. Though there may be an overall related theme of authoritative parenting, not everyone's parents will be as strict as mine. some people may have more lenient parents or even stricter parents than mine that may lead to different findings. It is also possible that a child's relationship with their parents overall may lead to different findings as well. For example, children who do not get along with their parents may argue more than children who do get along with their parents. Another limitation may be my gender. Females in Latinx culture are kept on a tight leash. My experiences may differ from a male because they typically have more freedom than females do. This is because, in the Latinx community, girls are seen and not heard. They are expected to be silent and obedient, while boys are expected to be loud and assertive.

Another limitation could be the personality of the child. Children that have a more obedient and introverted personality are less likely to argue with their parents than children who have an extroverted and assertive personality. Since I have an extroverted and assertive personality it made sense that I argued with my parents. I did not always agree with what they would tell me to do and would argue with them to try and get a different outcome. Since not everyone has the same personality as I do, it is possible that there would be different outcomes to the findings. More obedient children will not see an issue with their parents' authoritative parenting styles and will obey without question.

CONCLUSION & FURTHER RESEARCH

To further this research as well as improve it, a similar procedure could be conducted with a larger population of individuals. Instead of looking at only my journals, One could look at the journals of other people who also identify as Latinx. Looking at their journals and analyzing them for feelings of anger and displeasure the same way I did with mine will allow others to determine whether or not culture affects parenting styles. Using a larger sample of Latinx people would be beneficial because the bigger the sample size the more reliable the data would be. Future studies could consist of a simple survey asking Latinx people if they believe that their parents were authoritative or not. The survey would also include questions about the person's past experiences with their parents' style of parenting.

Another study that could be done would be to look at different cultures to see if they affect parenting styles. A similar study could be done with people of different cultural backgrounds. Researchers would look at the journals of children from different cultural backgrounds to see how they express their feelings about their parent's parenting styles. The study would focus on African American parents and their parenting style. After writing in the journals, they would then be analyzed for emotions that are equivalent to that of the parent's parenting style. So if African American parents also had an authoritative parenting style, the findings would be fairly similar to mine, therefore showing that culture affects parenting style.

Hochschild explicates that a person's class standing affects how they parent their children. Middle-class parents are more likely to teach their children that their emotions matter and that emotions can be changed than working-class parents. Nevertheless, what she misses is that culture can be another aspect that affects parenting style and teachings. This study shows that Latinx culture has similar aspects to the working-class when it comes to parenting. Latinx parents and working-class parents have similar parenting styles in the sense that they both do not typically teach their children about emotions- that their emotions matter, their children's emotions matter and that emotions can be changed. By looking at my journals, I was able to analyze my Latinx parents have similar parenting styles to working-class parents, meaning that culture affects parenting styles.

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Space Efficient Knot Mosaics for Prime Knots with Crossing Number 10 and Less

James Canning

sponsored by Aaron Heap and Doug Baldwin

ABSTRACT

The study of knot mosaics is based upon representing knot diagrams using a set of tiles on a square grid. This relatively new branch of knot theory has many unanswered questions, especially regarding the efficiency with which we draw knots as mosaics. While any knot or link can be displayed as a mosaic, it is still unknown how large the mosaic needs to be, and how many tiles are needed for every knot. In this paper we implement an algorithmic programming approach to find the tile and mosaic number of all knots with crossing number 10 and less. We also introduce an online tool in which users can search, create, and identify knot mosaics.

While knot theory has roots dating back to the 18th century, the study of knot mosaics is a rather new branch of this field that was introduced in the late 2000s. A knot mosaic is a two-dimensional representation of a knot, made up of a finite set of tiles arranged onto a square grid. All of the possible tiles are shown in Figure 4. Knot mosaics are helpful because they provide a uniform way to organize a knot diagram, and they can be easily represented as matrices. By assigning a number to each tile, any $n \times n$ knot mosaic can be represented as an $n \times n$ matrix, where the i, j th entry of the matrix is the number corresponding to the tile in the i th row and j th column of the knot mosaic, as shown in Figure 3.

Figure 1: The Trefoil knot projection
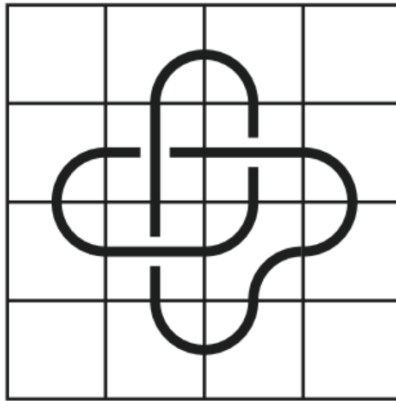
Figure 2: The Trefoil knot as a mosaic

$$\begin{pmatrix} 0 & 2 & 1 & 0 \\ 2 & 10 & 9 & 1 \\ 3 & 9 & 8 & 4 \\ 0 & 3 & 4 & 0 \end{pmatrix}$$

Figure 3: Matrix representation of the Trefoil knot mosaic

T_0 T_1 T_2 T_3 T_4 T_5 T_6 T_7 T_8 T_9 T_{10}
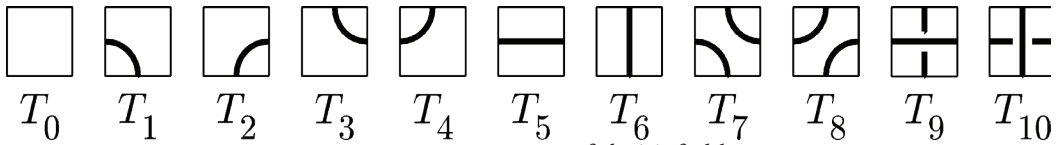
Figure 3: Matrix representation of the Trefoil knot mosaic

By representing a knot as a matrix, we can use all the wonderful and widely available tools for working with matrices on knots. Furthermore, computers can store matrices more efficiently than they can store images of knot diagrams, and so knot mosaics allow for simpler integration with programming.

1.1 Definitions

We will begin by defining some general terms in knot theory.

Definition 1.1

> A knot *is a simple closed curve in S³. A* link *is the nonempty union of a finite number of knots.*

Definition 1.2

> A connected sum *of two knots is a knot formed by removing a segment (1-ball) inside each knot and attaching the resulting boundary points (1-spheres).*

Definition 1.3

> A composite knot *is a knot that is the connected sum of two non-trivial knots. A* prime knot *is any knot that is not composite.*

Definition 1.4

> A knot projection *or* knot diagram *is a projection of a knot into a plane with arcs at crossings drawn as over-crossings and under-crossings. A* link diagram *is a similar projection of a link.*
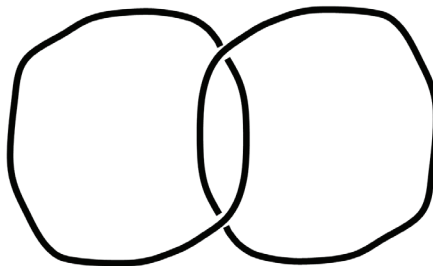
Figure 5: The Hopf Link

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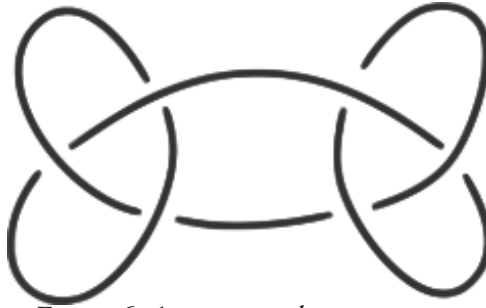
Figure 6: A composite knot projection

A link is simply two or more knots in the same space. Connected sums are created by "cutting" two knots and "gluing" them together at the cuts. The composite knot in Figure 6 is the connected sum of two Trefoil Knots. In this paper, we are interested only in prime knots.

There are an infinite number of ways to draw a knot as a projection. Knot theory is often concerned with determining whether two knots are unique, for which we need to define equivalence.

Definition 1.5

> *Two knots K_1 and K_2 are said to be* knot equivalent *if there is a continuous function,* $i : [0,1] \times S^3 \to S^3$ *such that*
>
> $i(0, S^3)$ is the identity function
>
> $i(1, K_1) = K_2$
>
> For all $t \in [0,1]$, $i(t, S^3)$ is a homeomorphism to S^3.
>
> *We call* i *an ambient isotopy.*
>
> An ambient isotopy can be thought of as a continuous deformation of a knot, where stretching and reshaping is allowed, but cutting or breaking the knot is not allowed. When we say that two knots are the same, we mean they are knot equivalent.

Now that we can determine knot equivalence, we need to be able to classify and categorize knots. This is done with a crossing number.

Definition 1.6

The crossing number *of a knot is the fewest number of crossings needed to represent the knot as a projection.*

Figure 7: Two projections of the unknot

The unknot, or trivial knot, has crossing number zero. Figure 7 shows two projections of the unknot, one with the crossing number realized. Although the projections are different, the two knots shown are knot equivalent, as there is an ambient isotopy from one to the other. The trefoil knot is the only prime knot with crossing number three.

Having defined the basics of knot theory, we now provide a more formal definition of knot mosaics. Recall that a mosaic tile refers to one of the eleven tiles listed in Figure 4.

Definition 1.7

A connection point *of a mosaic tile is a midpoint of a tile edge that is also the endpoint of a curve drawn on the tile.*

Definition 1.8

A mosaic tile is suitably connected *if each of its connection points touches a connection point of an adjacent tile.*

Definition 1.9

An n ×n mosaic*, or* n-mosaic*, is an* n×n *matrix whose entries are suitably connected mosaic tiles.*

As an example, Figure 8 shows a matrix with a tile that is clearly not suitably connected, and thus the matrix is not a knot mosaic. By changing that one tile to a tile that is suitably connected, we create a knot mosaic depicting the 4_1 knot, also known as the Figure Eight knot, in Figure 9.

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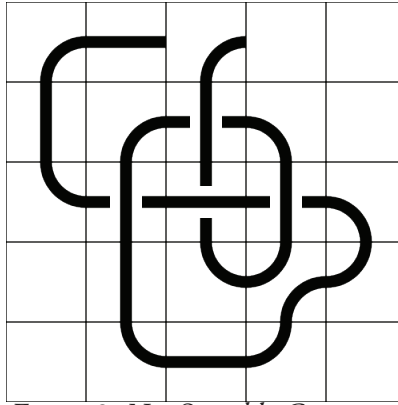
Figure 8: Not Suitably Connected
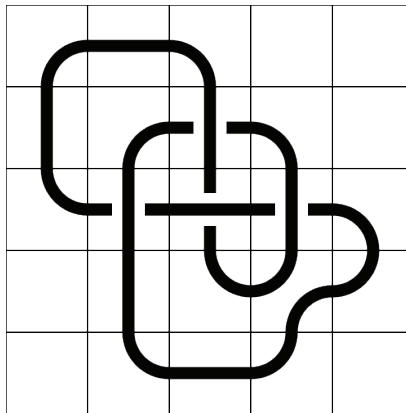
Figure 9: The 4_1 knot

There are many open questions regarding the efficiency with which we can create knot mosaics, including how small of a matrix we can draw a knot on, and how many non-blank tiles we need to use. To rigorously describe these problems we must introduce a few more definitions.

Definition 1.10

> *The* mosaic number *of a knot is the smallest integer* n *such that the knot can be drawn as an* n-*mosaic.*

Definition 1.11

> *The* tile number *of a knot is the fewest number of non-blank tiles that are needed to represent that knot.*

Definition 1.12

> *The* minimal-mosaic tile number *of a knot is the minimum number of non-blank tiles needed to represent the knot as an n-mosaic, where* n *is its mosaic number.*

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In Figure 2 we show the trefoil knot as a 4-mosaic. This is the smallest grid that this knot can fit on, and so the trefoil knot has a mosaic number of 4. Additionally, this mosaic uses the fewest number of non-blank tiles as possible. Therefore the trefoil knot has tile number and minimal-mosaic tile number 12.

We make the distinction between tile number and minimal mosaic tile number because some knots with mosaic number 6 can be represented as a 7-mosaic using fewer tiles. For example, the 9_{16} has mosaic number 6 shown in Figure 10 (Heap & Knowles, 2019). This mosaic uses 32 non-blank tiles, and thus the 9_{16} knot has minimal-mosaic tile number 32. However, the 9_{16} knot can also be drawn as a 7-mosaic using only 29 non-blank tiles, as shown in Figure 11. We will prove that this is the fewest number of non-blank tiles needed to represent this knot, and therefore the 9_{16} knot has tile number 29.
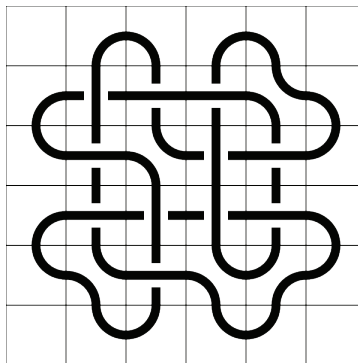
Figure 10: 9_{16} knot with minimal-mosaic tile number realized
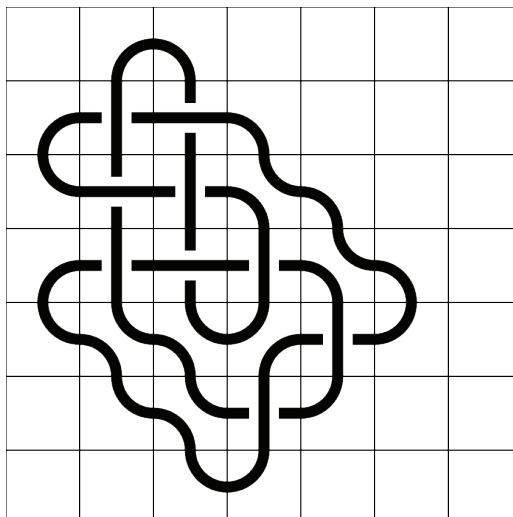
Figure 11: 9_{16} knot with tile number realized

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Definition 1.13

> *A* space-efficient n-mosaic *is an* n-*mosaic in which the number of tiles used is minimized for a mosaic of size* n.

That is, an *n*-mosaic is space efficient if the knot shown cannot be drawn using fewer tiles on an $n \times n$ grid.

Definition 1.14

> *A* minimally space-efficient *mosaic is a space-efficient mosaic for which the mosaic number is realized.*

The mosaic shown in Figure 9 is not space-efficient, as it has unnecessarily large loops that could be reduced using fewer crossings. Note that both mosaics in Figures 10 and 11 are space-efficient, and the latter is also minimally space-efficient.

While it is fairly simple to tell the mosaic and tile number of knots with few crossings, it becomes much more difficult as we examine more complicated knots. For all knots with crossing number 8 and less the mosaic number [2] and tile number [1] are known. Therefore, we implemented programming algorithms in an attempt to speed up the search process, in hopes to find the mosaic and tile number for all 9 and 10 crossing knots.

Previous Work

In 2019, Knowles and Heap found the space-efficient mosaics of all knots with mosaic number 6 or less (Heap & Knowles, 2019). They accomplished this by proving that any space-efficient 6-mosaic will have one of the layouts listed in Figure 12 (Heap & Knowles, 2018). That is, if the mosaic is space-efficient, it will have an outer shell as shown in the layout with tiles T_7 through T_{10} (from Figure 4) filling in the inside of the shell. Going through these layouts by hand, they were able to find all possible space-efficient 6-mosaics. These mosaics included all knots with crossing number up to 8, and some knots with crossing number 9 through 13.
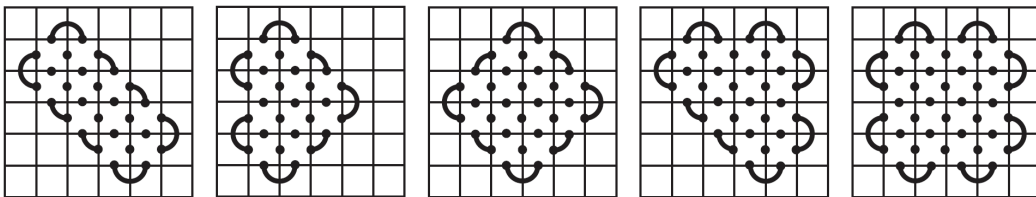
Figure 12: All Space-efficient 6-mosaics

We started to look at the 7×7 mosaics in hopes to find the remaining knots with crossing number 9 and 10. Fortunately, Heap and LaCourt have proven that the layouts shown in Figure 13 contain all possible space-efficient 7-mosaics (Heap & LaCourt, 2020).
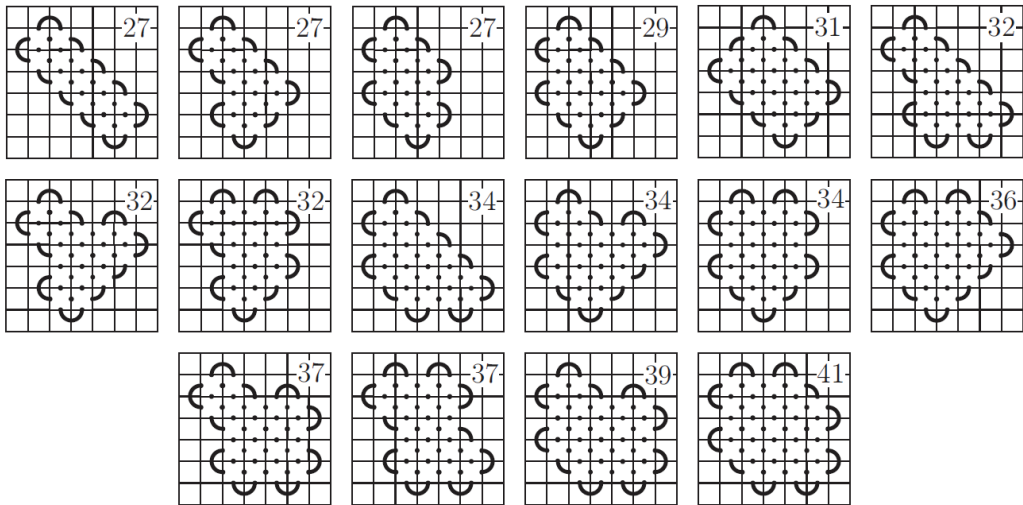
Figure 13: All Space-efficient 7-mosaics, with number of non-blank tiles in the top right corner

We used these layouts as starting points to find all the possible knots.

Presented here is a continuation of Gregory Vinal's work, showing the preliminary results of our work. Here we expand those results and provide images of the knots as proofs. Additionally we completed the knot mosaic website that was introduced in (Vinal, 2020).

Methods

To find every knot with crossing number 9 or 10 on a space-efficient 7-mosaic, we pieced together several programs into one pipeline. This pipeline creates every possible mosaic and identifies the name of the knot it depicts. In the following subsections we describe each piece of the pipeline. A diagram of an example run of the pipeline is shown in Figure 14.

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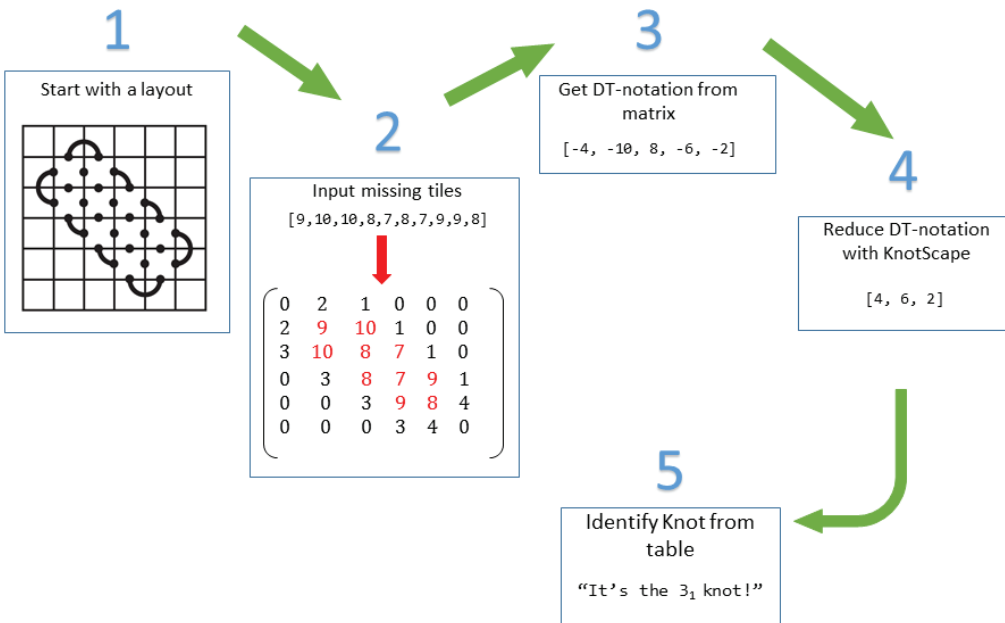
Figure 14: Example run of the pipeline

3.1 GENERATE ALL KNOTS

We begin the pipeline by selecting one of the identified layouts from Figure 13. Each layout has a given number of interior positions that need to be filled. We create a matrix in Python that represents the layout mosaic using the integers associated with each tile (as in Figure 3), leaving the empty inner tiles as a null value. For a layout with n tile positions to fill, we start the pipeline by generating a vector of length n for every possible combination of the numbers 7, 8, 9, and 10 as entries of this vector. Replacing the null values of the layout matrix with each of these vectors will create all possible mosaics for this layout. However this requires 4^n vectors, and as n increases it becomes infeasible to create so many vectors at once. So we split the process in half.

Let $k = floor(\frac{n}{2})$. Using the *product* function from the *itertools* package, we create 4^k vectors of length k and 4^{n-k} vectors of length $n-k$, including all possible configurations of integers 7 through 10 for each length. By concatenating every pair of vectors of the two lengths we can create all 4^n possibilities more quickly and using less memory.

Splitting this process into two parts also allows for further optimization. By only looking for knots with a minimum crossing number m (in our case, 9) we only need to check mosaics with at least m crossings. These correspond to concatenated vectors containing at least m entries that are 9 or 10, since 9 and 10 correspond to the crossing-tiles T_9 and T_{10}. We count the number of 9s and 10s in each of the smaller vectors, and only concatenate pairs of vectors that will result in a total of at least m crossing tiles. Doing so reduces the number of vectors created from $4^n = 2^{2n}$ to

$$\sum_{i=m}^{n} \binom{n}{i} 2^i * 2^{n-i} = 2^n \sum_{i=m}^{n} \binom{n}{i}$$

possibilities.

We then fill in the layout matrix by putting the n values from the vectors into the n empty spots of the matrix, one vector at a time. We send this matrix representation of a knot mosaic on to the next step in the pipeline.

3.2 Get the Reduced DT Notation

Now that we have a method to create all the possible mosaics in a layout, we need a way to identify them. To do so, we will use the Dowker-Thistlethwaite notation (DT notation) (Dowker & Thistlethwaite, 1983). The DT notation is a 1-dimensional representation of a knot diagram as a list of even integers, and is determined by the following method:

Start at an arbitrary point on a knot with n crossings.

Travel along the knot, labeling each crossing with integers 1 through $2n$ sequentially. When assigning an even number, if you are at an under crossing, assign the negative even number instead.

Each crossing will have two numbers, one even and one odd. Arrange the n odd numbers in ascending order with their associated even numbers, for example [(1, 4),(3, -6,),(5, 2)].

Take the even numbers in the order determined by the odds (4, -6, 2). This sequence of even numbers is the DT notation.

Although it is not a knot invariant, the DT notation does uniquely identify knot diagrams, and every DT notation of a knot can be reduced to the representation of the simplest knot diagram of that knot. That is, given any knot diagram, the DT notation of that diagram can be reduced to the DT notation that represents the same knot in its most reduced diagram.

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We wrote a Python function to produce the DT notation given a knot mosaic represented as a matrix. The function identifies the first non-zero entry of the matrix (starting at the top left and continuing down the row) and then follows the knot all the way around until it reaches the initial spot again. At each crossing, it adds the associated part of the DT notation. If the program ever returns to the initial position before it has passed the expected number of positions we know that we have found a link, and so we can disregard that mosaic since we are only interested in finding knots.

Although we can create the DT notation, we cannot always determine the name of the knot just yet. We need to reduce the notation, and we do so using the program *Knotscape*, created by Morwen Thistlethwaite in the 1990s. We adapted this C program to take multiple notations in sequence and output the reduced DT notation of each one. If the program finds a composite knot, we throw that one out, since we are only interested in prime knots.

3.3 Identify the Knot

The final step in the pipeline is to identify the name of the knot. Using the newly reduced DT notation, we reference a table that contains all the 9 and 10 crossing knots and their reduced DT notations. We output the name of the knot (if the DT notation is found on the table) along with the original vector that created the mosaic, so that we can reproduce the knot mosaic we found. If the DT notation is not on the table, it is from a knot with crossing number less than 9 or greater than 10, and so we are not concerned with it.

We then reference all the knots found on the current layout with all the knots found on previous layouts. We identify any new ones, and note if we found a knot using fewer tiles than before. We also wrote a bash script to count the number of crossings in each mosaic of a layout and identify the mosaic for each unique knot with the fewest number of crossings.

To test the pipeline we ran the first four 6×6 layouts shown in Figure 12 and the first three 7×7 layouts from Figure 13 (Heap & Knowles, 2019).

We ran the pipeline on machines with 12 cores, two threads per core, 125 gigabytes of RAM, 32, 256, and 3072 KB of cache, and max CPU clock speed of 2900 MHz. The first two 6×6 layouts each take less than 5 minutes to run. The third layout took 40 minutes, and the fourth one took about 11 hours. The first three 7×7 layouts each took about 4.5 hours to complete, and the fourth layout took about 9 days. The run of the fifth layout was broken up into multiple sections due to a power outage, and it has not completed its run in an aggregate of about 70 days. The sixth layout finished in about 18 days, and the seventh took 24 days.

4. Results

After the successful test runs we began running the larger 7×7 layouts through the pipeline. We have successfully found all of the knots that can fit on the first four layouts listed in Figure 13, and we have initial results from the fifth layout. In these first five layouts we found all 9 and 10 crossing knots that had not been identified as knot mosaics in previous work, leading to the following theorem:

Theorem 4.1

> *All prime knots with crossing number 10 or less have mosaic number 7 or less and tile number 31 or less.*

The specific results from the size 7 mosaics are listed below. The first layout uses 27 non-blank tiles, and it confirmed the following theorem from Heap & LaCourt (2020):

Theorem 4.2

> *(Heap & LaCourt, 2020) The following prime knots have mosaic number 7 and tile number 27*:
>
> 9_6, 9_{15}, 9_{18}
>
> 10_5, 10_6, 10_7, 10_8, 10_9, 10_{10}, 10_{13}, 10_{14}, 10_{15}, 10_{16}, 10_{17}, 10_{18}, 10_{19}, 10_{24}, 10_{25}, 10_{26}, 10_{29}, 10_{30}, 10_{31}, 10_{32}, 10_{33}, 10_{35}, 10_{36}, 10_{38}, 10_{39}

The second and third layouts did not produce any knots that were not found on a previous layout. The fourth layout uses 29 non-blank tiles and leads to the next theorem (Vinal, 2020).

Theorem 4.3

> *The following prime knots have mosaic number 7 and tile number 29:*
>
> 9_{22}, 9_{25}, 9_{29}, 9_{30}, 9_{32}, 9_{33}, 9_{34}, 9_{36}, 9_{38}, 9_{39}, 9_{42}, 9_{43}, 9_{44}, 9_{45}, 9_{47}, 9_{49}
>
> 10_{23}, 10_{27}, 10_{37}, 10_{40}, 10_{42}, 10_{43}, 10_{45-57}, 10_{67-73}, 10_{79}, 10_{82}, 10_{83}, 10_{84}, 10_{86}, 10_{87}, 10_{90-95}, 10_{101}, 10_{102}, 10_{103}, 10_{106}, 10_{107}, 10_{112}, 10_{113}, 10_{114}, 10_{117}, $10_{128-136}$, 10_{145}, 10_{146}, 10_{147}, $10_{149-153}$, 10_{156}, 10_{158}, $10_{160-164}$

Although the fifth layout has not finished completely, the initial results have given us the following theorem:

Theorem 4.4

> The following prime knots have mosaic number 7 and tile number 31:
>
> 9_{40}, 9_{41}

$10_{58\text{-}60}$, 10_{80}, 10_{81}, 10_{88}, 10_{89}, $10_{96\text{-}99}$, 10_{104}, 10_{105}, $10_{108\text{-}111}$, 10_{115}, $10_{118\text{-}123}$, 10_{137}, 10_{138}, 10_{154}, 10_{157}, 10_{165}

For many knots, the minimal-mosaic tile number is the same as the tile number. However, Heap had identified 13 9 and 10-crossing knots with mosaic number 6 and minimal mosaic tile number 32 that we were able to find with a smaller tile number (either 27 or 29) as a 7-mosaic (Vinal, 2020).

Theorem 4.5

The following prime knots have mosaic number 6 with a tile number that was realized on a 7-mosaic:

Tile number 27: 9_{10}, 10_{11}, 10_{20}, 10_{21}

Tile number 29: 9_{16}, 9_{35}, 10_{61}, 10_{62}, 10_{64}, 10_{74}, 10_{76}, 10_{77}, 10_{139}

Many space-efficient mosaics have more crossings than the crossing number of the knot that it represents. Mosaics in which the crossing number is realized have been found on the 7×7 grid for all 9-crossing knots and for all but two 10-crossing knots. To find these results, we have run the sixth 7×7 layout through the pipeline searching for 9 and 10-crossing knots, and we have initial results for the ninth and twelfth layouts.

Theorem 4.6

The crossing number for the following knots is first realized on a 7-mosaic in which the tile number is not realized, using the given number of tiles:

27 tiles: 9_{10}, 9_{13}, 9_{21}, 9_{26}

29 tiles: 9_3, 9_7, 9_9, 9_{15}, 9_{16}, 9_{19}, 9_{24}, 9_{37}, 9_{46}, 9_{48}, 10_1, 10_5, 10_{11}, $10_{13\text{-}16}$, 10_{21}, 10_{22}, 10_{24}, 10_{31}, $10_{33\text{-}36}$, 10_{38}, 10_{39}, 10_{62}, 10_{63}, 10_{65}, 10_{74}, 10_{78}, 10_{139}, 10_{140}, 10_{142}, 10_{144}

31 tiles: 9_4, 9_{12}, 9_{29}, 9_{35}, 10_6, 10_7, 10_9, 10_{12}, 10_{17}, 10_{37}, 10_{61}, 10_{64}, 10_{67}, 10_{68}, 10_{70}, 10_{72}, 10_{77}, 10_{79}, 10_{84}, $10_{90\text{-}93}$, 10_{114}, 10_{152}, 10_{153}, 10_{158}, 10_{163}

34 tiles: 10_{20}*

It is possible that the 10_{20} knot listed in Theorem 4.6 could be found as a mosaic with crossing number realized using 31 tiles, pending the finished pipeline run of the fifth space-efficient layout from Figure 13.

Corollary 4.6.1

The prime knots with crossing number 9 or 10 not listed in Theorem 4.6 have mosaics in which both the crossing number and tile number are realized, except for the 10_3 and 10_{76} knots.

Space-efficient mosaics in which the 10_3 and 10_{76} knots are displayed with crossing numbers realized have not yet been found. We know that such mosaics do not appear on the first four or the sixth 7×7 layouts listed in Figure 13.

In analyzing the results, we found that the first three size 7 layouts all produced the same exact knots. This was also true for the first two size 6 layouts and the sixth, seventh, and eighth size 7 layouts. This gives evidence to support the following conjecture proposed (Heap & LaCourt, 2020).

Conjecture 4.7

> *Space-efficient layouts of the same size and using the same number of non-blank tiles produce the same prime knots.*

Ongoing Work

The fifth layout from Figure 13 is currently running, searching only for knots with crossing number 9 and 10, in case we find a mosaic that realizes the crossing number for the two knots mentioned in Corollary 4.6.1 or the 10_{20} knot.

Having found all the 9 and 10-crossing knots, we now can expand our search to include knots with higher crossing numbers, as well as knots with crossing number less than 9 for which we have not found a mosaic that realizes the crossing number. We have completed running the first four 6×6 layouts shown in Figure 12 searching for all knots, and the fifth layout is still running. We have also finished running the first three 7×7 layouts. The fifth 6×6 layout and the fourth 7×7 layout are currently running. So far through these runs we have found mosaics that realize the crossing number for all knots with crossing numbers up to 8.

As a part of this research we have developed a website that serves as a tool for working with knot mosaics. On this website users can build a mosaic of their desired size by dragging the tiles onto a grid. They can choose to start from any of the space-efficient layouts for sizes 5 through 7, or start from a blank grid. Once they have created a mosaic they can click a button to identify the knot. This sends the matrix representation of their mosaic into our pipeline, and returns the name of the knot depicted. The website will recognize links and composite knots but will not identify or name them.

Additionally, the results of our research are stored in a database on this website so users can search for and display the knot mosaic representation of the knots that we have found. They are able to specify whether to find the mosaic with the fewest tiles, fewest crossings, or smallest size, and how to prioritize these three options. When a knot mosaic is displayed the website will also tell the user whether the tile number, crossing number, and mosaic number are realized.

This website is not currently available for public use. However once it is, it will be available and free to use around the world. A screenshot of the website is attached in Figure 15.
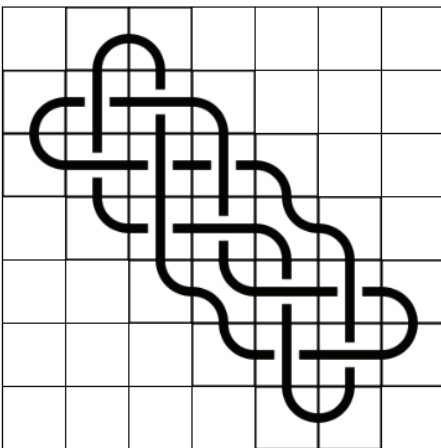
Figure 15: Screenshot of the website

APPENDIX

APPENDIX A: Knot Mosaics from Theorems

The appendix contains mosaics for the knots referenced in the theorems. We exclude mosaics from Theorem 4.2 as they were included in Heap & LaCourt, (2020). Mosaics that are marked with an * are space-efficient mosaics that have more crossings than the crossing number of the knot they represent. Our images were created using

a program that we wrote that takes the matrix representation of a mosaic and draws the mosaic using the Python PyCairo package. The appendix is located in the online edition of *Proceedings of GREAT Day 2020*, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/9.

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The Effects of Process Differentiation in an Eighth-Grade Mathematics Classroom

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ABSTRACT

Research indicates that teachers should implement strategies that target individual student's needs, while also instructing in a heterogeneous classroom. In the present study, I designed a sequence of activities to observe the effects of differentiation on a cohort of students in their eighth-grade mathematics class. Students were given a pretest to examine their knowledge before any differentiation was implemented. Throughout the next unit, I collected data about my students' responses to the activities, designed new differentiation activities, and quantitatively analyzed their responses. To conclude the study, the students took a post-test. As the literature suggests, all three activities focused on student choice, productive struggle, and open-questioning. Students were given options and the freedom to write their own problems or choose their own way to approach a problem. The students were surprised by the appearance of choice in these activities and struggled to confront the more challenging problems that they were given. The conclusions of this study suggest that in order for differentiation to be significantly productive, it is necessary to adopt a culture of differentiation early-on in the classroom and continue to support this culture throughout the school year.

LITERATURE REVIEW

Teachers are often faced with the inevitable challenge that their classes will consist of various learners who are at different levels within their learning process. Differentiation is about teaching to the individual, while teaching in a heterogeneous classroom. This requires that teachers are cognizant of their students' individual abilities, the demands of the content, and the strategies they can employ to help every student reach their maximum potential (Tomlinson, 2014). In mathematics, there has been research on the types of differentiation and their effects on individual students, but there is not a considerable amount of research on how differentiation can help increase the understanding of entire cohorts or classes. The literature provides evidence of specific

justifications for differentiation, various techniques that have been developed, and their effects on students and teachers.

The goal of differentiation is to help each individual student reach their full potential. Vygotsky developed the theory of the Zone of Proximal Development, which describes the distance between the actual level of understanding of an individual, and the potential level of understanding that an individual can achieve (Vygotsky, 1978). This theory by Vygotsky implies that every student has the ability to learn more and achieve higher mathematical goals, but they need to be pushed to close the distance between their actual understanding and their potential understanding.

In the United States, this process was hindered by tracking in middle schools and high schools. Schools track students according to their academic capabilities and sort them into different sections or classes (Noguera & Rubin, 2004). However, tracking methods can be suspect, especially when it is up to teacher discretion. Certain teachers may place students in particular tracks based upon their race, ethnicity, or family background, rather than their objective academic abilities. Studies have shown that tracking can increase racial divides in schools, decrease the efficacy of students in lower level classes, and continue trends of inequality in higher education (Rubin, 2006). When students are placed in lower tracks, they often encounter lower expectations and adopt a set mindset about mathematics. Many people against detracking argue that placing "lower level" students into a classroom with "higher level" students will subject all learners to behavioral problems and disruption. However, Boaler and Dweck support the idea that the reason students in lower track mathematics classes exhibit behavioral problems is because they were told at a young age that they did not have the ability to succeed (2016). Students are prone to losing focus or acting out in their classes because they develop a fixed mindset. They do not believe in their own abilities to grow and advance in their learning, so they give up on themselves and default to disruptive or indifferent behavior.

The other common argument against tracking presented in the literature is the idea that if classes are heterogeneous that the gifted students will not be pushed as hard. A parent may worry that their child will miss out on opportunities if the teacher is forced to teach at all levels. Yet, there is research that proves that classes in higher tracks have disadvantages as well. Students can lose out on diverse perspectives and learning styles when taught in a homogeneous classroom and they can also be pushed to learn too quickly without proper retention (Rubin, 2006). Furthermore, when students are labeled as "gifted" they are also given a fixed mindset about mathematics because they believe that they are inherently better than other students (Boaler & Dweck, 2016). This is a dangerous message to send students because it implies that they have nowhere else to grow and advance above being "gifted." Findings on tracking indicate that the best solution for students is to move towards a heterogeneous classroom dynamic. If the needs of lower level learners and higher level learners cannot be fulfilled separately, then they must learn together. However, this creates a new challenge for educators: teaching all learners at all levels in one classroom.

Differentiation requires that teachers are familiar with curriculum, countless teaching strategies, and the abilities of every student in their classroom (Tomlinson, 2014). This is not a simple task because it takes time and effort to get to know students and then design lessons that target their individual needs. It is suggested that teachers are familiar with "big ideas" of each unit, so that they can establish a baseline of knowledge every student should have at the end of the lesson or unit (Lin & Small, 2010). The big ideas tend to be aligned with the standards that the teacher is working under. After identifying a general goal for the class, the teacher can determine ways to elevate the big ideas and connect them to higher-order thinking skills.

Once a teacher has established the "big ideas," they can begin to separate out students into different levels or groups. This separation should be based on actual data from pretests (Lin & Small, 2010). It should also be noted that groups and ability levels can change from unit to unit, as students can improve over time and/or may be stronger in particular units. Therefore, teachers should continue to utilize formative assessments and pretests to ensure that they have an accurate perspective of their class. (Herrelko, 2013). After grouping students by ability level, a teacher can begin to plan lessons accordingly.

The literature tends to agree that there are three types of differentiation: content, process, and product. When a teacher differentiates according to content, they determine the overarching "big ideas" of the content and then present it at different levels for different learners. Process differentiation refers to the way in which content is taught, and often relies on the teacher being knowledgeable in various teaching strategies and student thinking patterns. Finally, product differentiation gives students choices about how to present their learned information (Schultz & Sondergeld, 2008). All three types of differentiation can be used at different points in instruction. Content and process differentiation occur during the instructional periods, while product differentiation corresponds to assessment of instruction. While making modifications to lessons according to these types of differentiation, it is critical that educators maintain high expectations and promote productive struggle (Hunt, Lewis, & Lynch, 2018). Encouraging students to struggle and making it a norm in a classroom helps advocate for active problem solving.

Differentiation is a daunting task because it requires a teacher to be constantly assessing students and developing lessons catered towards all students. The most common reason for a lack of differentiation in a classroom is that teachers do not have the knowledge or skills to properly differentiate (Civitillo, Denessen, & Molenaar, 2016). Research tends to agree upon two strong differentiation strategies that target all learners. The first strategy is the incorporation of choice. Students should be given options and opportunities to push their learning even further (Lin & Small, 2010). Through pre-assessment and reassessment, a teacher should be aware of the different levels of learners that they have in their classroom. They can design tasks or activities that teach the "big ideas" of the day in different ways that target students' abilities and thinking processes. Then, students can be given the choice to explore these tasks as they please.

The teacher should create a classroom environment that encourages challenges and include tasks that teach above the expected content that could cater towards higher-level learners (Boaler & Dweck, 2016). Selective tasks should be grounded in content, and should make the content accessible to even the lowest level learners without lowering expectations. An important benefit of differentiation is providing diverse perspectives to a classroom and creating an environment in which each student is confident in their ability to succeed.

Another differentiation strategy comes in the form of open-ended questions. Questioning techniques are a part of process differentiation because they allow students to learn the content in a different way. A particular article discussed using this technique to have higher-level students investigate what the least amount of information they needed was to prove two triangles are congruent. This task did not have a definitive answer and it allowed students to consider what they had already learned to come up with more conjectures about mathematics. Students who were still learning the basics of triangle congruency were tasked with continuing to work through examples and procedural tasks (Finalyson, 2004). This exemplifies the benefits of process differentiation because the teacher was able to teach those who needed extra support, while also catering towards the more investigative and curious learners. In the end, the students who dealt with the open question, presented their findings to the class, which was an example of product differentiation (Finlayson, 2004). This allowed the students who were struggling to learn even more from their peers and gain perspective about what they could possibly do if they continued to improve.

Questioning techniques do not have to be complex or in-depth to promote differentiation. Teachers can employ open questions to a general class discussion or worksheet. It is imperative that open questions are mathematically meaningful and do not have one correct answer (Lin & Small, 2010). The point of an open question is to have students think critically and explore the mathematics in their minds. Often in mathematics, students believe that there is only one correct answer and live in fear of not having that one specific answer. Open questioning opens the floor for students to be wrong and to learn from the discourse. One question can elicit different responses from different learners. Those with a deeper understanding may elaborate more on the concept at hand, which can in turn enhance the learning of the whole class (Lin & Small, 2010). Open-questions are an easy technique to employ in any type of lesson. A teacher should consider the "big ideas" of the lesson and create open-questions that will generate mathematical discussions around the idea.

It is worth noting that studies show that in heterogeneous classrooms, lower-level students' scores can increase, while higher-level students plateau (Zmood, 2014). This shows that teaching to a particular level of learners perpetuates the academic imbalance, but now hinders a whole group of students. Therefore, a great deal of literature about differentiation focuses on helping the "gifted" students reach their potential. There will always be a select group of individuals who pick up material faster than their peers. Educators tend to call them "gifted." This perspective is dangerous, be-

cause it leads students to believe that to be talented in mathematics, one must learn quickly (Boaler & Dweck, 2016). Educators should be aware of the implications of this term before utilizing it openly within their classes.

The goal of differentiation is to ensure that all students are held to high expectations, not just the quickest learners. In a study that reviewed student opinions, they mentioned that if schools detracked, teachers would have to change their mindsets in order for the change to be effective. They said that getting rid of the distinctions would not solve the problem entirely and that students would need to feel like their teachers believed in them (Jones & Yonezawa, 2006). It is interesting that the majority of literature on differentiation is focused on "gifted" students, because the goal of differentiation is to help every individual. By focusing on one subgroup, it can imply that differentiation is not for the benefit of all.

The research on the effects of differentiation in the classroom is less plentiful than literature on strategies for differentiation. There are particular studies that focus on individual students, but very few examine cohorts of classes and their improvements overall. A particular teacher followed the journey of her student Adam and evaluated the effects of differentiation. She came to the conclusion that his resistance of choice and other strategies was due to the fact that he had never been exposed to differentiation before (Finalyson, 2004). The culture of differentiation should be established early on in students' academic careers because they are most malleable at a young age. Once it is ingrained in their minds that being complacent is acceptable, it becomes more difficult to shift their point of view towards modern strategies.

In a study focused on a private school in Istanbul, differentiation strategies were implemented utilizing knowledge of multiple intelligences (Altintas & Ozdemir, 2015). The results showed significant differences between the achievement levels of the experimental group that was exposed to differentiation practices, and the control group that was taught without differentiation. While the results of this study were encouraging, there was a particular focus on gifted students, which could be a potential source of bias within the article. When researchers concentrate on a particular subset of the classroom, it does limit the scope of the conclusion.

Another study gauged teacher perspectives of differentiation. Most subjects agreed that differentiation helped develop students' ability to interact and developed stronger conceptual understanding. They also noted that group work and time were disadvantages of the process (Altintas & Ozdemir, 2015). The biggest adjustment for teachers in terms of differentiation is the amount of planning and pre-assessment that they must conduct. Differentiation also encourages mathematical discourse and group work, which challenges the norms of classroom management.

The literature pertaining to the effects of differentiation across an entire cohort or class without a particular focus on gifted students is lacking in mathematics educational research. Although it is important to support higher-level learners and ensure that they are being challenged, it is just as crucial to validate the abilities of the rest of the

learners within a heterogeneous class. The goal of differentiation is to create an open classroom environment in which a teacher can instruct at all levels without implementing multiple different lessons. It is a blending of learning styles and perspectives into one space, and there should be more research into the effects of this strategy on an entire group of students. Educators should be able to observe which strategies are effective and which strategies do not produce significant differences in understanding. By developing and improving effective differentiation strategies, educators can create more diverse and enriched classroom settings for students.

Methods

Research Design

In this study, subjects were given a pretest to assess their initial abilities, and then at the end of the study they were given a post-test to assess any changes that may have occurred during the research process. There was a control group, who received instruction consistent with the local school district's established methods but with no differentiation beyond normal tracking.

Research Sample

The subjects of this study were eighth graders at a rural middle school in New York State. The control group had $n = 11$ and the experimental group had $n = 36$. The sample was a result of convenience sampling due to the researcher's ability to work with the subjects on a daily basis for an extended period of time. Four students were excluded from the study due to language limitations; they are not included in the $n = 36$.

Background and Limitations

This research study was conducted within an eighth-grade classroom over a timespan of three weeks. The researcher was working under a certified NYS teacher. During the study, students were learning new information about linear equations. The pre- and post-tests were created by modifying locally-developed assessments within the middle school's curriculum. Though this study was limited by the local school district's implementation of curriculum, the results were still promising.

Data Collection

Pre-test **(See Appendix D)**

The pre-test focused on the topics of slope and equations of lines. Students were asked to calculate slope from multiple representations, identify slope and y-intercept from an equation, and graph lines on a coordinate plane

Post-test **(See Appendix E)**

The post-test contained questions that paralleled the pre-test with additional questions about interpreting equations of lines. This addition was due to the fact that the pre and post-tests also served as formative assessments for the students, and the students had learned new material throughout the study.

Instructional Materials

There were three different process differentiation activities utilized during this study. Process differentiation refers to the way students are taught information (Schultz & Sondergeld, 2008). All three activities had "big ideas" that were centered around standards. It is the goal that all learners will retain the big ideas, while higher-level learners can strive for a deeper understanding through challenging questions (Lin & Small, 2010). The activities were based upon the idea that choice, open questions, and challenge are important qualities of differentiation. Boaler suggests that holding students to high standards and providing challenging questions for students supports both high- and low-level learners (Boaler & Dweck, 2016). High-level students are pushed to think in different ways, while low-level students are able to observe a level of learning that they can strive for. This maintains an environment of high expectation and productive struggle, which promotes equity in the classroom (Hunt, Lewis & Lynch, 2018).

Activity 1 (See Appendix A)

The first activity was a Desmos Activity that the researcher designed as a "warm-up" to introduce the concept of interpreting equations of lines (See Appendix A). In this case, screens 7-13 were optional "challenge slides" that were meant to push higher-level students and reflect a sense of choice. Students were only required to complete screens 1-7, which touched on the "big ideas" of the lesson centered around the standards. Screens 11-13 required the highest level of thinking on Bloom's Taxonomy: create. Students were asked to create their own word problems that model linear functions. This required them to take what they had learned about equations of lines and their interpretations to produce their own problems. Students in the control group were taught the lesson without screens 11-13.

Activity 2 (See Appendix B)

The second activity was a general practice worksheet that focused on writing equations of lines. In this activity, choice and open questioning were utilized. Subjects were given the choice to write their lines in whatever form they preferred throughout the worksheet. Then, subjects were given the option to choose a process to explain in their own words. The prompts were as follows:

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Choose 1:

1. If you are given two coordinate points, explain how you would find the equation of the line between the points.

2. If you are given a table of points, explain how you would find the equation of the line between the points.

The goal of this activity was to help students think conceptually and explain their thinking process in a unique way. Students could have chosen to use formulas, graphs, or tables to explain their thinking.

Activity 3 (See Appendix C)

The final activity was a "Ticket to the Homework." This was a small worksheet that students completed before they were given their homework at the end of a lesson on point-slope formula. Students were given the ability to choose their own point to write the equation of a line:

"Now you pick a point (x,y).
a) My point is (___,___).
b) Write the equation of a line that has a slope of 3 and passes through the point you chose.

Then, at the end of the worksheet, students were given the option to tackle a "challenge" question that was more application based. The question was as follows:

Elsa can make temperatures drop at a rate of 6° F per second. We know that at 6 seconds, the temperature is 32° F. Explain how you would write an equation of a line to model this situation.

This was meant to challenge students to utilize what they had learned throughout the unit to dissect a word problem and apply it to their knowledge. In all previous examples, students had been given a specific point and slope, a graph, or a tabular representation. This word problem was intended to be a challenge because the students had not seen a question exactly like this in their classwork. However, they had the prerequisite skills to completely answer the question.

Research Implementation

Due to the environment of the study, the differentiation activities were taught in tandem with lessons based upon the district's curriculum. The activities were utilized as warm-ups, review, or tickets to homework. Students were not made aware of the differentiation, so as not to add bias to the study's results.

Data Analysis

Data was collected for each activity. The data was catalogued as "Attempted <question>," "Did <question> correctly," "Did <question> incorrectly," "Did not attempt <question>," or "Absent." Then, the proportion out of *n* was recorded.

Grades were calculated from the pre and post-tests from both the experimental and control groups. They were analyzed according to their five-number summaries and then compared using boxplots formulated from the data.

RESULTS

Analysis of the differentiation activities.

Table 1:
Activity 1: Desmos Activity (See Appendix A)

	Number	Percent of n = 36	Percent of those who attempted slide
Did Slide 10	29	83%	
Did 10 Correctly	28	80%	97%
Did 10 Incorrectly	1	3%	3%
Did not do 10	5	14%	
Did Slide 12	27	77%	
Did 12 Correctly	14	40%	52%
Did 12 Incorrectly	13	37%	48%
Did not do 12	7	20%	
Absent	1	3%	

Table 1 shows that more students were willing to try slide 10 rather than slide 12. Furthermore, out of the students that tried slide 10, 97% correctly completed the task. The data also shows that fewer students tried slide 12, and that slide appeared to challenge them seeing as only 52% of those who attempted the task constructed a viable word problem.

Table 2:
Activity 2: Practice with Everything (See Appendix B)

	Number	% of n = 36	Percent of those who chose
Correct but did both	16	46%	
Correct and did only one	14	40%	88%
Incorrect but did only one	2	3%	12%
Blank	4	11%	
Absent	1	3%	

Table 2 shows that 46% of students correctly responded to the final choice question in Activity 2, but failed to choose and instead answered both prompts. The data also shows that of the 14 students who employed choice, 88% explained the processes correctly, while 12% needed more detail or explanation.

Table 3
Activity 3: Ticket to Homework (See Appendix C)
2: Choose a point
4: Challenge

	Number	Percent of n = 36	Percent of those who chose
Did 2	32	94%	
Did 2 Correctly	26	76%	81%
Did 2 Incorrectly	6	18%	19%
Did not do 2	2	6%	
Did 4	20	59%	
Did 4 Correctly	7	21%	35%
Did 4 correctly with help	2	6%	3.5%
Did 4 Incorrectly	10	29%	30%
Did not do 4	15	44%	
Absent	2	6%	

Table 3 shows that 94% of students were comfortable with choosing their own points to find the equation of a line in Activity 3, and of those students, 81% were able to complete the question correctly. However, on the challenge question 4, only 59% students chose to attempt the question. Then, the data also shows that 3.5% of those students received help or guidance with the problem. Note that 21% of the students overall were able to complete the challenge question correctly without help or guidance.

Pre-Test and Post-Test Data Summary

Experimental Group

Control Group (*n* = 11)		
	Pre-test	Post-Test
Average	87.4	78.2
Min	69.4	60.0
Q1	84.7	67.5
Med	87.8	77.5
Q3	91.8	90.0
Max	95.9	97.5
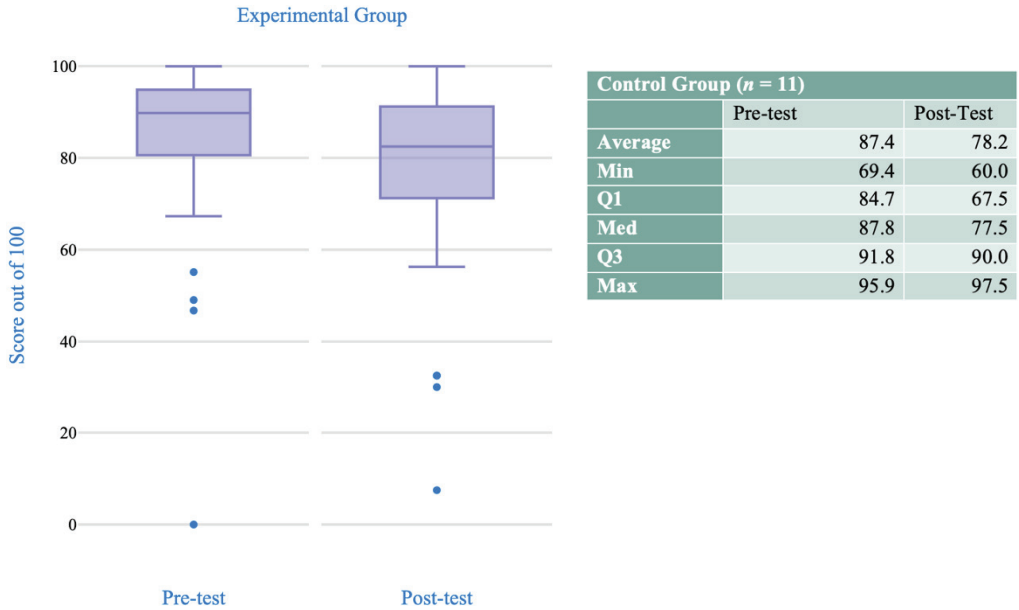
The data from the experimental group shows that the average score of the students in this sample dropped about 6 points overall. It also notes that the minimum increased by 7.5 points, while the maximum remained at 100.

Control Group

Experimental Group (*n* = 36)		
	Pre-test	Post-Test
Average	82.6	76.6
Min	0.0	7.5
Q1	81.1	73.1
Med	89.8	82.5
Q3	94.4	90.6
Max	100.0	100.0
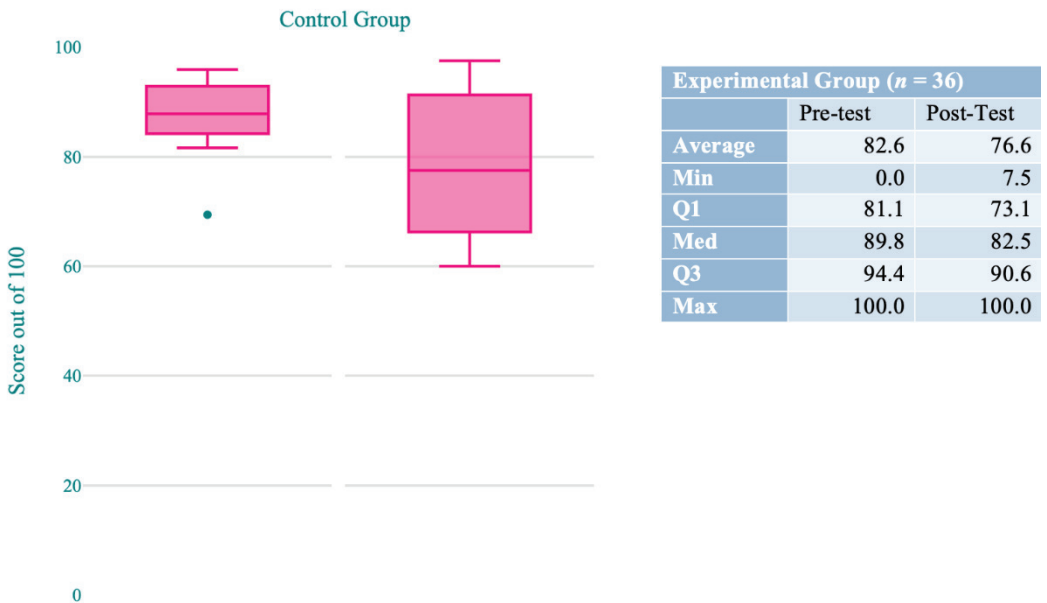
The data from the control group shows that the average score of the students in this sample dropped about 9.2 points overall. The minimum decreased by about 9 points, and the maximum increased by about 1.5 points. From the box plot, we can see that the spread increased with the post-test, indicating the scores varied more in this assessment.

Conclusions

The research shows that the differentiation activities did not cause a significant difference in the cores of the control group that was taught according to the middle school curriculum without added differentiation and the experimental group that was provided differentiation.

Activity Analysis

Activity 1

From the results of the Desmos Activity, we can conclude that students are more likely to choose to attempt "challenging problems" if they believe that they can find the correct answer. Slide 10 of the Desmos Activity (Appendix A) was an optional slide that students could work through, but it was similar to the slides that came before it and required many of the same skills for writing an equation of a line. Thus, because the question seemed familiar and conquerable, 83% of the experimental group attempted the slide. However, when students were asked to write their own word problem on Slide 12, using the skills they had acquired throughout the activity, there was a 6% dip in participation. We can also see that of the students who did attempt slide 12, only 52% of them created a word problem that was correctly written.

The results of this activity highlight the importance of risk-taking and mistakes in mathematics. People often hold the misconception that making mistakes is something to be avoided and that perfection is what is expected, not only in the classroom, but in real life. In her book Mathematical Mindsets, she discusses the founder of Starbucks: Howard Schultz. When Schultz first began his company, he set up stores based upon the coffee-shop scene in Italy, which clashed dramatically with what consumers in the United States were comfortable with. His team had to make many mistakes in design before landing on what is now one of the most popular coffee chains in the country (Boaler & Dweck, 2016). This example of making mistakes can be directly related to the mathematics classroom. It is imperative that teachers are supportive of mistakes because mistakes allow students to reflect and improve their learning. This also links to the zone of proximal development and students' metacognition. If a student never is challenged to make a mistake, then they will never have the opportunity to grow. Thus, a solution to the problem we see in Activity 1 is the development of a new classroom culture that focuses on the positives of challenges and the acceptance of errors as part of the learning process.

Activity 2

From the results of Activity 2, we see a different problem with choice. Recall that Activity 2 was a worksheet that practiced the many strategies of writing equations of lines and the element of differentiation was the final question where students were asked to choose to explain how to find the equation of a line from one of two representations: a table and a pair of points. The majority of students were able to complete this question correctly with well written explanations, however the interesting result that

arose from this worksheet was the evidence that students did not want to exclusively choose one representation. Instead of choosing either the table or the pair of points to explain, 46% of the students in the experimental group explained both processes and all of the students chose to explain their answers using a bulleted list or a paragraph.

The idea behind a question like this was to give students free reign to not only choose which representation they wanted to discuss, but also to allow them to explain their thinking process freely. Yet, we see a fear of leaving any question blank and we also see a conformity in their explanations. Boaler explains that many people see mathematics as a rigid subject where answers are cold calculations and nothing more. She points out that in order for students to truly thrive in a mathematics classroom, the curriculum and strategies must reflect the creativity and fluidity of real-world mathematics (Boaler & Dweck, 2016). These sentiments are directly related to the results of Activity 2 because we see a cohort of students who are unable to leave questions blank and are unaccustomed to explaining their thought processes in a creative way. Through the use of choice, students are able to explore what they personally find interesting, which helps them engage with the material (Lin & Small, 2010). However, the idea of choice and creativity must be embraced in the classroom on a regular basis.

Activity 3

The results of Activity 3 reflected similar conclusions to those from Activity 1. Students were more comfortable attempting question 2 because it was a low-risk question. They chose a point, and then found the equation of a line using the given slope. However, when faced with question 4, which was a word problem, only 59% of students attempted the question. This re-emphasizes the fact that students evaluate the risk of being incorrect before attempting a question.

When I wrote question 4, I wrote it knowing that students had the skills and knowledge needed to complete it. The problem was more difficult than the other questions on the worksheet, but I wanted to test the idea of keeping high expectations for students throughout the differentiation process. The other interesting result of this particular activity was the cooperating teacher's desire to help the students and/or give the students the answer. It is not reflected in the numbers, but the other teachers in the room were afraid that students would not be able to complete the problem and thought that the question was "too hard."

In the literature, Hunt explains that all students should engage in productive struggle. This means that students should be challenged and allowed to struggle in the classroom before they arrive at a correct answer (Hunt, Lewis & Lynch, 2018). Productive struggle connects to the idea of problem solving in the classroom. Jinfa and Lester emphasizes the importance of including problem-solving in the mathematics classroom because it enhances students' conceptual understanding, reasoning, and communication skills (2010). Problem solving and productive struggle work hand in hand to ensure that students are active learners who understand that making mistakes, taking risks, and struggling are natural parts of a learning process. The idea of a parent

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teaching a child how to ride a bike comes to mind; eventually the training wheels have to come off and the parent has to let go of the bike to see if the child can do it alone. The knowledge and skills that teachers provide are like training wheels and scaffolds are the hand holding the bike, but eventually the expectation is that students will be able to support themselves.

Pre- and Post-test Analysis

Because the pre- and post-tests were created by modifying locally-developed assessments, the post-test contained newer information. This can account for the decrease in overall scores from the pretest to the post-test. It should be noted that both the control group and the experimental group experienced a drop in scores, which indicates that the differentiation activities do not show a notable negative affect on students' test scores.

General Analysis

In summary, this study exposed the barriers in the classroom that can affect the success of differentiation. It is crucial that the ideas of choice, productive struggle, and high expectations are upheld and ingrained in a classroom's culture before differentiation is implemented. Without these ideas we saw that students were afraid to take risks, afraid to leave questions blank, and afraid to struggle. We also observed that teachers were not accustomed to embracing mistakes and productive struggle as part of the learning process.

Suggestions

It is suggested to try utilizing differentiation strategies such as choice, open-questioning, and challenges on a more consistent level in the classroom. Finlayson mentions that inconsistency in differentiation from grade-level to grade-level can create students who are not motivated to challenge themselves and take risks (Finlayson, 2004). This directly relates to the evidence in this study where students were less likely to choose to challenge themselves. Boaler relates this fear of a challenge to a set mindset in mathematics, which can prevent students from believing that they can advance and succeed in the subject area due to stereotypes and misconceptions (Boaler & Dweck, 2016). Thus, an important part of differentiation is inevitably classroom culture and consistency of education. In order for students to understand the goals of differentiation and embrace the practice, they must be taught to have a growth mindset. They should be encouraged to make mistakes and take risks in their mathematics classrooms from year to year. Differentiation should not be an isolated practice, but rather a continued strategy that students become familiar and comfortable with.

If this study were to be done again, it would be valuable to observe multiple, randomly selected cohorts of students that better represented the education system. It would also be useful to observe the students over an entire school-year or more to observe the effects of an established classroom culture of differentiation, rather than a three-week study. An agreed set of differentiation strategies could be taught to the

teachers of these cohorts in order to establish consistency. By increasing the sample size, randomizing the sample, and increasing the timespan of the study, it is possible more significant results could be found.

Appendices

All appendices are located in the online edition of *Proceedings of GREAT Day 2020*, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/11

Appedix A: Activity 1 - Desmos Activity

Appendix B: Activity 2 - Practice Worksheet

Appendix C: Activity 3 - Ticket to Homework

Appendix D: Pre-test

Appendix E: Post-test

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Within the Known: Wonder That Comes from Understanding

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sponsored by Steven Derné

ABSTRACT

Peter Marchand claims that understanding is contradictory to wonder, describing only two Sub-Rasas of the Adbhuta Rasa (the Rasa of Wonder). The first Sub-Rasa includes wonder that occurs when there is a lack of understanding of an experience that could be understood. The second Sub-Rasa comes from not understanding experiences that cannot be understood. Marchand fails to discuss the possibility of understanding leading to or supporting experiences of wonder. He even suggests that when understanding is obtained, previously experienced wonder is greatly diminished. To explore the concept of wonder, thirty interviews were conducted by fifteen students in the SUNY Geneseo SOCL 476. Each subject was interviewed about their experiences with wonder, enchantment, and surprise, and asked about how those experiences affected them. The findings from this study confirm that people experience wonder from a lack of understanding, but that they can experience wonder from understanding as well.

Wonder is a largely unexplored phenomenon in sociology. Some scholars have claimed that due to technology, bureaucracy, and scientific thinking, our lives have become disenchanted and lacking wonder. Other scholars believe we still experience wonder, but that it is limited in certain ways and that there are barriers to this experience. Peter Marchand says that there are only two types of wonder, wonder that occurs when one does not understand something but know it is understandable, or when one does not understand something and know it cannot be understood. Marchand misses the possibility of experiences of wonder that result or are supported by understanding and our interviews suggest that this experience of wonder is possible.

LITERATURE

Marchand writes about the basis of wonder and its Sub-Rasas. According to Marchand, "wonder comes when we recognize our own ignorance" (2006, p. 55). This meaning that wonder occurs when we can acknowledge that not everything can be understood. Marchand (2006) describes this experience as the ego surrendering and therefore allow-

ing wonder to take over. He describes life as needing mystery and opportunity for learning to be wonderful. According to Marchand, "the moment we know what is happening and how, the Adbhuta Rasa disappears" (2006, p. 56). The Adbhuta Rasa is the Rasa of wonder. Therefore, Marchand claims that knowledge or understanding diminishes wonder to the point of extinction.

Marchand (2006) writes that there are two different Sub-Rasas of wonder. The first comes when we have an experience that we do not understand. However, we know that the experience *could* be rationally understood (Marchand, 2006). The second Sub-Rasa occurs when an experience is not understood and there is an expectation to be able to understand it. This second type of wonder is thought to be much stronger than the first as it completely subdues the ego (Marchand, 2006). According to Marchand, the more the ego is subdued, the greater an experience of wonder can be. The ego is the part of us that attempts to understand everything and is threatened by a lack of understanding. It is for this reason that the Rasa of Fear is friendly to the Adbhuta Rasa. As Marchand writes, "that which we do not understand always becomes a little fearsome" (2006, p. 58). Both Fear and Adbhuta Rasa's work to subdue the ego. To master wonder and completely subdue the ego, Marchand (2006) writes that one must keep an open mind towards a lack of understanding. In fact, he suggests that to reach the highest Wonder Sadhana, one must "completely refrain from the idea of understanding anything" (Marchand, 2006, p. 60). Understanding only serves to diminish wonder and feed the ego. On the other hand, Wonder is helpful to the Rasa of Joy and Marchand (2006) writes that Joy is the Rasa most often produced through Wonder.

Methodology

The data for this study comes from a collection of thirty interviews conducted by the fifteen students in SUNY Geneseo's Sociology 476 senior seminar class. Each student in the class conducted two interviews with people they knew about wonder, enchantment, and surprise. Of the thirty interviews, seventeen were male and thirteen were female. Twelve of the participants were categorized as college aged (ages 19-20); seven were between ages 23 and 26; seven were between the ages of 51 and 60; and four were of retirement age (ages 61-74). Students were instructed beforehand on how to protect human subjects when interviewing and made sure to get informed consent from all interview subjects. They agreed to be recorded and were told the recordings would be destroyed after they were transcribed. Subjects were also informed that the transcripts of their interviews would be distributed to the senior seminar class and could be used in writings by students or the professor. Any identifying information was removed from the transcripts before they were distributed to the class.

The interviews started with a background statement that stated some scholars believe that the world has become disenchanted, but that our professor believes people still experience wonder today. Interview subjects were asked, "Have you ever experienced wonder, enchantment, or surprise in your life? Or maybe your life has always been

disenchanted, dull, and predictable?" In response to this question, subjects were asked to describe an experience of wonder, enchantment, or surprise they faced in their lives. Students were provided with certain open-ended follow-up questions which included asking how they responded to the experience, did they reflect on the experience afterwards, and if the experience changed how they think or live. Subjects could provide as many examples as they wanted and were free to terminate the interview at any point.

When analyzing these interviews, I looked for evidence of understanding and its effect on wonder. I specifically looked for the words understand, knowledge, or learning. I also looked at the subject's descriptions of their experiences of wonder and whether it included a lack of understanding, an experience of learning, or the presence of understanding their experience. Doing this I was able to find several examples to support both the Sub-Rasas that Marchand (2006) discussed, as well as my suggested third Sub-Rasa.

FINDINGS

The First Sub-Rasa

As Marchand (2006) suggests, understanding was seen to diminish wonder for some subjects. When reflecting on an experience of wonder during Independence Day, Mr. Frederick was asked why he thought that experience led to feelings of wonder. In response, Mr. Frederick discussed his wonder at the concept of fireworks as he was young and did not yet understand them. This is an example of the first Sub-Rasa of wonder in which something is not understood, but it could be. Mr. Frederick says, "I think that if you understand things better, there is less wonder and surprise." This statement supports Marchand's description of the first Sub-Rasa and his theory that understanding acts to decrease wonder.

This Sub-Rasa is also supported by Mr. Alexander's description of wonder as he said, "wonder is that thing a child has before they learn something." This statement suggests that wonder is found in things that are not understood at the time but can be understood in the future. This is an idea that is echoed by Mr. Culberson who, like Marchand (2006), stressed the importance of mystery in the experience of wonder. When asked about the effect taking away that mystery would have on his experience of wonder he responded, "I guess it would kind of ruin it." The wonder of his experience was that it was not understood, despite the fact that it could have been. He supports the idea that understanding would destroy the wonder and enchantment of his experience.

The Second Sub-Rasa

The second Sub-Rasa of wonder, which comes from not understanding that which cannot be understood, was also experienced by some subjects. When asked about what wonder means, Mr. Alexander responded, "Just the unexplainable, joy and fas-

cination." He goes on to discuss spirituality and human energy as sources of wonder that cannot be explained by science, therefore finding wonder in not understanding this that escapes human understanding. Additionally, both Ms. Henderson and Ms. Domhoff discussed experiences of wonder that had to do with the death of a loved one. Although both note the experience was tragic, they found wonder in the lack of understanding about death and the afterlife, something which cannot be understood. Ms. Henderson said, "It's a natural part of living, but there's so much not known about it." The absence of understanding allowed for the ego to be subdued and wonder to be experienced.

A Third Sub-Rasa

The third aspect of wonder that Marchand (2006) neglects to look at is when understanding actually produces or supports an experience of wonder. When asked about an experience of wonder, Mr. Davis described the experience of gaining an understanding in class. He said, "In class when certain things click when you are trying to understand something …. When everything kind of clicks together kind of is a moment of wonder." This experience counters Marchand's (2006) claim that understanding only works to decrease wonder. In this case, it was the experience of learning and gaining the understanding of the class concept that allowed Mr. Davis to experience wonder. Mr. Davis also noted that this experience led him to feel "happy" and in a "good mood," descriptions that reflect feelings of joy, the Rasa produced through wonder.

When asked about her definition of wonder, Ms. Henderson also discussed understanding. She described wonder as "the process of figuring it out." Contrary to Marchand's (2006) reasoning that we must stop trying to understand things in order to experience wonder, this statement points to looking for understanding as a source of wonder. Mr. Keller also gave a similar description when asked about what wonder means to him saying, "That's not knowing the unknown to me. And wanting to know what it is." He again looks to the process of looking for understanding and trying to fulfill curiosity as the experience of wonder, rather than the antithesis of it.

When reflecting on his experience of wonder and enchantment, Mr. Parker rejects the idea that understanding diminishes wonder. In his experience, he saw someone wearing a shirt on an anniversary date that had to do with that shirt. At the time this was a wild coincidence that could not be understood or explained. However, Mr. Parker mentions that a logical explanation was later found. His initial experience reflects the first Sub-Rasa as it was an event that was not understood but that an understanding could be found for. When specifically asked if his wonder disappeared however, Mr. Parker responded, "no, not really." Meanwhile, Marchand (2006) would claim that finding the understanding and explanation for this occurrence would make the wonder disappear.

LIMITATIONS

The data collected for this study has certain limitations in its representativeness, validity, and ability to determine prevalence. Firstly, the subjects chosen to be interviewed were selected by the student interviewers as people who were likely to talk about wonder. It is possible that there might be less instances of wonder discussed by a random sample of subjects rather than a convenience sample. Additionally, the data consists of only thirty interviews, a small sample from which to draw conclusions from. Furthermore, this sample was not designed to be representative of the population of interest. For example, we had no interview subjects between the ages of 27 and 50, leaving a large gap of subjects unaccounted for who could have different experiences of wonder.

The validity of this study could be low due to researcher subjectivity as the questions were not designed to capture the subject's ideas about understanding, so the quotes from interview subjects had to be interpreted to some extent. Therefore, it cannot be certain that the information drawn from the interviews truly means what I interpreted it to. Some barriers to validity for this study came from a possible lack of frankness by subjects or an unwillingness to tell about certain experiences of wonder. Reactivity is also a concern as interview subjects could have tailored their responses to what they thought the interviewers wanted to hear.

Finally, the prevalence of these different experiences of wonder cannot be known as the interview questions were open ended and all the information was volunteered by the subjects. Without specifically asking about understanding during the interview, there is no way of knowing if the subject had no experience of wonder intersecting with understanding, or if they simply did not mention it in their volunteered answers.

SUGGESTIONS FOR FURTHER RESEARCH

For future research, conducting this study with another sample that was designed to be representative of the population would help increase representativeness of the data. Furthermore, getting a sample of randomly selected individuals would increase representativeness as well.

Using another method of data collection such as a survey or an interview with more direct questions about understanding and wonder would be helpful. Both would increase validity as direct questions would make it clear what the subject is referencing in their answer. Less interpretation of their quotes would be needed. These other methods could also give an idea of the prevalence of different experiences of wonder and understanding as it could be directly asked about, rather than relying on subjects to volunteer that information or not.

It would be interesting in further research to analyze the education level of those who have different experiences of wonder and understanding to see if there is any correlation. Could having a higher level of education or an education profession lead people to find wonder more in understanding than in a lack of understanding? I would

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also be interested to see if religiosity has any effect on the link between wonder and understanding. Many religions stress the idea of not understanding everything but putting faith in a higher power so that understanding is not necessary. Would being raised with this mentality make people less likely to seek understanding of wonderful experiences?

After analyzing the data from this study, it seems reasonable to conclude that understanding can contribute to wonder in ways that Marchand (2006) did not suggest. Although he claimed that understanding is contradictory to wonder, interview data collected by fifteen sociology students shows that understanding can be a source of and support for wonder. Future research would need to be done to address issues of representativeness and validity of this study and to enable any claim about prevalence of this sort of relationship between understanding and experiences of wonder.

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Wonder is in the Eye of the Beholder, Rather than the Event

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sponsored by Steven Derné

ABSTRACT

This study wishes to tackle some of the mystery of wonder. To do this, thirty open-ended interviews were conducted asking participants to describe their experiences with wonder. Results reveal that some who experience wonder will process the event internally, rather than placing that emotion on the object. This paper outlines the data and suggests further studies that could be conducted for this thesis.

Wonder has always been a mysterious emotion. The idea has been considered to be so abstract, that several scholars believe that people do not fully process wonder when they experience it. Vasaolu (2012) states that people place their emotion of wonder on the event instead of recognizing the feeling internally. This study, however, neglects that people do recognize when they are experiencing wonder.

Considering thirty interviews that were conducted during Fall 2019, results suggest that most individuals do recognize when they are experiencing wonder. However, there are some problems with this acquisition that I address later on in the paper. I also provide some options for further study. While there are some complications, I believe this is a good starting point for more interesting research within this realm.

In Vasalou's "Wonder: Toward a Grammar," she states that people have "a tendency to draw emphasis away from the emotion [of wonder] as an experience, and channel it toward the object that excites it" (2012, p. 24). This happens because "wonder appears to register as a rather elusive presence to those who would seek to understand it" (Vasalou, 2012, p. 17). Due to this lack of comprehension, people tend to distance themselves when they experience wondrous events. This distance can be seen when people tend to attribute the sensation of wonder "to the object rather than an emotion ascribed in the first person to oneself" (Vasalou, 2012, p. 24). Whether consciously or not, people rarely consider wonder as an emotion they are feeling due to the confusion they feel from the event. Rather, they interpret wonder towards the event or an object, thus deflecting the emotion from themselves.

Vasalou provides further examples by noting how the statement, 'I wonder' is a grammatical anomaly in modern-day speech compared to common phrases like 'I'm scared' or 'I feel terrified.' I-statements are more commonly used towards other emotions like fear, but very rarely expressed with emotions of awe. Wonder is instead expressed through phrases like 'Wow!' or 'How wonderful!' Note how these phrases do not discuss any personal emotions; neither are they directed towards anything other than the object. This means that the viewer often interprets wonder only through an event. They also are not fully realizing that they are experiencing the emotion of wonder. However, I argue this is not the case due to our research.

For this study, thirty qualitative interviews were provided by students in a section of Sociology 476 during Fall 2019. Students each contacted two people they had close relationships with to be interviewed. Interviewees were asked about their experiences of wonder and how it affected them. Following questions included have you ever experienced wonder? How have you reflected on these moments of wonder? Can you describe a specific instance of wonder? Questions were a basic guideline for these interviews, but they were not mandatory to be asked. Rather the interviews were open-ended. These interviews were then analyzed to identify similar patterns with wonder.

After studying the data, I found that eleven out of thirty interviewees did use I-statements when discussing wonder. Examples of such phrases can be seen by Mr. Frank when he stated "I wonder at my luck to experience such a thing," or "I wonder at it every time." Others like Mr. Alexander also used the phrase, "I experience plenty of wonder." This goes against what Vasalou was saying. At least a third of the interviewees realized that they felt wonder and attributed that emotion to themselves.

There were also cases where wonder was directly placed towards themselves, rather than in the event. Six out of thirty interviewees found wonder in themselves. Mr. Baker found wonder in living eight years after he was diagnosed with ALS. Other people also found wonder in being alive, such as Ms. Gregory who described "realizing that [she] was alive...and was [then] overcome with joy." Ms. Young found wonder when she went "to a foreign country alone and came out with really good friends on the other side." Ms. Henderson also found wonder in having the ability to give her partner sexual pleasure. She described it as making her feel "powerful." All of these instances are important to note because it shows that not only are these participants acknowledging that they are processing wonder, but they are also finding the origin of their wonder internally. This seems to be a whole other tier of agency in wonder that Vasalou did not explore.

It is also interesting to note that some people were not completely detached from the meaning of the experiences as well. This disproves Vasalou's belief that wondrous events are too elusive for people to comprehend. Mr. Parker describes how he viewed a bird pooping on his car on the anniversary of his friend's death. As Mr. Parker described it: "That was [him] fucking with me. I know it. He's still got that sense of humor." For Mr. Parker, while the initial event was shocking, he was able to compre-

hend the event afterward as a sign from his deceased friend. Mr. Parker shows no sign of confusion or ambiguity about the event anymore. This decision also does not lessen the sense of wonder for the interviewee.

There were certain limitations in this study. The first problem being the validity of the study. Validity describes how well the measure describes the concept. Due to the data coming from qualitative open-ended interviews, the determination of validity and variables falls onto the researcher, which is a flaw in itself. One could interpret that I am biased to look for the answers that work for me, so the outcome is more skewed than truthful. In terms of what there is to look for, there was no correct answer to focus on. As you can tell above, I looked at various variables that I thought disproved Vasalou's statement. This includes looking for when interviewees directly used I-statements in their testimony. However, I also determined that looking for instances where people got wonder from themselves also proved my statement. I determined these variables to be important, however, other people may not disagree. Others may also claim that I could look for other variables to prove my thesis.

Another problem in terms of validity is that the interviews were not focused on the variables I deemed important. This round of interviews was more so meant to get a starting point on the topic of wonder. This leads to the interviews being more vague rather than focused on my topic. In an interview that focuses on the variables I discussed before, there would be more data for me to study. So these interviews do not fully exhaust the capability of my thesis. There were also other problems related to validity in that the interviewees could have forgotten their experiences of wonder, which is a loss of data to study. Others may also not be comfortable to share these moments of wonder with the interviewer.

There is also a problem in terms of representativeness in the interviews. Representativeness describes if the data represents the population, which again helps maintain the validity of the research. Interviewees were personally contacted by interviewers, so interviews weren't conducted ensuring that they were representative of the population. This denies our research from reaching those who are not within the social pool of the interviewers. This in turn can affect our prevalence in our research. Prevalence is the amount of results proven during research. As I said before, validity and representativeness are both lacking in this study for my topic, and so this in turn hurts my prevalence. While some research proves my thesis, there needs to be more research done with a larger pool base and more focused variables to confirm my topic.

For further research, I would also recommend sending out a survey to a larger sample size in the general population. The questions in the survey should pursue the variables I have studied earlier. While I did find some interesting results, the numbers just were not there. It may be beneficial to see if these variables have weight in the population, or if they were just independent coincidences. If there were no statistical significance in these variables outside of the first interviews, then there would be no point in studying it further. This would also be a good place to see if the variables I studied previ-

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ously were worth considering for the next round of open-ended interviews. However, it also may be smart to think about other variables of agency in wonder.

Questions in the survey include: Can you think of an instance where you found wonder in a person, or yourself? Do you think it is possible to feel wonder? The variables I am most concerned about are the more interpretive and rare ones, which may prove to be harder to calculate in a quantitative method. However, maybe placing examples beforehand will help people open up more. Such as paraphrasing Mr. Parker's experience and then asking survey takers if they have faced similar circumstances. Thus, it may be beneficial to allow a space after questions and answers for survey takers to explain their answers further.

At this point, it may be clear to see that I highly emphasize another round of open-ended interviews for this thesis. Specifically interviews with a greater focus on examples of personal agency in wonder. While I believe what I have done already is a good start, it is more interpretation than solid proof. The surveys will provide the numbers to prove that the thesis is noticeable in the population. However, the interviews will provide more focused answers and more definitive results. Questions could ask interviewees the survey questions while probing for further information. Questions could follow in the form of: Can you think of an instance where you found wonder in a person, or even yourself? Can you explain further? How important do you think personal reflection is with events of wonder? Do you have an example? I would still recommend the open-ended and fluid structure we exhibited in our first round of interviews, since through interviews. One could find even more variables to study and pursue. It would not benefit anyone to limit both the interviewer and interviewee of paths to follow.

After studying thirty interviews, I hoped to find evidence that people do not distance themselves from wondourus events, such as Vasalou stated. To do this, I searched for instances where people used I-statements to describe their experiences and announce they were actively feeling at the moment. I also described instances where wonder was not reserved only to the event, but rather within themselves. While I am proud of the work I have done thus far, there are still problems in terms of validity and representation in the data. I suggest further research for more focused questions in both surveys and open-ended interviews. However, I do think this is an interesting topic to continue researching.

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An Interview with Steven Derné

Ethan Owens

Steven Derné is Professor of Sociology at SUNY Geneseo and ten-year sponsor of GREAT Day. He sponsored three papers that appear in this volume of *Proceedings of GREAT Day*.

Could you tell me about some of the nominations you made for GREAT Day?

The latter two papers [Odette and Vick] are from a senior seminar. In the senior seminar, which they are from, all of the students did two interviews about the experience of wonder. Wonder is something that's understudied in sociology. Sociology is very concerned with disenchantment, but has no theorization of enchantment.

So, the second paper by Vick, there hasn't been much empirical research and philosophers often think that wonder comes from things where you encounter something that you don't know. So, some of the interviews found that people did encounter wonder from what they did know. So, Vick's paper showed that opposed to what the philosophers say, that wonder doesn't always follow from the unknown. It also could follow from knowing things.

[Odette's paper] is also a really radical change. In philosophy, people assume that wonder is something that people don't talk about in themselves. They talk about wonders that they came upon something that wonders. So unlike other emotions wonder is something that, the philosophers say is, in the event, not in the person; however, many of the people who we interviewed, roughly one third, talked about how they felt wonder on their skin how they, had they tried to chase after wonder. So, basically these papers are making great contributions to sociology of wonder, which is an understudied topic. And I got to revise and resubmit writing a paper with these people. It just goes to show how it's super important research. So that's why I shared them, it's well written stuff but it was also smart important research.

So, we had read some studies about how class shapes what people learn about emotions. The basic idea this is very common in the sociology of emotions, that people who are upper middle class, children learn that their emotions matter their parent's emotions matter. Then in the working-class families, the research tends to show that it's more of behavioral, instead of controlling emotions they control behavior. Camilo's paper suggests that this class differences are kind of over layered on some kind of cultural differences associated with being a Latina, so that means that, although her parents were middle class, she argued that some of the cultural traditions associated with being a Latina played some role in shaping that parenting styles. Now, with the other papers. I tried to look at what are the best eight papers in the class trying to put together a panel. But

Camilo really reached out to me that she wanted to do GREAT day, which I thought was really great. Those papers were done in the spring, so she had to wait all year to do them. And I think it really showed excellence in terms of, well it was good paper and smart for sure, but she also showed excellence and kind of reaching out to like to GREAT Day. And in this case, actually I didn't have to do that; rather, Camilo reached out to me.

Has GREAT Day changed over the past ten years, that you could notice, in any sizable way?

This is obviously the first time doing virtual GREAT Day but no, the greatest thing about GREAT Day, the thing I like most, is that the students rise to the occasion, so they always do very good papers. Sometimes the papers are not that good in writing but they're very good when they're presented, and the students support each other.

How do you think an undertaking like virtual GREAT Day affects the landscape of GREAT Day, if at all?

If the students didn't want to do it, I wouldn't do it. I think it's great that the students research is recognized. I think that it's good, but I think it's going to be a darn lot more difficult. The students rise to the occasion and they can do whatever they want but this situation is just like everything else, it's not going to be as good. However, it's good to see student researchers recognized. That's the most important thing is to see research is recognized.

The Ills of American Capitalism and the Case for Reparations

Emma Mandella

sponsored by Maria Lima

ABSTRACT

Chattel slavery was the foundation for capitalism in America, and the extreme impact it has had on economic development of the nation has made American capitalism into a system uniquely cruel to its working class. This uniquely American preference of profit over worker security began with the seemingly endless profit from slavery, and can still be identified in worker exploitation today. A close reading of Matthew Desmond's "In order to understand the brutality of American capitalism, you have to start on the plantation" brings forth the realization that an oppressive capitalist system continues to work against black Americans. From the Reconstruction period until today, structural inequality permeates the lives of African Americans; housing discrimination, unfair lending practices, and social discrimination culminate in the perpetual subjugations of black citizens under American capitalism. Based on this, I will argue that to achieve any lasting solution to such inequities, optimal reparations must attack structural injustice, and (perhaps most importantly) work outside of American capitalism itself.

The 1619 Project is an effort by *The New York Times* to prompt a reconsideration of the beginning of American history. This project states that, rather than in 1776, the United States truly began to take shape with the arrival of slavery in 1619. The articles within the project trace various aspects of American culture back to chattel slavery, showing how the impact of the institution is still felt in many aspects of society. One article explores slavery's influence on the creation of American economic power and the uniquely cruel system of American capitalism. Matthew Desmond (2019) argues that American capitalism has a uniquely cruel nature because of its foundation of slavery, and many financial practices at work today reflect those practices used for an insidious purpose in the past. Based on the evidence from his article and the rest of the 1619 Project, not only would I agree with his point, but I would argue that the original injustice that founded the nation's economy is compounded by the perpetual economic disadvantage faced by Black people today. Considering slavery's continued impact, a common question is how the nation may rectify these structural injustices for Black people. One case for repaying those who society has perpetually forced into this disadvantaged state

is reparations. Although there are many proposals, I see a necessary element of reparations to involve somehow subverting modern American capitalism. The practice is so thoroughly informed by chattel slavery that it is difficult to imagine any solution to injustice within this system. As Black oppression seems historically and necessarily tied to American capitalism, I would argue that the optimal system of reparations must work outside of this framework, and call upon alternative economic practices for solutions.

Chattel slavery was the foundation for capitalism in America, and the extreme impact it had on economic development in the nation has made American capitalism into a system uniquely cruel to its working class. Desmond (2019) characterizes this particular breed of capitalism as involving constant competition over a depreciating price and a large body of unskilled laborers in a strict position of inequality under an uncontrolled market of greed. To understand the extremism of American capitalism specifically, one can compare working conditions in the United States to other countries. For instance, as Desmond reminds us, the United States lacks worker protections when compared to other developed countries. American union membership falls short considering that "Only 10 percent of American wage and salaried workers carry union cards" (Desmond, 2019, p. 32). Furthermore, the United States scored second to last on a scale from the Organization of Economic Cooperation and Development that ranked the protections of temporary work arrangements (Desmond, 2019, p. 32). While there may be alternate explanations for the lack of worker protections, Desmond makes a compelling argument that slavery was the most influential factor in creating this oppressive form of capitalism, and the diversity of the other nations referenced in his statistics strengthens this. In the statistics on union membership, high-scoring nations range from Ireland to Italy, two countries which have plenty of cultural differences. Therefore, the lack of worker protection through union membership in America cannot be purely due to cultural differences; an element of the American economy must set it distinctly apart from other capitalist economies to explain this disparity. It may seem initially alarming to trace modern American capitalist practices back to slavery, but Desmond connects this past brutality to oppression today, as well as the similarities between practices today and in the past.

If American capitalism is unique today in its preference for absolute profit over worker security, this began with the seemingly endless profit from slavery. After the rise of the cotton industry, the most valuable trade in the nation was slavery. This led to a concentration of wealth in one class and location; as Desmond states, "The Mississippi Valley was home to more millionaires per capita than anywhere else in the United States" (2019, p. 32). Not only was the trade extraordinarily lucrative, but the reward was available to a small class profiting from the subjugation of others. Once planters acquired the necessary land through abuse of Native Americans, Desmond claims that industrialization increased the demand for enslaved peoples as cotton became easier to harvest and sell with inventions like the cotton gin (2019, p. 33). With the advent of new technologies, the value of enslaved peoples skyrocketed; as the cotton industry became more lucrative, the slave trade grew to match this demand. Desmond cites

the massive scale of slave labor: "As slave labor camps spread throughout the South, production surged. By 1831, the country was delivering half the world's cotton crop, with 350 million pounds picked that year" (2019. p. 34). What helped secure slavery's place in the American economy was the cyclical nature of its profit. One may posit that American capitalism is not brutal in its own right, because European nations participated in the trade, but this domestic trade refutes that. The profit from slavery and the crop trade was self-sustaining in the United States, so the desire for profit from inhumane treatment continued, even after the international slave trade came to a close. The seemingly endless amount of money the planter class made at the expense of human lives has given American capitalism a particularly violent foundation, one unlike other nations.

The fundamental place the cotton industry and slave trade have in the history of American capitalism is demonstrated generally, but specific economic practices also have roots in chattel slavery. The hierarchy of power present on the plantation itself is reflected in a bookkeeping process that became necessary as the trade expanded. A new practice rose from the plantation, and Desmond states that those in power "developed complicated workplace hierarchies that combined a central office, made up of owners and lawyers in charge of capital allocation" (2019, p. 34). Data collection was the logical result of this accumulation of bodies and assigning value to so many human lives. To efficiently sustain profits, it became important to keep track of every aspect of the economy and identify the money involved. According to Desmond, this bookkeeping "developed to maximize returns also helped to ensure that violence flowed in one direction, allowing a minority of whites to control a much larger group of enslaved black people" (2019, p. 35). Not only did data collection allow the class profiting off of slavery to squeeze any money they could out of the labor from each enslaved person, it also helped sustain the unequal power structure with physical violence and maintain control over the people. Some historians attribute intense bookkeeping to the railroad industry, but as the 1619 Project makes abundantly clear, the alternative start is far more sinister (Desmond, 2019, p. 34). This claim allows historians to separate modern industrial practices from slavery, and depict the institution as far removed. However, the importance of data after industrialization got its inhumane start on the plantation. Desmond references statistics to demonstrate only maximum profit as the goal and data as the support, as "enslaved black people became America's first modern workers, their productivity increasing at an alarming pace…The average enslaved fieldworker picked not 25 percent or 50 percent as much but 400 percent as much cotton as his or her counterpart in 1801" (2019, p. 35). Scrutinized data extracts the max amount of productivity and profit from each worker, but simultaneously dehumanizes the worker in the eyes of their superior. One specific practice he cites involved "assessing the market value of enslaved workers over their life spans," intentionally neglecting the value of human life for money (Desmond, 2019, p. 34-35). In today's American workplace, data analysis is enormously impactful on the lives of workers; the worker's use of time, activity, and profit are all monitored in their workplace. Capturing their every movement allows a company or superior to determine

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methods of maximizing worker productivity (Desmond, 2019, p. 34). Considering that the roots of this surveillance lie in the brutal practice of chattel slavery, one can trace the unique abuses of American capitalism from this history to today's modern work practices.

The direct parallels between economic practices during the era of slavery and the modern capitalist workplace clearly connect the two time periods, but slavery's influence is also found in the repeated institutional subjugation of Black Americans from public government interests and those of private institutions. Once abusive capitalism became a mainstay in the American economy, so did the suffering of Black people. Due to this connection and the continuous rise of capitalism, Black people still face economic inequalities with a lack of available opportunity for advancement. During the period of Reconstruction following the end of slavery, oppression continued in new forms. Ta-Nehisi Coates references a study done in 2001 by the Associated Press into the historic theft of land from Black people, which found "some 406 victims and 24,000 acres...The land was taken through means ranging from legal chicanery to terrorism" (2014, p. 56). The combined oppression from the public and private sector shows the effects of the nation's capitalist foundation; these American institutions exist as players in the same economy and thus as participants in a capitalism with roots in the economic abuse of Black Americans. Following this narrative reveals the omnipresence of the continuous robbery from Black people, even after the end of the initial structure for stealing property and labor that was slavery. Jim Crow Laws and Black Codes brought this trend into the modern era, which Trymaine Lee (2019) claims further limited the social and economic freedom of black people. Lee also mentions one horrifically unsolved terrorist attack in Oklahoma, when an estimated 300 black people were killed and 10,000 lost their homes (2019, p. 83). Attacks came from all sides: racist policies were coupled with racially motivated violence. Lee argues that Black Americans had "limited opportunity to accumulate wealth, and then you have a process where that wealth is destroyed or taken away" (2019, p. 83). The group historically faces restrictions from participating in the American economy. Once the opportunity arises, equal participation is extraordinarily limited.

This trend continues into the modern era, through the same unified oppressive project of the government and private companies. Both participate in the same abusive capitalism; therefore, they support the economy's unjust historical goal. Lee refers to a variety of social proposals that appear revolutionary such as Franklin Delano Roosevelt's New Deal. It economically benefited some, but failed to come to the aid of others, like Black workers (Lee, 2019, p. 83). This economic racial discrimination becomes most evident with the "redlining" phenomenon, which excluded Black neighborhoods from the thriving housing market supported by the Home Owners' Loan Corporation and the Federal Housing Administration. Coates specifies the policy and its discriminatory nature: "On the maps, green areas, rated 'A,' indicated 'in demand' neighborhoods...Neighborhoods where black people lived were rated 'D' and were usually considered ineligible for FHA backing. They were colored in red" (2014, p. 58). This was a government program, but one finds the same discrimination

in the private sector. Clyde Ross is one man who serves as an example of this larger phenomenon; as a Black man in Chicago, he tried to receive a private loan to purchase a home. However, the corruption is clear when Coates states, "The men who peddled contracts in North Lawndale would sell homes at inflated prices and then evict families who could not pay...They'd then bring in another black family, rinse, and repeat" (2014, p. 58). Under American capitalism, private companies and public government work together in this racial discrimination. Coates emphasizes the almost inescapable narrative this creates for Black economic growth, inevitably leading to other social problems; in Chicago, "a black neighborhood with one of the highest incarceration rates [West Garfield Park] had a rate more than 40 times higher than the white neighborhood with the highest rate [in Clearing]" (2014, p. 60). This incarceration rate can easily be attributed to the perpetual economic hardship forced upon Black citizens by the listed discriminatory practices. Unfair policy coupled with racial violence and private bias has a lasting effect which culminates in the perpetual subjugation of Black citizens under American capitalism.

Reparations is one proposed method to compensate for these constant historical injustices Black Americans face. In the political sphere, bills such as H.R. 40 are at the forefront of discussion. This bill would begin research into the oppression incurred upon Black people and how the United States government can begin to compensate for the problems. A common opposition to reparations focuses on the fact that there are no living enslaved people today, and therefore reparations is nonsensical. However, the timeline of discrimination for Black Americans shows the consequences of slavery still impact Black people today: the country still has issues to compensate for. Despite this, as scholars begin to discuss reparations, dispute arises over the forms it will take. Patricia Muhammad (2013) establishes "financial compensation from corporations and insurance companies in Western nation-states, awards of the current equivalent value of forty acres and a mule, [and] a trust fund for slave descendants" (p. 198-199). These are closely tied to economic growth under capitalism, and Patricia Cohen refers to similar examples, such as direct payments to descendants of enslaved peoples after identifying a specific number for the injustice faced. Despite their pervasive presence in discussion, Cohen takes issue with these types of proposals, grouping them into the "settlement model, a legalistic approach that looks backward to compensate victims for demonstrable financial losses" (2019). There are many models of reparations that perceive the solution in the form of economic repayment, however, this is not the only option available. Others support an alternative framework for a system of reparations that emphasizes social programs and collective community development.

The settlement approach reveals a temptation to work within the American capitalist framework, however, I see these proposals as problematic. They are still related to the economic system historically tied to Black oppression. From the country's inception, abuse of Black bodies fed economic growth to inevitably connect violence to capitalist greed. The claim that "America begins in black plunder and white democracy, two features that are not contradictory but complementary" from Coates has evident and compelling proof, but I would add American capitalism as complementary to this

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Black plunder (2014, p.62). One cannot achieve freedom in the same system that perpetually limits them, and so ideal proposals for reparations should be separate from the economic system that necessarily oppresses. Roy Brooks mentions a parallel example, in which "South African scholars report that victims of apartheid who received cash reparations were poor again within a year of receiving them" (2019). Although victims were repaid, the solution was only temporary, as the economic impact on the lives of the oppressed had already taken its toll. Rather than as payment, Brooks believes that reparations must be in the form of revolutionary structural change to support Black citizens. This adheres more to the atonement model, an alternative to settlement reparations that emphasizes long-term efforts that account for structural inequalities. Additionally, rather than continuing to entrench Black Americans in the oppressive capitalist economy, reparation proposals might look to other economic frameworks for solutions. This is not to say proposals for reparations should not involve money or profit in any form. Rather, reparations should be acquired by particular means and support structural change.

Structural change can be accomplished in a variety of ways, but certain commonalities lie in proposals for reparations that act separately from a capitalist system. Some economic frameworks show ways to analyze these ideas as distinct from capitalism. For instance, one socialist definition from Paul Le Blanc states that a core element of reaching liberty is acknowledging "[the worker's] demand for human rights and democratic guarantees...The socialist task is to not to deny democracy, but to expand it and make it more complete" (2010). A group achieves political freedom through unified uprising and the reclamation of democratic control for the historically neglected in the form of a bottom-up democracy. Essentially, the Black Socialists of America equate the working class with no control of their labor under capitalism to Black Americans who suffer the same, leading to a collective of unified workers to control the means of their labor production through self-management and reclamation. The marginalized community would set the standards for progress, and mass organization around the common goal brings about its achievement. In the context of reparations, a Black grassroots movement would adequately designate the demands of the community and remain separate from the force of white American capitalism.

Multiple proposals for reparations have this mobilization in common, as well as other counter-capitalist elements. An early proposal for reparations that aligns with this framework is a manifesto from the Student Nonviolent Coordinating Committee. A key element of this manifesto is a call for unified structural resistance of Black Americans against oppressive institutions, stating "[w]e call upon all black people throughout the United States to consider themselves as members of the National Black Economic Development Conference" (Black Manifesto, 1969, p. 9). This collective will demand a $500 million fund; parts of this fund go to structural change, such as a skill-training center, organization of welfare recipients, labor strike funds, community-owned land, and the construction of universities. Another group known as the National Coalition of Blacks for Reparations in America (N'COBRA) supports reparations in any form, but some specific proposals include redistribution of land,

educational scholarships, increased non-discriminatory health care, and funds for infrastructural community development. Once again, the group supports accomplishing these goals through Black mobilization, stating "N'COBRA shall organize and mobilize all strata of these Black communities into an effective mass-based reparations movement" as one of their primary goals (N'COBRA, 2004, p. 1). Eljeer Hawkins proposes other grassroots policies which repeat the demands of community development but include community control of local police forces, institutions they find repeatedly oppress Black communities and individuals. All of these groups eschew the capitalist model in their proposal, as each example emphasizes social programs and collective community cultivation achieved through mobilization.

If reparation proposals begin from the atonement framework and are separate from distinctly capitalist practices, they can accomplish the daunting project of reclaiming control of the class positioning and labor force of Black Americans. Rather than focusing on growing individual wealth in the Black community, reparations proposals from the referenced groups emphasize working within one's own community to better their total condition. Furthermore, mass mobilization within the Black community allows us the historically denied right of participation in the narrative and control of our fate. Considering the context of certain tenets of socialism stated by the Black Socialists of America, these proposals are hardly inspired by capitalist ideologies; each proposal seeks repayment not to competitive individuals, but to the community as a whole. Focusing on grassroots mobilization also allows Black people to determine the form reparations will take with a truly equal collective organization. From this movement, the redistribution of property and labor takes the varied forms listed to achieve structural change through redistribution of wealth owed to Black Americans and social programs to uplift the community itself. These reparations will grant security to the people, something perpetually denied. Considering this, a movement of this class allows Black people to organically assert the ideal means for solving problems within their community and confronting structural injustice. It is wholly unjust that slavery allowed America to become a capitalist economic power, and the impact of that core of America's economy is still felt today. It impacts Black Americans most heavily, as they often receive none of the benefits of this profit and wealth and are institutionally prevented from participation. If this capitalism has fundamental connections to slavery and informs the nature of capitalism today, then no quest for equality is complete without somehow remodeling or discarding this system. So long as reparations intend to equalize the playing field and respond to the racial disparities in America, they must be developed in a framework that is distinct from the nation's racially oppressive capitalist system.

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An Epistemological Account of the Logic of Propaganda

Michael Badalamenti

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ABSTRACT

Propaganda is an un-avoidable feature of modern society. It has been identified with multiple global conflicts, oppressive totalitarianisms, and misinformation campaigns that threaten democracy. Despite the world's popularization in discourse, it remains somewhat ambiguous, begetting many attempts to define and analyze the concept of propaganda. This project contributes to this effort by examining how propaganda involves itself in logical forms of reasoning and judging its value from an epistemological perspective. Propaganda can be interpreted through logically argumentative forms. These arguments are always improper, involving an invalid form or false proposition; therefore, propaganda cannot directly provide real knowledge. Nevertheless, it succeeds in leading its audience to adopt a belief or action through nonlogical means and the manipulation of available information. An individual may identify and avoid propagandas that rely solely on nonlogical techniques by working to identify their apparent logical flaws, although resisting them altogether still appears to be a major challenge. Unfortunately, propagandas that manipulate available information are far more difficult for an individual to avoid, due to their leveraging of the propagandee's lack of knowledge held by the propagandist and inability to find the truth themselves. The only way to effectively limit the negative epistemic influence of these propagandas may lie at the societal level, but specific solutions remain a subject of debate and additional research.

I tems called "propaganda" have had an influential role in the history of the last century. In one infamous instance, the Nazi regime used propaganda to mobilize the German nation to initiate one of the most destructive and atrocious wars the world has ever seen (Appendix 1-a). More recently, the Russian state has been accused of using it to polarize politics in the United States in advance of the 2016 election (Appendix 1-d). Democratic governments have not abstained from sponsoring its production either, as evidenced by the United States' mobilization for World War I and contemporary controversies over the content of state textbooks (Appendix 1-e). Upon closer examination, propaganda does not appear to be the exclusive product of political entities, nor is it only involved in major events: indeed, it seems that it is proliferated by a variety of public and

private organizations and can target activities that seem relatively inconsequential, such as the decision of a consumer to buy one product over another.[1]

This apparent pervasiveness of propaganda, especially in relation to movements that look to be dangerous to the overall wellbeing of society, is what motivated me to begin this project. I chose to look at these things called propaganda from the perspective of epistemology, the study of knowledge, and to evaluate their effect on an individual's ability to gain knowledge, something I consider to be basically and intrinsically good. To this end, I looked at how propaganda engages in forms of logical argumentation, as I consider logical reasoning to be the most reliable tool at an individual's disposal for arriving at true conclusions from available information, for gaining knowledge.

In doing so, I have developed a unique definition for propaganda—which is compatible with many pre-existing definitions—based in the necessarily improper format of its logical argumentation, and thereby its inability to give its audience knowledge directly. This definition can increase the capacity of an individual to identify, analyze, and potentially avoid certain kinds of propaganda, namely those with inherent logical flaws. There still exist other forms, however, that are more evasive, thanks to their manipulation of information made available to their audience and internal logical consistency, calling for more research into the subject of how these propagandas may be mitigated.

Background and Challenges to Defining Propaganda

To begin talking about propaganda, we must first establish a working understanding of the concept. Unfortunately, "propaganda" is a woefully ambiguous and sensationally charged term, so much so that some researchers have suggested that it should be avoided in analytical contexts (Marlin, 2013, p. 4). Some of this ambiguity can be traced in the word's complicated history.

Examples of propaganda can be found as far back as the Peloponnesian War, but the modern term did not appear until the 17th century, when the Latin *propagare* was used by the Catholic Church to describe missionary efforts to spread, or propagate, the Catholic faith (Miller, 2005, p. 9). By the 19th century, the word was still rather obscure in the Anglosphere, but carried fairly neutral connotations when applied, with it being used to describe ideological crusades and campaigns to promote public health alike (Miller, 2005, pp. 10- 11). Social, political, and technological developments by the turn of the century allowed for the creation of the first true mass media campaigns, which were used extensively during World War I by the German, British, and American governments to facilitate military and industrial mobilization (Badsey, 2014). The war had the effect of popularizing the word "propaganda" and, given the efficacy of these campaigns, legitimizing the careers of those involved in mass media persuasion (Miller, 2005, pp. 11-13).

1: This is not to suggest that all marketing is propaganda, though some of it is. This distinction is clarified in the *Stipulative Definition* section. For one example of marketing that is propaganda (Appendix 1-f).

This period also laid the groundwork for the word's pejorative connotations in English. "Propaganda" was used to describe German information efforts, which were denounced as malicious and deceitful, while the Allies avoided publicly applying the word to their own efforts, instead describing them as educational and informative (Miller, 2005, pp. 13-14). There was an attempt in the 1920s by some wartime propagandists, many of whom had now turned to working for the private sector, to recover the term's more neutral meaning, but these efforts failed (Miller, 2005, p. 15). Terms such as "marketing," "advertising," and "public relations" came to be used to describe their activities, while "propaganda" came to be associated with political and governmental activities, even though this private sector work used remarkably similar tactics (Miller, 2005, pp. 18-19). The extensive use of propaganda by the German Nazis during World War II and the Russian Communists during the Cold War seems to have solidified the word's negative connotations throughout the English-speaking world.

This turbulent history produced a variety of definitions of propaganda. Edward Bernays, an early pioneer and proponent of propaganda in the 1920s, described propaganda as the means of communicating the complex views and information of an organization or individual to others in a more consumable form, as a part of popular discourse (Bernays, 2005, pp. 38-39). He argued that propaganda was a practical necessity for a modern democratic society, as without it, the discourse at the foundation of democratic decision-making would be unworkable, because people lack the means needed to properly hear and digest the complete views of competing interests (Bernays, 2005, pp. 37-38). According to him, propaganda is actually beneficial to society, so long as propagandists followed a proper code of ethics (Bernays, 2005, pp. 69-70).

By contrast, Jacques Ellul, a French philosopher and sociologist that wrote in the 1960s and 70s, saw propaganda as an inevitable yet distinctly negative sociological phenomenon within a mass society, defined in a non-exhaustive way as "a set of methods employed by an organized group that wants to bring about the active or passive participation in its actions of a mass of individuals, psychologically unified through psychological manipulations" (Ellul, 1973, p. 61). Additionally, for Ellul, only successful propaganda is real propaganda (Ellul, 1973). It must totally encircle each individual's ability to find information, exercising every medium available, becoming constant, unignorable, and unchallenged, as anything less would fail in subjugating the individual to the propagandist (Ellul, 1973, pp. 9-14).

Disagreement over a proper definition of propaganda remains in the 21st century, especially over the necessary characteristics of propaganda. Such controversial or vague elements of definitions include: whether or not propaganda must be produced or spread by some intention; the relationship propaganda may have with truth; whether or not propaganda is necessarily beneficial or detrimental to a society; whether or not propaganda has some inherent ethical skew; the degree to which propaganda may involve actual alterations to an individual's environment or condition; the acceptable subject matter of propaganda (e.g. whether commercial marketing is a form of propaganda, or if it should be treated as a separate category, with propaganda restricted to

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the political realm); the audience for propaganda (whether it must target an entire society, a group, or just one individual); whether true propaganda must be successful or not; whether propaganda must seek to inspire action, or if shaping attitudes and beliefs is sufficient; and, whether propaganda must involve a large, organized campaign, or if more singular efforts can be included.[2]

Considering these controversies is a significant task when discussing propaganda. Should one draw a conclusion about a more restrictive definition of propaganda, another may inappropriately generalize that conclusion to a broader definition. However, resolving many of these controversies would be time consuming and of limited use for the purposes of more narrow research. Therefore, I seek to establish a somewhat broad definition for propaganda that aids an epistemological analysis, one that hopefully accommodates the entire set of things that could legitimately be called propaganda in its modern sense by avoiding qualifiers that should be the focus of other types of inquiry into the subject (e.g. ethical inquiries). The definition that I seek to establish here draws inspiration most directly from Randal Marlin's definition, which describes propaganda as "the organized attempt through communication to affect belief or action or inculcate attitudes in a large audience in ways that circumvent or suppress an individual's adequately informed, rational, reflective judgement. (Marlin, 2013, pp. 12-13). Jason Stanley also provides an inspirational characterization of propaganda, describing it as a contribution to public discourse related to supporting or repairing a flawed ideology, which is a system of belief that obstructs an individual's ability to gain knowledge within a domain (Stanley, 2015. pp. 52-56). However, this definition diverges considerably from these precursors by construing propaganda in a way that highlights how its defining features can be considered from the perspective of logical reasoning.

Stipulative Definition of Propaganda

Propaganda is an argument—or something that is intended to inspire an argument—toward a conclusion that a person or people are led to believe is proper, thereby inspiring belief or action, but is actually improper. A proper argument is one that correctly follows the rules of a form of logical reasoning. For example: if the argument is deductive, it is proper if and only if it is valid and sound; if it is inductive, this means it is strong and cogent; if it is abductive, this means it is simple, practical, and probable. Moreover, proper arguments are made with consideration paid to all potentially-relevant available information,[3] so that potential defeating evidence and counter

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2:Such differences are found between the definitions established by various scholars that are discussed by Ellul's *Men's Attitudes*, Marlin's *Persuasion* in pages 7-12, and Stanley in pages 48-53.

3: I will admit that this is an ambiguous notion. I lack a way to state generally what sort of information is or is not relevant to an argument. Pitting an argument against all of the information available to an individual would be an impossible task, and probably largely pointless—why ensure that an argument about tomorrow's weather forecast is consistent with the color of a banana? However, it is also possible that information that seems irrelevant on the surface could lead to some contradictory implications. Ultimately, we are only human. My point here is that there should be a good faith effort to consider potential contradictions to an argument when possible. This is a problem shared in

arguments are accommodated, whether by disproving competing claims or reserving some skepticism towards the conclusion. By contrast, improper arguments include invalid deductive arguments, weak inductive arguments, improbable and impractical abductive arguments, arguments predicated on false premises, uncertain forms of inference that ascribe undue certainty to their conclusions, arguments made in willful ignorance of an available defeating counterargument, and other forms of fallacious logic, such as circular reasoning. Any or all of the premises or the conclusion of a propaganda argument may actually be true or false statements about the world; if all are true, the problem lies in the connection between them being illogical.

Any informational medium—a thing that is capable of conveying information—whether it be visual or auditory, artistic or academic, an object, an event, or anything in between, may act as propaganda, and media that began without a propagandist purpose may be transformed into propaganda when presented in a certain context. Any parts of the argument may be explicit in the propaganda or merely implied by, with the expectation that its audience will receive it in a certain way. Propaganda may be spread unwittingly, but it seems to require some sort of intention at its inception, although this intention may not necessarily be malicious or even conscious that it is producing propaganda. There could be many possible causes behind this propaganda-producing intention, such as a desire to deceive, apathy towards the truth, a belief that one knows truth despite failure in some epistemic duty, loyalty to some dogma, a drive for some self-interest, or a desire to legitimately help society. The original propagandist is the person or group that supplies this intention at the time of a propaganda's production, while "propagandist" more generally denotes any person, group, or thing that has the effect of leading, or attempts to lead, a person or people to believe that a propaganda argument is proper, regardless of the existence of intention. The "propagandee" is the propaganda's audience, whether intended or actual.

This definition should be understood in relation to a few other terms and concepts. A propaganda campaign is the coordinated use of multiple separate propagandas to inspire the same belief or action, or a related set of beliefs or actions. A propaganda regime is such a campaign that achieves a hegemonic status over a society, such that it is widely accepted and nearly inescapable for those within the society, making refutation of it a seemingly futile effort.[4] A person or people may perceive any information in an entirely unintended, illogical way, but while such misperception may have essentially the same effect on them as propaganda, this phenomenon is perhaps better called mistakenness or misunderstanding than propaganda. True education, understood as

epistemology by responses to the Gettier problem: Gilbert Harman, for instance, said, "It is not at all clear what distinguishes evidence that undermines knowledge from evidence that does not" (Harman, 2008, p. 204). This problem is also analogous to a problem facing a coherentist theory of knowledge: what sort of body of beliefs must a belief cohere with for it to be justified? Beliefs that are conceptually relevant, or all other beliefs? (Goldman & McGrath, 2015, pp. 11-12).

4: This concept draws inspiration from the ideas of Antonio Gramsci and Michel Foucault on hegemonic discourse, referenced by Marlin in his talk of definitions (Marlin, 2013, p. 6); it also draws significant inspiration from Ellul's conception of propaganda, most notably what he calls "total propaganda" (Ellul, 1973, pp. 9-17).

the medium by which a person or people are taught the truth by proper arguments, is not propaganda. In practical reality, however, education is often difficult to distinguish from propaganda, as propaganda efforts are likely to masquerade as education. Furthermore, factors such as uncertainty towards the truth of premises in a proper argument, uncertainty towards the sort of intention at an argument's origin, and competing propagandas may cause an individual, especially a cynical one, to mislabel true education as propaganda. Both propaganda and education are forms of persuasion, understood as the general attempt to inspire belief. Marketing is another form of persuasion, with the term merely indicating some relationship to commerce. Items of marketing may fall under either category of education or propaganda. Public relations is a form of persuasion too, one that denotes a focus on one entity's perception among a general public audience.

Propaganda is also related to the concept of knowledge. In epistemology, knowledge is traditionally defined as a true belief that the believer has a proper undefeated justification for believing (Goldman & McGrath, 2015, pp. 52-56). Under this definition, propaganda arguments cannot grant a person true knowledge, at least not directly. If the propaganda is spreading mistruths, then the beliefs it instills are false, and therefore does not provide knowledge. If the argument it presents is improper, whether it be deductive and invalid, inductive and weak, or otherwise fallacious, but the conclusion is true, it has still failed to provide its audience with a proper justification, and thereby knowledge, even if they have indeed adopted a true belief. A propaganda argument can only provide its audience with an unjustified false belief, a justified false belief, or an unjustified true belief. When it comes to the presentation of information in logical forms, true education, not propaganda, is the path to real knowledge, to justified true belief. However, a piece of propaganda may grant knowledge indirectly, outside of its function as propaganda: for example, it would be reasonable to conclude from a poster encouraging the public to buy war bonds that a war bonds program exists, and that the nation is in a state of war. Considered in this way, the piece would serve a secondary educative purpose outside of its primary purpose as propaganda.

The Logical Definition at Work: Interpreting a Piece of Propaganda

To show how this definition may be used to interpret a piece of propaganda, consider the following poster, designed by Harry Hopps in 1917 for distribution in the United States to encourage enlistment for World War I (Hopps, 1918):
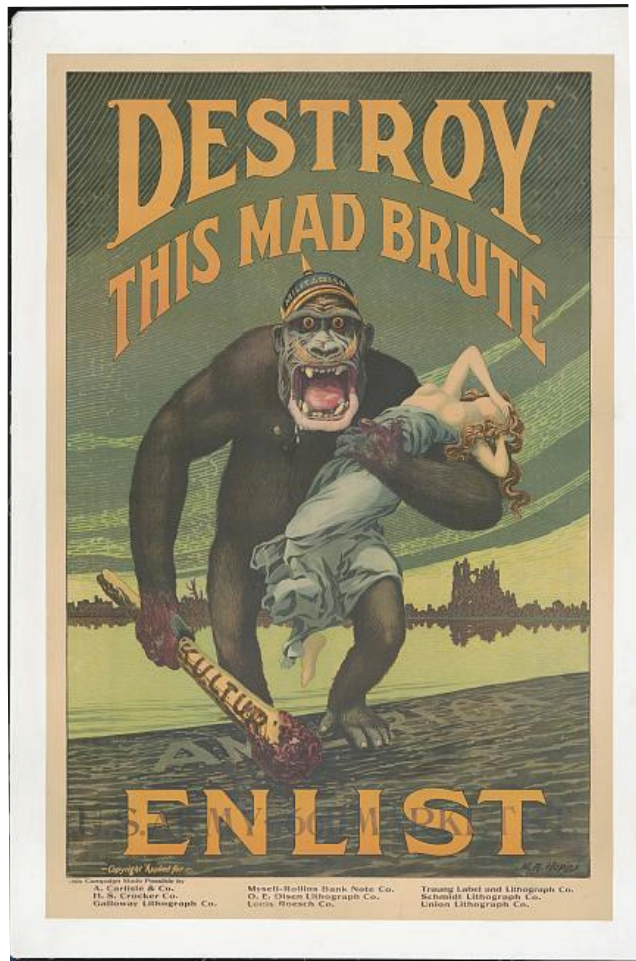
The primary purpose of the poster appears to be to get men to enlist in the military, indicated by the command at the bottom. This does not mean that the poster only targets men who are able to enlist: indeed, it may sway others to view what the military is doing more favorably, or encourage them to pressure the men they know who can enlist to do so, compounding the propaganda's efficacy. For the sake of brevity, however, I will only focus on a few propaganda arguments the poster intends to convey to the perspective of a man of enlistment age. The conclusion they are intended to derive is, "I should (or must) enlist in the military." The following short, simple argument can be immediately derived from the text:

1) This mad brute should be destroyed.

2) Therefore, I should enlist.

This argument is invalid and therefore, if intended alone, a propaganda argument. However, the argument can be made valid if the propagandee is expected to supply a premise: "If this mad brute should be destroyed, then I should enlist." But this argument still lacks justification, evidence, and fails to incorporate significant elements

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of the poster. A stronger argument intended by the poster should be considered to determine whether or not it still passes as propaganda.

The large, ape-like character in a pickelhaube, alongside the descriptive "this mad brute," are meant to convey a premise that "the Germans are brutes." The distressed woman and bloody club, labelled "kultur," further emphasize that point and provide some evidence of the atrocity that a brutish German may cause. The poster's command to "destroy this mad brute" prompts a premise that so-called mad brutes should be destroyed, a premise that may be supported by societal norms of justice encountered by an individual throughout their lifetime in education and other propagandas. Other media at the time would have surely indicated that the country is at war against the Germans, providing another premise; it is therefore unnecessary for the poster to supply that information. Finally, it is implied through the "enlist" command's inclusion that an individual's enlistment will help the nation in its war, and thereby aid the goal of destroying the Germans. The following is one valid way this argument can be structured:

> *1) The Germans are mad brutes that cause harm to others.*
>
> *2) Mad brutes that cause harm to others should be destroyed.*
>
> *3) The Germans should be destroyed.*
>
> *4) If my country is fighting in a war to destroy the Germans and the Germans should be destroyed, then I should enlist (since I will thereby help the war effort).*
>
> *5) My country is fighting in a war to destroy the Germans.*
>
> *6) I should enlist.*

The poster conveys an additional, separate argument, one that appeals more to the propagandee's self-interest than some high-minded righteousness. The German brute is shown stepping onto a shore labelled "America," implying an imminent threat of invasion. No longer are his atrocities limited to Europe. Now, the propagandee's own livelihood is at stake. This second argument may look something like the following:

> *1) The Germans are going to invade my country.*
>
> *2) If the Germans invade my country, they are going to threaten my way of life.*
>
> *3) If something threatens my way of life, I should fight against it.*
>
> *4) I should fight against the Germans (which I can do by enlisting).*

These two arguments are better justified than the initial invalid one, as their premises appear to be supported by evidence. If all of their premises are true, they would be educative rather than propagandist and would render knowledge to their audience, so

long as they correctly interpreted these arguments. However, both of these arguments contain at least one premise that is arguably false, thereby rendering them unsound and propagandist.

In the first argument, support for the idea that the Germans are mad brutes, the justification for their destruction, is arguably weak and should thus be treated as false. On what basis could they be called brutes, insofar as a brute is understood to be something subhuman? The mere drawing featured in the poster of a German as an ape-like creature is certainly insufficient evidence.

One could use their actions as evidence. It is true that the Germans pioneered some of the cruelest weapons of the war, including chlorine gas and the flamethrower. However, the allied powers also came to adopt and further develop these weapons. Likewise, both sides committed abuses against prisoners of war and broke the rules of warfare set forth by the Hague Conventions. The Germans did undeniably commit numerous atrocities in occupied territories, albeit not to the extremes purported by Allied propaganda; one could argue that these atrocities outweighed those committed by the Allies, but, since the Allies—save Russia, who did commit similar atrocities during their occupation of Austro-Hungarian territories—were never similarly positioned to occupy German territory in Europe, it is difficult to conclude that they might not have acted similarly (Kramer, 2017). The Germans are therefore worthy of condemnation, and perhaps retaliatory action, but this is not the same as labelling them as subhuman brutes.

How else could the Germans be labelled subhuman brutes, since it would be contradictory to call them such for committing acts comparable to those of the Allied powers, who do not label themselves as brutes? If one could identify a few Germans that are unquestionably mad brutes, that would still be scant proof that every German is a mad brute. Perhaps the mad brute refers not to the German people, but to the monarchist, autocratic German state. But if that is the case, how could an alliance with tsarist Russia, an equally oppressive regime led by a cousin of the Kaiser, be justified? It seems that the brute moniker, and all of the grievous connotations that come with it, are unearned, applied only because dehumanizing a wartime enemy helps to rally people to the cause. This argument is consequently propaganda, if only because the premise calling the Germans brutes, classifying them as sub-human monsters, is too strong given the available evidence.

In the second argument, the idea that a German invasion of US shores after 1917 is possible, never mind imminent, is weakly supported. Even ignoring the challenge posed by the U.S. Navy, the Imperial German Navy, having struggled to combat the British Royal Navy and facing an increasing state of collapse after the 1916 Battle of Jutland, would have been insufficient to provide the logistical support necessary for a significant naval invasion of the United States; not to mention how German ground forces were bogged down in France since the start of the war (Osborne, 2014). A naval invasion of the United Kingdom, a much closer target, would have still been unreal-

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istic. Ultimately, this argument rests on fear to incite action, but this fear can only be inspired by those who are ignorant of the practical realities of warfare and the German situation. Once the impossibility of a German invasion is realized, the argument is revealed as propaganda based on blatant lies, considering that the Army, who must be well-versed in the practical realities of warfare, appears to be promoting it.

There is a third valid argument that could be intended by the poster when considering the trustworthiness of its source, one that is a bit more difficult to definitively call propaganda:

1) The U.S. government says that I should enlist.

2) The U.S. government is a trustworthy authority in matters of the national interest, and by extension matters of my own interest.

3) I should adopt the beliefs touted by trustworthy authorities (as they are probably true) and follow their advice regarding matters relevant to their competencies.

4) I should enlist.

This argument might not be intentional considering the context of the poster. If it is intended as a possible legitimate interpretation, it is not stressed nearly as much as the two prior arguments: the only element of the poster that clearly indicates its source is the faint watermark that says "U.S. Army." Nothing in the poster appears to purport the trustworthiness or competency of the U.S. military or government in support of the second premise, outside of the suggestion that, in this instance, they are doing the right thing by fighting the German brute—but in that case, the prior two arguments are advanced anyways, rendering this one pointless.

Maybe support for this controversial second premise is supposed to come from some other source, as part of a larger campaign. In that case, what evidence could there be? The evidence cannot come from information propagated by the U.S. government alone, otherwise all of the arguments would be, "The U.S. government is trustworthy because the U.S. government says they are trustworthy," resulting in a logically fallacious circularity. Support for the premise would also be weak if all of the evidence came from independent sources that had a vested interest in the people believing in the U.S. government's trustworthiness, like an empowered political party seeking reelection or an influential lobbyist group. The government's historical record could provide some insight, but the fact that executive officeholders change with each election raises questions over the relevance of a longer-term analysis. However, a lack of strong supporting evidence does not disprove the statement, either.

The government's trustworthiness in this expanded context thus seems uncertain and debatable. If it is true that the government is trustworthy, this argument would be proper, educative, and provide the propagandee with knowledge. Knowledge derived from an authority's word may not be as useful as knowledge justified in other ways,

as it is difficult to draw additional conclusions from such cursory evidence, but it is still an epistemic justification. Nevertheless, even if this premise could be proven to be true, the poster would remain as a piece of propaganda altogether due to the presence of the other arguments.

Just because these arguments are propaganda, however, does not mean that it is false that men should have enlisted for World War I. Participation in the war may very well have furthered the nation's—and consequently its people's—long-term strategic interests. Individuals that enlisted could have had the potential to reap certain rewards from their society for their contribution. It also could be false, though. Perhaps an isolationist policy would have been sustainable and better for the American people given the U.S.'s geopolitical situation. For a particular individual, maybe there is a good physical or mental health reason why they should not enlist, even if they can.

Whether or not a person should enlist to fight in a war is a complicated question. There is an objective answer as to what is best in terms of certain metrics, but that answer is often obscured, difficult to determine from the limited information of the present. A poster like this is unhelpful in trying to determine that answer. A person needs information that is presented carefully, arguments that are clear and justified with caveats to highlight exceptions and warn of uncertainties, in order to have any hope of realizing the truth in an appropriate amount of time.

Defense of the Logical Definition Against Potential Criticisms

There are some who may criticize this definition and construction of propaganda for, in their eyes, mischaracterizing propaganda. One such criticism may be over my inclusion of media and arguments that target individuals, rather than the mass. Certainly, the character of propagandas that target the mass differ greatly from those that target individuals and smaller groups. Propaganda aimed at the mass must adopt forms that appeal to the mass, forms that both accommodate and minimize the individual, making them feel significant while also small, by being relatable, identifiable, and empathetic while simultaneously vague and general (Ellul, 1973, pp. 6-9). Arguments that target other people may play off their particular histories, character traits, and interests. I do not deny this, but I do deny that this second category is not propaganda. The motivation for excluding this category seems to be an assertion that the propagandist is not concerned with winning over particular individuals with particular efforts, because such efforts are expensive at scale and thereby provide little value (Ellul, 1973, p. 6). To the contrary, the propagandist may find it valuable to target certain individuals: namely, leaders within society. If a propagandist can convert the individuals who other people already trust and follow to their cause, such as politicians, business elites, celebrities, influencers, and the leaders of groups like religious organizations, trade unions, interest groups, and clubs, they can achieve the effects of a mass campaign without adopting the character of a mass campaign (Bernays, 1928, pp. 40-44). Therefore, it seems misguided to exclude those more personal, targeted

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techniques from the category of propaganda, even when those techniques are used on a relatively insignificant individual.

Another objection may concern intention. A critic could argue that, in defining propaganda, the focus should be on how it affects an audience, how it is perceived, not on its production. I assent that it is important to consider propaganda from the position of its audience, but defining it from this perspective presents difficulties. For one, I would question how such an approach would assess pieces of information intended as propaganda that fail to garner an audience. The inability to identify some propagandas from the audience's perspective presents another problem. Regardless, I will consider an example of how propaganda could arise entirely without intention, to see if this definitional approach is unjustified.

A group of people could conceivably draw some association between two things on their own, say, between a political party and a color that just so happens to be used by its members more often than not in promotional materials, without there ever having been an effort by anyone to intentionally instill that association. Then, they could simultaneously associate one of those things with a third thing, like that same color with a soft drink that happens to be that color. This group of people could then associate the other original thing with that third thing, the political party with the soft drink, without there being a proper reason to do so. If someone from this group saw a person drinking the soft drink, they might consequently think of the political party or illogically assume that the person is associated with the party in some way, influencing how they behave towards them. As a result, the people in this group would hold the same beliefs and act the same as if they had been subjected to an intentional campaign to associate the soft drink with the political party.

I think it is true that a group's own subconscious creation of illogical associations in a scenario like this—if it is possible—would have the same effect on them as an intentional campaign. However, I hesitate to relate this process more directly to propaganda. Propaganda seems to involve some kind of subversion or abuse of a person's capacity for critical thought, and such subversion or abuse appears to require intention (Marlin, 2013, p. 5). I think that this scenario, which only involves faulty critical thought, not subversion or abuse, is better characterized as a widespread misunderstanding, as mistakenness, which, if subsumed under the category of propaganda, would risk overextending the concept of propaganda.

Suppose another possible example of misunderstanding, where a group listened to a typically trustworthy radio broadcast and heard the message, "The Yankees win and will go on to the World Series." From this, they justifiably concluded that the Yankees must have won and will appear in the World Series. As Yankees fans, they excitedly shut off the radio and purchased tickets to the World Series. But, unknown to them, the actual message was, "The Yankees did not win and will not go on to the World Series." Interference caused this message to be distorted, cutting out the "did not" and "not" in a way that made the perceived message seem legitimate, not distorted.

The fans' perception of the situation thus resulted in a justified false belief. Could this misunderstanding rightfully be construed as propaganda, since it affected them the same way as an intended propaganda could have?

I do not think so. Although successful propaganda is sufficient for unjustified belief or justified false belief, it is not necessary for either; there are, for example, non-logical things that can instill and justify belief. If this misunderstanding can be called propaganda, from where did its logical argument originate? The radio, a non-thinking thing, could not have formulated such an argument, and the radio host in fact formulated an argument contrary to the message that was perceived. Perhaps you could say that the fans propagandized themselves, concluding that the Yankees won on a false premise, that the radio was reliable, in an argument that they invented for themselves. I am skeptical toward this answer, as its feasibility is rooted in controversial questions about the nature of the mind, agency, and intention, questions that I cannot resolve here.[5] I do think that it is possible for a person to propagandize themselves using intention, for instance by intentionally surrounding themselves with certain kinds of information to protect their sensibilities, as in an echo chamber. However, in this case, there is no conceivable intention that the fans could have had to risk deceiving themselves, as deceiving themselves only resulted in them buying tickets to a game that will certainly disappoint them.[6]

Finally, there are some objections that may criticize the logically argumentative nature of this definition of propaganda. One could argue that commands, which are common features of propaganda, are not arguments. I would respond that a person may need reason to follow the commands present on propaganda. The commands inspire an argument that a person should or should not do what the command says—therein lies the argumentation.

5: If a mental process besides intention that creates logical arguments does exist, then the argumentative ideas communicated by this process to the rest of the mind or to others—not the radio or anything else in the world that inspired these ideas—could perhaps be called propaganda, in which case you have propaganda that arises without intention. However, I cannot say for certain whether subsuming such ideas under the category of propaganda would be appropriate. My notion of intention is admittedly somewhat vague, and these are questions that are probably better left to someone that is better-versed in psychology and the philosophy of mind than myself.

6: I should note that if these fans then went on to intentionally spread their belief that the Yankees won (e.g. via the argumentation "I heard the Yankees won on the radio; the radio tells the truth; I heard the radio's message correctly; therefore the Yankees won.")—if a misperception is intentionally communicated, even though the communicator is unaware that they hold such ideas as a result of misperception and are communicating them because they earnestly believe them to be true—then such communications could rightfully be called propaganda (as these justified false beliefs have now actually been formulated as an improper argument), and the fans could be called original propagandists. However, since the ideas they spread originated as justified false beliefs, such original propagandists could probably be called less culpable for their propaganda than those that intentionally lie or ignore the truth. I imagine that they would quickly stop producing this propaganda once they discovered evidence to the contrary, that the Yankees lost.

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A stronger objection concerns what psychiatrist Vladimir Bekhterev called reflexology (Marlin, 2013, p. 74). This idea suggests that the aim of propaganda is not typically to engage the propagandee in a process of rational thought, which they would need to use to consider logical argumentation. Instead, it is meant to foster a reflexive, habitual reaction to information, so as to circumvent any rational process that might uncover its flaws. If this theory explains how much of propaganda works, how could it be said that it necessarily intends to inspire an argument?

I do not disagree with this assessment. It does not seem that our minds operate purely on logical processes; for instance, our thinking seems to involve nonlogical processes like heuristics. So much as a word, like "honor" or "freedom," may invite a sensational feeling or habitual connection due to its meaning or regular associations, and those attributes can influence one's disposition towards a broader idea (Stanley, 2015, pp. 2-4). Bekhterev's reflexology provides an explanation for how a lot of propaganda succeeds.

There is reason to consider staying with the argumentative definition nonetheless. Even if propaganda may not be intended to be perceived in a logical form, its intended effects can still be expressed in a logical form for the purpose of analysis. Would-be propagandees who are subjected to this kind of propaganda might still be able to try to dissect what such a piece is trying to argue to them, if they have not developed a habitual response to its symbols or become curious as to why it expresses some attitude.

This admittedly risks introducing some subjectivity into the analysis of propaganda, as it is impossible to know with certainty what argumentative mapping the original propagandist would have agreed is most representative of their message. Yet this is a problem that arises in any analysis of an author's intent. Without direct access to the original propagandist's mind, it is impossible to know what they intended to say with certainty, even in propagandas that assume a logical form. Intent can only be extrapolated from the available evidence. Because of this uncertainty, one should try to consider a few of the strongest potential arguments that could be made by the propaganda when conducting this sort of analysis, involving both as many of the propaganda's elements as possible and information that would have readily been available to the propaganda's audience in its original context.

That said, the reflexologist's objection is significant in shedding light on how propaganda subverts, avoids, and abuses a person's capacity to consider it rationally. If our minds did operate strictly on the rules of logic, it is difficult to see how propaganda could be so successful, as we would conceivably be more apt to identify its flaws. This definition does not seek to diminish this reality; it merely seeks to ascribe these alternative constructions to an explanation of how propaganda works, rather than an explanation of what it fundamentally is.

Propagandist Techniques

So, how does propaganda work? How are people convinced to adopt beliefs that do not pass logical scrutiny, that lack epistemic justification? There are numerous techniques that achieve this end, which many scholars have explored in depth. Some of these techniques concern the content of a propaganda argument itself, while others have to do with the context in which an argument is presented. I will call attention to a few.

According to Bekhterev, a reflexology response may be achieved through a specific three-step process. First, the individual is physically exhausted through prolonged confinement, making them psychologically vulnerable. Next, they are forced to concentrate on a single subject, the propaganda, for an extended period, undermining their ability to concentrate. Then, the propaganda expresses certain moods, prompting the audience to echo those moods, thereby building reflexive associations between ideas and emotions (Marlin, 2013, p. 74). This process thereby instills a belief by bypassing the audience's capacity for logical reasoning. Rallies in Nazi Germany, where crowds of people stood outside for hours focused on the highly emotive speeches of Adolf Hitler, provide a good case of reflexology at work (Marlin, 2013, p. 74). Conceivably, this is not the only process that may create such a reflex-response, but just one example of how it may be achieved.

Propagandas need not always create their own habitual responses. By invoking sacred, emotionally charged ideas already present in society, propaganda can achieve the same effect with less of a concentrated effort; in fact, this method is more common than efforts to create new responses, at least initially in a campaign, as propaganda would struggle to survive if it contradicted sacred norms (Ellul, 1973, p. 35). Victor Klemperer, a German Jew who lived through the Nazi regime, talks about how he would speak with people in a school about the meanings of culture, democracy, and other ideas, and while it appeared that he was making progress in moving them away from Nazism, all it took was the invocation of heroism, talk of some heroic person or act, to reverse this progress and render discussion futile (Stanley, 2015, pp. 2-3). The way that an issue is framed, the ideals that it implicates itself with, will affect the immediate perceptions of the propagandee, thereby biasing them to receive the issue in a certain way (Marlin, 2013, pp. 96-98).

Propaganda need not even serve the ideals it touts. Stanley establishes a category of propaganda called undermining propaganda that presents itself as an embodiment of certain ideals despite effectively eroding them (Stanley, 2015, p. 53). As an example, he points to the *Citizens United* case: the Supreme Court extended constitutional rights to corporations, touting the decision as a defense of democratic ideals of free expression, while the practical effect of this decision was to erode these ideals by allowing corporations to use their wealth to crowd out smaller, less powerful voices (Stanley, 2015, p. 61). Propaganda can also associate itself with everyday things, rather than venerated ideals, to achieve this kind of response. If it becomes associated with a cultural icon, like a celebrity or a buzzword, of which a popular perception already

exists, that propaganda will likely inherit part of that popular perception, despite a lack of a logical reason for this association (Marlin, 2013, p. 96).

The use of deceptive language can support propaganda. Linguist Dwight Bolinger identifies some ways that sentences can be manipulated to change the ideas that they express. The things left unsaid are as significant as the things that are actually said, but they are harder to pick up on. Using more passive language that removes an agent—"Jane kicked the ball" versus "the ball was kicked"—can lighten the perception of that agent's responsibility for some event. Using more positive terms, like "surgical strike" instead of "precision bombing," can soften the impact of serious news. By omitting significant information, such as by saying, "It is believed that 10,000 people attended the rally," leaving out the fact that this belief was held by a single overly-optimistic person who cannot count, one can technically tell the truth while conveying a false impression (Marlin, 2013, p. 99-101). Another example from Eric Swanson shows how ambiguities and vagueness in language, which he calls failures of shared information, can be utilized. A political campaign could use rhetoric that conjures different ideas in different people to gain support; for instance, appealing to a vague notion of freedom could attract the attention of both socialists and laissez-faire liberals, as both embrace a concept of freedom, but the ways they define freedom differ radically (Swanson, 2017, pp. 939-941).

Similarly, statistical information can be manipulated to advance improper arguments. By adjusting the scale of a graph, significant differences or similarities in data can be visually obscured or implied. Correlations in data can be stressed to improperly suggest causation. Averages can be skewed by adding outliers. Polling data can be biased by asking leading questions, and an unrepresentative sample of people can be used. Additionally, data can be outright fabricated, since it will probably take another person a significant amount of time to verify it (Marlin, 2013, pp. 129-134). Statistics seem to be particularly useful in propaganda since they carry an air of irrefutable scientific fact, one that can obscure the disingenuous mechanisms that may lay at their source.

Propaganda can assume a form that appears logical at a glance, but is revealed to have some flaw upon closer examination. Bandwagoning happens when an argument is meant to be believed on the basis that virtually everyone agrees with it. While consensus among informed agents may provide strong grounds for an inductive argument, this consensus is meaningless if everyone within the agreeing mass lacks justification for the belief outside of its being a mass belief. Likewise, adopting a belief after it is endorsed by a certified expert is inductively reasonable, but propaganda may be presented by people that only have the appearance of being experts, whose credentials are suspect or who are untrustworthy (Marlin, 2013, pp. 102-105). A long list of logical fallacies, including ad hominem attacks, post hoc, ergo propter hoc arguments, hasty generalizations, and begging the question fall under this category, too (Marlin, 2013, pp. 110-113).

Many of these techniques show how propaganda uses a distorted version of the truth to imply a false reality. Propaganda can also plainly lie—argue in defiance of a known truth—or bullshit—argue with insouciance towards whatever the truth is—but lying and bullshitting are more dangerous (Cassam, 2018, p. 3). Such claims can be contradicted, proven demonstrably false, damaging the credibility of the propagandist. It is much better for the propagandist to twist true information, to associate propagandist goals with irrefutable facts, even if the connection is illogical, and to be able refute contradictions as mere differences of interpretation (Ellul, 1973, pp. 52-57). When propaganda does involve blatant falsehoods, it is best if they are presented alongside an abundance of other information. This information need not be particularly relevant: the goal is to overwhelm the propagandee with more information than they can practically scrutinize, to exceed their capacity to resist (Ellul, 1973, p. 18). Even if they find some lies, there is too much other information to contradict—independent arguments that also supposedly support the conclusion—making refutation of the entire propaganda infeasible. Many will thereby take the propagandist at their word, trusting that the mass of so-called evidence has at least some truth to it. An example could be a shoddy but lengthy research paper, where people accept the paper's conclusion because they only glossed over a hundred pages of dense but nonsensical language offered as evidence.

A propaganda regime can take overwhelming a propagandee to the extreme. In what Ellul calls total propaganda, the relentless exposure of an individual to organized propaganda across different media that pervade an individual's life, eliminating the ability to retreat, can capture the mind of the propagandee in its totality, driving them to accept an idea that lacks proper justification axiomatically ((Ellul, 1973, pp. 9-10). The propagandist essentially places the propagandee in a sort of Cartesian demon world, where they have no hope of finding truth and gaining knowledge through typical means. This tends to require an accompanying censorship campaign, as dissenting views will dramatically weaken the effect of a propaganda regime, although it may be possible for total propaganda to crowd out other views on its own (Ellul, 1973, pp. 11-12). The destructive power of freedom of information to a propaganda regime can be seen in the collapse of the Soviet Union. While doubt towards the Communist party line existed prior, Gorbachev's policies of glasnost and perestroika enabled the dissemination of dissent, revealing the extent of *Pravda*'s mistruths and causing the people to reject it in favor of newly available alternative sources of information from the West, hastening the Union's collapse.

Categories of Techniques: Misdirection and Misinformation

There seem to be two general categories that propagandist techniques can be roughly broken up into. When it uses appeals to emotions or ideals, associations with popularly-perceived icons, soft language, words with multiple meanings, logical fallacies, manipulated statistics and data presentations, or an overwhelming amount of distracting information, but all information relevant to the subject matter is available, it seeks acceptance by distracting the propagandee from their capacity for proper logical

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reasoning, hoping that they are not paying close attention. This first category of techniques can be called misdirection. If a hypothetical perfect logical thinker—who only accepts beliefs based on their logical reasonableness, is not prone to human conditions like emotion and habit, and can process an infinite amount of information—were to analyze propaganda that relies only upon these techniques, they would be able to correctly identify it as propaganda, pointing out the lies, contradictions, or lack of real evidence present within.

The other category of propagandist techniques relies upon leveraging the propagandee's ignorance or uncertainty, their lack of knowledge. When it selectively omits key information that cannot be found in other sources, appeals to authorities that seem proper to the propagandee but are actually untrustworthy, spreads lies, bullshits, or fabricates data that cannot be presently disproven, or, at the highest level, encapsulates its audience in an unchallengeable false dogma, even an ideal logical thinker will struggle to correctly identify the propaganda. This second category of techniques can be called misinformation. These techniques are typically most effective when the propagandist is in an epistemically superior position to the propagandee; when the propagandist has knowledge that the propagandee is known to lack, the propaganda can be better tailored to appear proper. A censorship campaign might be particularly useful to a propaganda campaign using misinformation, as the censorship of views that contradict the propaganda is likely to increase the amount of certainty that propagandees place in it, unless they become aware that a censorship campaign run by the propagandist exists. Large enough censorship and propaganda campaigns could make the propagandist the sole source of information for a propagandee, significantly widening the gap in knowledge held by the propagandist vis-à-vis the propagandee and increasing the possible efficacy of misinformation techniques. So long as a hypothetical perfect logical thinker does not have the knowledge necessary to contradict the information presented by propaganda using these misinformation techniques, their ability to correctly identify the propaganda is doubtful. This is a grave problem that will be explored further shortly.

Categories of Propaganda

Similar to how propagandist techniques can be categorized, propaganda arguments can be divided into two categories: logically weak forms and logically strong forms. Note that these "weak" and "strong" monikers do not indicate the likelihood of a typical propagandee accepting or rejecting the propaganda. Factors like the pull of emotion and the capacity to process large amounts of information vary from individual to individual. The power of techniques should not be discounted; a particularly emotionally compelling weak propaganda may garner more attention and acceptance than a stronger propaganda that uses misinformation. Different forms of propaganda will naturally work better or worse depending on the nature of the propagandee. Instead, the strength or weakness of propaganda in this context indicates the ability of the hypothetical perfect logical thinker established prior, serving as propagandee, to

identify the propaganda as such based on the stipulative definition, based on how its content presents a logical argument.

For the purpose of categorization, independent arguments made by a single piece of propaganda should be judged independently, rather than judging the piece as a whole. When it is possible to place a propaganda argument in multiple categories, it should be placed in the weakest category that it qualifies for. When an argument contains multiple flaws or weaknesses within the same category, or additional flaws or weaknesses indicative of a stronger category, it may be called weaker than other arguments within that category that lack these additional problems, but it should not be recategorized. When a single piece of propaganda, or a single original propagandist, advances multiple independent arguments that contradict each other, this does not affect the categorization of either argument, except in cases where either argument is supported by a premise that the propagandist is a reliable source of information, and where one of the contradicting arguments can be accepted as educative—both of these cases should result in a weak classification of the relevant argument.

Logically Weak Forms of Propaganda

The logically weakest forms of propaganda are those whose argumentative structures are fundamentally flawed, who fail even when their premises are assumed true. Invalid deductive arguments, where the necessary premises do not lead to the conclusion or contradict each other, are one example. Inductive arguments based entirely on premises that lack a connection with the conclusion provide another. Arguments that contain significant defeating evidence within themselves also fall under this category. Defeating evidence that is irreconcilable with an argument's conclusion may not challenge the truth of premises that do support the conclusion, but the acceptance of this evidence deprives these other premises of their explanatory power, making the entire argument weak. Additionally, this category includes arguments using uncertain forms of inference that ascribe absolute certainty to their conclusions. Logicians know to reject these arguments outright, before evaluating the truth of the premises.

Another weak form of propaganda, approaching something more moderate in strength, includes arguments that are predicated on at least one false premise and arguments whose conclusions are defeated by outside evidence, where near-certain knowledge of this defeating evidence or the falsity of necessary premises is readily available to the propagandee. This form is stronger than the last because it requires the propagandee to look outside of the propaganda in order to dismiss it—to outside evidence or to necessary sub-arguments that the propaganda itself does not engage with. However, the propagandee must border on certainty in their knowledge of this outside information in order to still call this form weak.

These weak forms of propaganda may use either misdirection or misinformation techniques, although if they use misinformation, they do so poorly, either including contradictory information within themselves or touting easily refuted lies. Belief in weak propagandas is always logically unjustified. If the perfect logical thinker were also

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omnipotent, all strong propagandas would appear to be of this second weak variety. But the perfect logical thinker is meant to be placed in the epistemic position of the typical propagandee, and most propagandees lack omnipotence. For that reason, logically weak propagandas should be differentiated from those that are logically strong.

Logically Strong Forms of Propaganda

Logically strong forms of propaganda are different from weak forms in that they cannot be fully discounted, either for practical or logical reasons. In order to evaluate them, these strong forms always require the propagandee to engage with uncertain forms of inference, like inductive reasoning, as if their propagandizing flaws concerned matters of actual certainty, these flaws would be readily available, and the perfect logical thinker would not be deceivable. Almost all propagandas of this type use misinformation techniques.[7]

A moderate-strong form of propaganda leaves the logical thinker in a position of great uncertainty. This category includes non-deductive arguments that are advanced by a dubious source—since they might be omitting some important information—and arguments that rely on a premise whose truth is only established by a dubious source. Reasonable grounds to distrust a source include vested interests, a lack of expertise or experience, and prior unreliability or bias on the part of the source in relation to the subject matter of the argument (Savellos & Galvin, 2001, p. 40). One hypothetical example is the case of a historically untrustworthy political party in a one-party state claiming to have done something good via its foreign policy. The logical grounds for accepting the argument are weak. However, it is difficult to reject this argument outright, as the argument follows a proper form and there is no stronger evidence available to suggest that the premises or conclusion are not true. The political party might be telling the truth, and there is no alternative source for this kind of information available that is more trustworthy. This propaganda could also thrive in multi-party states, if all of the political parties are equally untrustworthy and in continual disagreement. If three or four known liars are making equally plausible conflicting arguments, it is impossible to logically determine which one of them, if any, to believe. The logical thinker is doing their epistemic duty best by remaining skeptical, refusing to pass a judgement. However, absolute skepticism is often infeasible. If the logical thinker is prompted to act on a dubious set of information, skepticism does not seem to always justify inaction, as inaction may carry graver consequences than action. The

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7: The only exception that I can conceive of is the case discussed in footnote 6: propagandas that are created when an individual communicates a justified false belief that does not arise from another propaganda. Such cases need not necessarily involve any technique; since the original propagandist legitimately thinks they are spreading the truth, and is justified in thinking so as long as they have not failed any epistemic duty (e.g. has properly considered potential defeating evidence), they are neither lying nor bullshitting. Still, this appears to be a fringe case, and propagandas of this type seem unlikely to persist—the example in footnote 6 would probably be resolved quickly once the fans encounter overwhelming defeating evidence, and would learn to be more skeptical about the radio's messages thereafter.

logical thinker may have to make a choice more or less at random. The best they can do is make preparations for the possibility that their decision was the wrong one.

The strongest forms of propaganda present themselves as fully proper arguments backed by strong sources, causing the logical thinker to accept them with a high degree of confidence. To illustrate how this can work: a well-respected, trustworthy authority in the environmental scientific community might break from character after accepting a backroom bribe, deciding to provide falsified evidence in support of a land development plan, which has been embroiled in controversy due to fears over its environmental impact. Objectively, this scientist is not trustworthy, at least not when they are being offered large sums of money to settle controversial issues. However, from the perspective of a propagandee who cannot test the environmental impact of the plan themselves, there is no logical reason to distrust them if they have settled past controversies truthfully, since they do not know about the bribe. If they have a say in approving the plan, they should greenlight it, barring some other reason for rejection. Even if the scientist's evidence is proven incorrect, it might not be justified to discount them in all future environmental controversies if they have a strong record overall, as this instance could appear to have been the result of an honest mistake. Unless direct evidence of the bribe or forgery came to light, the supposition that they have been corrupted from a single instance would be an illogical conspiracy theory. Without access to additional information, there is no way to logically identify strong propaganda from the propagandee's perspective, at least not until after we have accepted it and suffered its consequences.

Resistance to Propaganda

With these distinctions and attributes of propagandas in mind, we can begin to consider how they might be resisted by an individual subjected to them, so that their negative epistemic influence is reduced. This is a topic that calls for additional research; an entire project of equal length to this one could be dedicated to discussing how a single type of propaganda might be resisted. I can only offer a cursory glance at some considerations for the ways that the epistemic effect of propaganda can be mitigated.

Resistance to Weak Forms

The first step to reducing the influence of propaganda from the perspective of a propagandee is to recognize propaganda for what it is, to unmask it. That is where the logical definition of propaganda developed in this project becomes practically relevant. By taking informational media that have been created or affected by a mind, the source of intention, which consequently might carry some message intended to be received by the propagandee, and analyzing them from a logical perspective, by breaking down their contents and seeing how they form certain arguments, one can hope to at least unveil logically weak forms of propaganda.

Two problems emerge: First, virtually anything that has been influenced by another person—whether a textbook, a lecture, an academic journal, a painting, a sculpture, a

piece of music, a graph, a public performance, the color of a product, the context in which an otherwise benign object is placed—could serve a propagandist purpose. It would be impossible for a person to analyze every informational medium, every potentially propagandist item, that they encounter in this way, even if they knew which media have and have not been affected by people. Second, a propagandee cannot directly perceive the intentions of other minds that produce propaganda. There is uncertainty in knowing which messages are actually intended and which a propagandee has mistakenly perceived for themselves as a result of exposure to an informational medium.

How can these problems be circumvented? For the first problem, a more manageable list of things that a person should analyze in this way, based on the likelihood that these things will include propaganda and have a practical effect on one's life or society, must be constructed. An individual might be inclined to start by analyzing things that seem to have a noticeable impact on their beliefs, especially those beliefs that are foundational to motivating other beliefs or substantial actions. It would be a waste of time to analyze ineffective or inconsequential propagandas. However, some propagandas find success by virtue of their subtlety: they affect belief without calling much conscious attention to themselves. An individual therefore must occasionally look to informational media that initially appear more benign as well. Things that seem to invoke some propagandist technique, like media that incite some emotion, may be more likely to be propaganda, and thus may be deserving of particular attention.

Another list of things worth evaluating could be based on their known origin. Certain people or organizations, particularly those in a position to gain from people holding certain beliefs, like an elected official or a company behind a new product, may be more likely to produce propaganda. Such a list could then be further refined by establishing the trustworthiness of particular individuals or organizations, based on the frequency of their messages being educative or propagandist. One would then be justified in approaching the claims of established sources with initial belief or doubt, only fully analyzing their claims occasionally to check for change, making room to evaluate the claims of newcomers.

A list might also be established by topic: propaganda might be produced for certain topics, like causes for warfare, more often than others, and certain topics might have a greater relevance to one's life or society than others. Certain kinds of media could be more conducive to communicating propaganda, too. By developing such lists, a propagandee could prioritize analyzing more impactful and more suspect informational media, thereby unmasking and reducing the influence of more propagandas that have a greater negative epistemic impact than one who analyzes informational media at random.

As for the second problem, it is true that, without an original propagandist's commentary—which is unlikely to come to light, especially in cases where they are seeking malevolent or selfish ends—it can be difficult to know the intended message within

an informational medium, if there is one, with a high degree of certainty. Still, the author's intent may be discernable by using clues within a supposed propaganda's content and original context. Necessarily intentional elements, like words in a poster or cartoon, might be discernible from potentially accidental elements, like vague facial expressions or backgrounds. If so, it makes sense to focus on the intentional elements and include as many of them as possible in a complete mapping of the propaganda's arguments. Consider the source, if available: the supposed original propagandist might have interests that are naturally apparent, and certain arguments may serve these interests better than others. When multiple informational media share a source, there could be a common trend among their messages. A piece might be clearly intended for a certain audience, or could have multiple messages intended for different audiences that perceive it. The propaganda may anticipate and appeal to the typical beliefs of such intended audiences, so these beliefs may form part of the propaganda's argument.

Confidence that a certain message is intended may be increased by having multiple people independently analyze the piece, especially if those people are from different backgrounds and are not biased to think that the piece must be or must not be intended for them. Evaluating multiple interpretations is probably a good thing, at least for epistemic purposes, as even if one of the messages being considered was unintended, better classified as a misinterpretation than a propaganda or educative argument, considering it on its logical merits alone is likely to give the analyst knowledge regarding its substance.

Once a weak propaganda argument is unmasked, it can be refuted on the basis of its clear improperness. Still, this may be easier said than done—the perfect logical thinker only exists as a hypothetical. Social pressures to conform and other practical considerations may make it rational for an individual to continue to accept propaganda, at least publicly, although the public act of accepting it may cause them to truly believe in it over time. Psychological phenomena that propaganda techniques appeal to, like emotion and habitual responses, may also make it difficult for an individual to fully relinquish belief in a propaganda.

Resistance to Strong Forms

When it comes to strong forms of propaganda, the propagandee faces even greater difficulties in resisting them. Regarding moderate-strong forms, they encounter the same issues in discovering them as they do with weak forms. However, it becomes even more difficult for the propagandee to abandon a moderate-strong propaganda after it is found; it cannot be practically discounted, since there are no logically superior alternatives to turn to and agnosticism on the propaganda's subject may be impractical or logically undesirable.

The strongest forms of propaganda appear almost impossible to resist. Since they leverage the fact that the propagandee lacks the knowledge necessary to recognize them, they cannot be unmasked, as they appear indistinguishable from proper educative

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arguments. If they cannot even be identified, how could they be resisted? Consider then a society captured by this kind of propaganda, as in the case of Ellul's total propaganda, something that a person born in Nazi Germany might have experienced had that regime persisted for a few generations and succeeded in its terrible designs. That individual, the regime's perpetual propagandee, would scarcely be better off than the subject of Descartes' evil demon when trying to gain knowledge about subjects where propaganda is necessary to legitimizing the regime—the individual's logical reasoning would continually lead them to false conclusions, as the only evidence available to them would have been carefully crafted to deceive them. They might assume educative arguments to be a weak form of propaganda, as they have been so convinced of certain false beliefs that they accept them as axioms. Such an individual could adopt a true belief by supposing that the regime is lying, but this idea would be a speculative conspiracy theory without evidence, making belief in this idea unjustified, a lucky guess at the truth, not knowledge. The epistemic prospects of this individual appear considerably limited.

Perhaps there exists some nonlogical means that could root out these propagandas more often than not, but what could these means be? I cannot conceive of any approach to information that could be more reliable in discerning truth from falsehood than logical reasoning. This possibility aside, only a position of total skepticism, where the individual adopts an agnostic, noncommitted position towards all ideas by jettisoning all beliefs—except for those that are necessarily true, like a belief in self-existence—would ensure that a person is totally protected from the influence of propaganda; but it cannot be justified to adopt this position. The motivation for resisting propaganda here is to curb its negative epistemic effect on individuals, its ability to prevent them from gaining knowledge and inculcate them with unjustified or false beliefs. Total skepticism would throw out the bulk of real knowledge alongside propaganda. That position would only appear to be justifiable if it is worse for an individual to hold a preponderance of false and unjustified beliefs than no beliefs at all and it is true that propagandas tend to capture the individual more often than real knowledge.

A skeptic encounters a paradox if they justify their skepticism in this way. They need to believe that people are probably more prone to propaganda than knowledge, yet they cannot seem to hold this belief without abandoning their skepticism. This paradox aside, I argue it is more reasonable to disbelieve the premise that strong propagandas tend to capture people more often than real knowledge. If this were the case, it would seem to me that the history and continued survival of humanity could only be explained as an accident, or as an inevitability thanks to some outside force, two explanations I consider to be unlikely. Our understanding of the deeper mechanisms at play might be muddled and inaccurate, but the practical utility of many ideas—our ability to predict outcomes and act accordingly, the mere ability of many of us to survive for eighty years, never mind our technological progress—seems to suggest that we do hold more knowledge than propaganda, at least concerning matters of significance contained within this reality. Selective skepticisms towards specific topics where we—either as a collective or individuals—appear less certain in our knowledge, or where

agnosticism might be preferable to taking a position, are justified: for example, I know that, having never studied theoretical physics in depth, my understanding of string theory is probably shoddy, and so I choose to take no position on whether the theory is likely true or false, especially since my life will probably remain practically unaffected no matter what position or non-position I take. But these selective skepticisms must be formed on the basis of some knowledge, otherwise their random adoption risks throwing out knowledge and its practical effects at the same rate as propaganda.

We must therefore accept the risk that we are sometimes being deceived by strog propagandas. Perhaps the best way for an individual to compensate for this reality without creating larger epistemic problems for themselves is by holding on to the possibility that any of their beliefs may be wrong, by remaining flexible and adjusting their beliefs according to the newest proper evidence as it emerges. Still, this could be infeasible. Going back to constantly reevaluate the veracity of your beliefs is a laborious task. It might be necessary for individuals to hold some beliefs axiomatically, even if such certainty is unjustified, in order for them to gain further knowledge within a field.

Resistance to Propaganda at the Societal Level

The prospects of an individual attempting to avoid propaganda entirely seem rather grim, but perhaps solutions can be found at the societal level, outside of the individual. Such solutions could strive to either reduce the ability of people to produce propaganda, reduce their interest in creating it, increase the ability or interest in producing real education, or increase the public's awareness of or ability to resist propaganda.

One significant debate focuses on the epistemic benefits of free speech versus the censorship of propaganda. Even though it will allow for the production of propaganda, free speech might carry epistemic benefits for a society: for example, the proliferation of improper arguments could be necessary to practicing and strengthening proper argumentation, while censoring propaganda could weaken our defenses against censored ideas and make them more alluring (Smart, 2018, p. 10-11). However, there is no guarantee that propaganda will not overwhelm a system with legally protected free speech, and it may be impossible to eliminate social pressures for conformity, allowing for propagandas to still attain a hegemonic status, stifling knowledge. Meanwhile, the effectiveness of censoring propaganda is reliant upon the reliability of the censors, who must have both the ability to identify propaganda and a genuine interest in censoring it. While censors may have access to additional information that puts them in a better position to identify propaganda than the average propagandee, an organization with the power to censor could be open to corruption and abuse. Censorship can be used to support propaganda as effectively as it can be used to support knowledge, if not more so.

Another way that a society could counter propaganda is by reducing epistemic inequality, since misinformation relies upon the propagandee's ignorance relative to the propagandist. Jason Stanley suggests that economic equality is a means to this end.

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Economic inequality makes people ignorant to the lived experiences of other classes, and furthermore causes them to dogmatically defend what they see as their class's interests out of economic anxiety (Stanley, 2015, p. 19). Reducing economic inequality would thus both reduce the differences in knowledge between groups of people that propaganda can exploit and mitigate a source of propaganda, since there would no longer be a widespread interest in producing propagandas to protect classist interests.

Sponsoring publicly-accessible true education would be another means of reducing epistemic inequality, although, just as in the case of censorship, it carries a risk. If the sponsors of such education struggle to discern propaganda themselves, or have an interest in spreading propaganda, then they may, intentionally or not, contribute to the dissemination of propaganda in a society. Classes that teach people about logical reasoning could improve their ability to recognize and resist weak propagandas.

A more controversial means of eliminating propaganda might involve eliminating rights to privacy. If a truly trustworthy state actor had access to and recorded every action committed by every individual, the state would have far more evidence that it could use to discern propaganda from knowledge, enabling them to censor or expose propagandists. Alternatively, every citizen could be given such access to every other citizen, so that anyone could make such determinations. If there were some way to read people's thoughts, memories, and intentions using technology, the production of many types of propaganda, particularly those that are intentionally deceptive for the propagandist's benefit at the propagandee's expense, would be virtually impossible.

Finally, the fields of virtue and vice epistemology might reveal how the attitudes and dispositions of individuals could be changed—either on a mass scale via social pressures or by a person themselves—so that people are more naturally resistant to propaganda. For example, dogmatism, the habit of clinging to a rigid set of ideas even if they are challenged, is an epistemic vice that has an overall effect of preventing an individual from gaining knowledge, even if it protects some knowledge from propagandist attacks (Beatson et al., 2019, p. 49-50). Cultivating more of a healthy skepticism or ideological flexibility in lieu of dogmatism may eliminate the ability of propagandas to use dogmatic beliefs as a vector, and may make educative arguments more likely to succeed over propaganda.

Of course, these solutions are only some cursory suggestions, potential remedies. I have not considered their efficacy on any basis other than the possibility that they might liberate a society's individuals from the influence of propaganda, enabling them to gain more knowledge. Some of these solutions, like ending rights to privacy, are certainly ethically dubious, and therefore probably should not be adopted. Others might be impractical or impossible to implement, either from a technical or policy standpoint—for example, attempts to alter school curricula might face significant pushback from teachers or parents. Some of these solutions may even have a negative epistemic effect at a collective level: for example, from the perspective of the idea of Mandevillian intelligence in social epistemology, a system may be able to gain more

knowledge overall if some of its epistemic agents have certain epistemic vices that cause them to produce propaganda (Smart, 2018, p. 10-11, 15-16). Paradoxically, a bit of propaganda that limits the knowledge of some individuals might increase the availability of knowledge to a society overall. The value of the ability for individuals to gain knowledge must be weighed vis-à-vis these other considerations if one seeks to appraise the full impact of a proposed change on an individual or society.

Concluding Remarks

When I began this project, I had hoped to find some way to conclusively identify propaganda, so that I could avoid it and develop opinions for myself that were better informed. I believe that I have at least found some success in this goal. I have found a way to describe propaganda objectively and, in doing so, have revealed how many propaganda can be identified and avoided. As a result, I have been able to begin reevaluating the standing of some of my own beliefs, to consider how I adopted them and the legitimacy of the arguments made in support of them, so that I can find better grounding for them, reject them when counterarguments appear more proper, or develop a healthy degree of skepticism around them when all appears uncertain.

Yet I cannot help but feel somewhat dissatisfied. To be secure in all of our beliefs, to resist propaganda entirely without jettisoning real knowledge alongside it, borders on the impossible: it would either require omniscience or the absence of propagandist intentions from the world. Even resisting logically weak forms of propaganda presents major challenges, rooted in the practical but limited nature of the human psyche and non-epistemic concerns. Furthermore, if such weak propaganda is successfully resisted, the issue of truth remains. Proving an argument to be flawed does not prove its conclusion to be false. Educative arguments still must be discovered on their own, adding to the work necessary to gain true knowledge. It seems to me that, while we can actively work to curb its influence, we are ultimately destined to live with propaganda, that there will never be a way to eliminate propaganda altogether.

One might place hope in the future, believing that advancements in technology will make propaganda easier to reveal or harder to produce. I am more pessimistic about the future's prospects. I am a member of the first generation to be raised entirely in the context of a popularized and accessible internet, which has enabled instant access to insane amounts of information and fostered the development of a truly global mass culture. On one hand, the internet has made it easier than ever before to learn new skills, conduct research, share one's findings, and interact with other people, suggesting that it has the potential to spread knowledge to all, to reduce propaganda's influence. However, the internet has simultaneously made it easier to disseminate propaganda, obscure the source of information, and confirm one's own biases, as evidence for virtually any belief can be found online, alongside a community of people espousing said beliefs. Meanwhile, other technologies have enabled the production of more convincing fabrications, like deep fakes, that can be used to support propaganda. The

mere existence of this technology casts doubts upon genuine evidence as well, making the truth more difficult to discern.

That said, I am not convinced that technology will necessarily make it harder to gain knowledge in the future, either. Technologies present opportunities to enhance both education and propaganda. I believe that our real epistemic future will be determined by how society reacts to these technological changes culturally, socially, and politically, and by how these reactions accommodate or complicate the production and consumption of propaganda versus education. We have some ability to affect the conditions of our future, and we should seek one that includes our betterment, whatever that betterment may entail. I cannot claim to know what we should do to achieve a better future, except that I know that the best way we can realize substantial solutions is through perception, reflection, and discussion of the evidence available to us. Therefore, I argue that we must continuously explore, consider, and debate the topics touched on by this project and the multitude of perspectives on them, and take action to advance what we know to be the right response once we are secure in that knowledge to the best of our ability. I can only hope that I have made a positive contribution to that effort here, that I have succeeded in rendering, both for myself and for you, the reader, some knowledge about propaganda.

Appendix

The appendix includes interpretations, per the stipulative definition, of additional real pieces of propaganda, similar to the interpretation of the World War I poster in the main body of the text. The interpretations here should not be considered exhaustive of the propaganda arguments contained in each respective piece. They are included to show how propaganda can be found and analyzed across a wide variety of informational media. The appendix is located in the online edition of *Proceedings of GREAT Day 2020*, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/16.

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Attitudes Toward Anglicisms in Montpellier, France: A Study on Linguistic Purism and Americanization

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ABSTRACT

France is known for its attitudes of linguistic purism; not only are there institutional and legal measures in place to protect the language, but many travelers report experiencing cold treatment if they do not speak French. All of this has been compounded by the sharp increase of anglicisms that accompanies the spread of American music, TV, and pop culture via the internet. As it becomes "trendy" to include English words or phrases in their media and advertisements, and as certain concepts originating in English do not always receive a French translation of equally popular usage, French preservation institutions such as the Académie Française attempt to prevent the influx of English use from encroaching upon French language and culture. As a French major studying abroad in Montpellier, I was interested to see how I would encounter these purist attitudes and whether or not the average person considers the French language to be compromised by the use of anglicisms. I conducted a series of interviews with students and professors from my university examining their views on anglicisms and protecting the French language. I was also interested in observing whether or not there was a marked generational divide on the issue.

In our increasingly connected global society, France is one of many countries to experience an influx of economic and cultural influence from the United States—and perhaps its most controversial export has been the English language. In their traditionally purist society, leaders and scholars of France have historically regarded cultural and linguistic borrowings with great suspicion, viewing such influential societies as a threat to the consummate society of France. However, leaders and scholars represent a minority of French speakers; the nation's reception of foreign influences is materially driven, instead, by its majority of ordinary citizens. The United States had ties with France from

the very beginning, but its international influence has grown the most during the last 130 years, during which it became the largest global economy and modern forms of technology progressively increased the speed, and intimacy, of connection between countries. Now, with global internet connections, average citizens from many different countries can naturally brush shoulders on many internet platforms, no longer waiting for a newspaper or radio presenter to act as interlocutor. We have created endless spots at a table that used to be occupied only by leaders and certain professionals; as a result, regulating cultural and linguistic exchange has become more unfeasible than ever before.

As an American student studying abroad in France, I was curious to see how the citizens of France felt about anglicisms and the public discourse surrounding them. Would they share in concern among the elites that the cultural identity of France is at risk, or were their own lives detached from this dialogue? In this study, I conducted an interview series with French citizens in order to better understand how the spread of American culture and English loanwords is affecting French society at the individual level.

Literature Review

Language Ideologies

Language ideologies are beliefs about languages, speakers, and discourse that speakers develop, often unintentionally, as they attempt to "construe [their] language's role in a social and cultural world" (Irvine, 2012). Yet language ideologies extend far beyond opinion; Simpson and colleagues (2018) outline how language ideologies interact with social institutions such as the church, the legal system, and the family to determine what type of discourse is appropriate, or *legitimate*, in different settings (p. 4). For example, speaking with relevancy is pertinent in professional settings—such as a board meeting where off-topic comments are viewed as inappropriate or *delegitimate*—whereas it is generally acceptable to change topics in a conversation with a friend. Language ideologies often carry some form of value judgment about speech actions or even entire dialects; for example, in the United States, using African American Vernacular English has historically been discouraged in school settings because of a negative stereotype that AAVE is "uneducated" or "unprofessional" speech. Clearly, well-established linguistic ideologies can have material consequences for many individuals.

In *Oxford Bibliographies*, Irvine (2012) describes that linguistic ideologies proceed from "the nexus of language, culture, and politics;" as such, the initial, mainly political, definition from Michael Silverstein in 1979 of "any sets of beliefs about language articulated by the users as a rationalization or justification of perceived language structure and use" has expanded to include a greater sociocultural focus as well. Yet his original framework is quite useful to understand that language ideologies cannot escape the surrounding structures of power. Because language is caught in an arena of

soft power in society, Avineri et al. (2019) contend that "language is neither a neutral communicative medium nor a passive way or referring to things in the world, but rather a crucial form of social action in itself" (p. 2). When we consider that language never functions outside of these systems of power, nor does the system allow for a truly neutral position, the influence of linguistic ideologies becomes more apparent.

Linguistic Purism

Linguistic purism is the ideology that one form of the language should be protected and standardized in favor over others. In many ways, linguistic purism is a testament to the influence of institutions over language use, particularly in the process of legitimizing certain forms of language while delegitimizing others. Linguistic purism is often connected to patterns of colonialism or the political elite in a state, but it can also be a reaction to outside forces of power. Björn Jernudd conceptualizes purism as "a linguistic effort to protect 'Self' from 'Others' in times of conflict or 'an articulation of changes in relations to Self and Others' in [conflict's] absence" (Eastman, 2020, p. 177). Linguistic purism is contingent on the ideas of separation and cultural boundaries, but such sequestration is impossible to enforce without formal measures. Often, the extent of a society's ability to enforce linguistic purism calls back to the idea of institutions; language can be controlled by designating certain language practices as legitimate through defining the language parameters of education, the legal system, and industry, among others. The idea of purism also carries a double-edged aesthetic and moral value that is used to justify the need to codify the standard variety. In other words, the standard form is held up as the most beautiful and well-educated form of the language, and the one that should be preserved.

Neologisms and Loanwords

The objective of keeping a language pure, however, is made complicated by the natural processes of neology and language borrowing. In the most basic sense, neology is the process of adding new words to the lexicon of a language—but this process is nuanced by the fact that words often enter the language informally in everyday speech before being formally added to dictionaries or officially recognized (Jamet, 2018). Maria Ryskina and her collaborators describe that the process of neology can be understood through supply and demand; neologisms emerge to supply words for semantic gaps, and groups of related neologisms reveal an increased societal demand surrounding a topic (Ryskina, 2020). In their book *Les Néologismes*, linguists Jean Pruvost and Jean-François Sablayrolles posit that neologisms are simultaneously, and somewhat paradoxically, "a natural phenomenon of language and communication… [that is] essential for the life of a language" and "a process which leaves no one indifferent and even involves a judgment on the usage" (Pruvost & Sablayrolles, 2003, p. 6-9, translation mine). While neologisms and other forms of language innovation are generally considered to be signs of a healthy language, Pruvost and Sablayrolles note that newspapers, scholarly institutions, and dictionaries have a significant role in accepting, rejecting, or attempting to replace words that naturally result from daily

life (Pruvost & Sablayrolles, 2003). In France, neologisms are also vetted by several legislative bodies: the Académie Française, the Ministry of Culture, and its associated General Delegation for the French Language and the Languages of France (*Délégation générale à la langue française et aux langues de France*, or the DGLFLF).

Though some neologisms naturally evolve with the language, a major source of new words are linguistic borrowing or loanwords. In many cases, a language gap stems from industrial or technological development in another country, in which case there is already extensive vocabulary on the topic in another language. One of the more obvious examples is that the prototype of the Internet—as well as some of the most widely used websites such as Google, YouTube, Facebook, Instagram, and Twitter—were all invented in the United States. Because of this, English loanwords, or *anglicisms*, spread everywhere that the Internet was spreading. Neologisms often follow social shifts as well, such as civil rights movements, new organizations, and the development of subcultures.

When neologisms begin as loanwords, the borrowings are often closely patterned off of the source language, which may contrast with the standards of the recipient language. The progression of assimilation for loanwords has been a topic of controversy among certain linguists, some of which hold that a loanword begins as a *code-switch*—or a brief alternation into a second language—and then gradually become more similar to the recipient language (Poplack & Dion, 2012). However, in a real-time study of English loanword assimilation in Québec over 61 years, researchers Shana Poplack and Nathalie Dion found that, from the time of their introduction, loanwords were produced already following the French standards for sound system, plural rules, determiners, and gendered forms. They concluded that borrowed words are, instead, integrated with the borrowers' language immediately:

> …when speakers access a lone other-language item, they make an instantaneous decision about whether to treat it as a borrowing or a code-switch. If they opt to borrow it, they produce it with all the requisite recipient-language morphosyntactic trappings…Based on the criterion of retaining donor-language grammar, speakers apparently do not [code-switch] with respect to lone other-language items. (Poplack, 2012, p. 296)

Yet, even if the borrowed words are produced following the structures of the recipient language, they are unlikely to completely conform due to features retained from the donor language.

A Brief History of Linguistic Purism in France

The history of linguistic purism in France can be traced back to the mid-1500s, when French initially began to be recognized as an official language rather than a Latin vernacular and began to replace it in political and judicial spheres. Within a hundred years, the French concept of "le génie de la langue française" (the genius of the French language) arose, claiming that French was superior to Latin and all of the other Euro-

pean vernaculars because it afforded an unparalleled clarity of expression (Vigouroux, 2013, p. 385). In 1783, the Berlin Royal Academy held an essay contest with the prompt "What makes French the universal language of Europe?"—it was, by this point, an elite language spoken in many European courts—and one of the winning essays made the case that French was not just the language of Europe, but the "human language" and the only true source of language clarity (Vigouroux, 2013, p. 385).

This alleged perfection was threatened by the increasing separation between social classes, as the Parisian upper-class variety became the legitimized version whereas the "patois" of lower classes was seen as jeopardizing the integrity of France, to which standardization was perceived as the cure. The imperial status of French was threatened during the Renaissance when Italian gained more status in the royal courts, during which Henri Estienne wrote a satirical book, *Deux Dialogues Du Nouveau Langage François Italianizé* (1578), criticizing the linguistic mixing with Italian (Hornsby, 1998). Centuries later, René Étiemble would produce a similar satire titled *Parlez-vous franglais?* (1964) criticizing the mixing of English and French.

The struggle between French and English began in 1731 with a British bill banning French from the courts, which until that time had allowed multiple languages (Vigouroux, 2013). As France lost power over its North American territories in the coming years, culminating with Louisiana, it had officially lost a major foothold in the New World: "The increasing use of English as the language of science and technology, diplomacy, and international trade appears to have lessened the international prestige of French, especially in the European Union," says Cécile Vigouroux (2013, p. 387). Vigouroux sums up that "La Francophonie," or the global French-speaking community and its related ideologies, "cannot be separated from worries about the vitality, or, more specifically, rather, the endangerment of French as an imperial language in the face of the spread of English" (2013, p. 380). As France continued to lose political powers from its colonial era, it became more anxious to encourage and enforce the use of French worldwide.

Académie Française

In order to protect and standardize the French language, the Académie Française was founded in 1635 by Cardinal Richelieu, Chief Minister to King Louis XIII. The values of the Académie were shaped by the Enlightenment ideals of symmetry, rationalism, and order, which the Académie tried to apply to the French language. Its forty members, known as the *immortels*, are stringently selected and hold their seats for life. The Académie was charged with writing and maintaining the official French dictionary, the first edition of which took 56 years (Reginato, 2018). They are expected to begin a new edition after each one is published, roughly every half-century. However, Craig Smith (2005) of the *New York Times* describes their current predicament:

> …as science and technology push more and more French and non-French words into common usage, the immortals…are struggling to keep up

their Sisyphean task. The academy has been toiling for 70 years on the dictionary's ninth edition and has reached only the letter P.

Maurice Druon, a famous *immortel* until his death in 2009, suggested that they first fell off pace because of World War II (Smith, 2005). Yet, as the earlier parts of this edition are already out of date, they have resorted to releasing it in volumes by sections of the alphabet (Smith, 2005).

Though other dictionaries may be published in France, the Académie Française has the final say on which words have been formally accepted into the French language, which has become an especially contentious question in recent decades as more and more anglicisms are taken up by French speakers. In every ministry in France—which represent different sectors such as the armed forces, education, culture, and the economy—certain individuals are responsible for identifying foreign words that are being used professionally and sending them to the Ministry of Culture's General Commissariat of Terminology and Neology, which consults with the Académie on options for replacement (Smith, 2005). The Académie has been known to approve words and phrases that many deem too stilted for public use, however, such as "*toile d'araignée mondiale*" for World Wide Web, which translates literally to "Web of the Global Spider" (Smith, 2005). Even so, their role as the language authority is firmly cemented.

On their website, the Académie also regularly updates a blog series titled "*Dire, Ne Pas Dire*" ("To Say, Not to Say"); researcher Gina Caruso describes that it was "designed to highlight errors and idiosyncrasies in modern language use, and is broken down into several subgroups or sections to make more specific recommendation for accurate language use" (Caruso, 2012, p. 27). One of these such subgroups is an entire section for "Neologisms & anglicisms." In one recent entry from May 7, 2020, the Académie criticizes the use of the anglicism "follower," which they claim is "essentially used in French to designate those who, by an electronic medium, signal that they adhere to the thoughts or actions of such and such, the value of the latter seemingly being indexed by their number of followers" (Académie Française, 2020, translation mine). This explanation alone might be considered unnecessarily pretentious for a fairly simple term, but even more surprisingly, the post runs through several synonyms such as "disciple," "partisan," and "admirer" before finally settling on a recommendation to revive an archaic religious term, which was also a borrowing:

> If the French terms mentioned above were not enough, perhaps we can add to this list by reviving the use of the noun *acolyte*, borrowed from the Greek *akolouthos*, "follower, companion, servant"…In the Catholic hierarchy, it is the title above exorcist, but today, it rather has [another] sense…this seems to be the equivalent of our modern follower" (Académie Française, 2020, translation mine).

In the end, however, they most effectively exert their influence over other institutions in France seeking terms for official use. Less certain is the extent of their influence over causal speech.

The Académie Française has gained attention throughout the centuries for its impenetrable bourgeois culture and notorious choosiness regarding new members, the vast majority of whom are white men over the age of sixty. New *immortels* are selected stringently and expected to raise over $200,000 for custom-made robes and swords upon induction, by some member reports (Reginato, 2018). Their process of choosing new members has long been mysterious; they send prospective nominees an invitation to apply to them and then reject most of the applicants, often leaving vacancies for years until they can decide. Even the great writer Victor Hugo was only narrowly accepted after multiple attempts. "It is something of a running joke in France that the highlight of the academy's long history is its habit of systematically excluding most of the country's greatest writers, instead filling its seats with those from the second rank," says Adam Nossiter of the *New York Times* (Nossiter, 2019b). Amin Maalouf, a Lebanese writer and *immortel*, attributes its recent hesitation to select new members to a larger trend: "We're the reflection of the society, and it's a society that's questioning itself" (Nossiter, 2019a). Some of the staunchly conservative members of the Académie have, perhaps, begun to see a need for modernizing their values to best serve their present society. Even so, many members of the Académie openly prefer its era of extreme exclusivity and upper-class luxuries such as lavish dinner parties, which is slowly becoming a thing of the past: "The bourgeoisie is dying," *immortel* Mr. Rouart laments (Nossiter, 2019b).

In addition to its luxurious culture, the Académie has come under criticism for its limited inclusion of women and people of color; there are only five women and one Black man among the *immortels* (Nossiter, 2019b). Furthermore, they have been accused of upholding sexism by refusing to budge on many traditional gendered nouns. In French, all nouns and adjectives are gendered, but many words have a male and female spelling with different pronunciations. A significant amount of profession nouns, however, still have only one form—a doctor or professor must always use the masculine spelling and articles "*le médecin*" and "*le professeur*" while a housemaid must always be the feminine "*la femme de chambre*." In recent decades, many have called for all profession nouns to be given male and female forms, an initiative referred to as the "feminization of the language," rather than uphold the assumptions that these professions are gender-specific by having only one form. The Académie aroused ire from feminists in 2017 with its strong rejection of calls for gender inclusive versions of profession nouns, in which they responded that gender inclusion "[will] lead to a fragmented language, disparate in its expression, creating confusion that borders on being unreadable" and claimed that "faced with the 'inclusive' aberration, the French language is in mortal danger" (Reginato, 2018). The Académie has retained its prestigious place in society, as well as much of its funding, despite such complaints.

Americanization

Though French elites have long been diligent to protect their language from foreign influence, the ascent of the United States into a global economic and technological superpower created ample opportunity for English loanwords to enter the language.

The United States surpassed Britain to become the largest global economy in the decades following the US Civil War, often referred to as the Gilded Age—more than a century ago ("Gilded Age," 2020). It has since maintained a widespread socioeconomic influence and remains the leading economy in terms of nominal GDP and net wealth ("Economy of the US," 2020). This socioeconomic influence further expanded throughout the last century, during which advances in technology have resulted in unprecedented levels of cultural mixing and the rise of a global culture. Technology such as television, radio, and the internet made it possible for the internationally popular United States culture to influence individuals worldwide in their own homes. With the diffusion of American brands, music, cinematography, and celebrities came the resounding force of the English language; it has catapulted to a status of the most studied language in the world with 1.5 billion learners, despite having only 527 million native speakers (Noack, 2015). English far surpasses the second-most studied language, French, which has 82 million learners worldwide.

In response to the growing strength of the English language, Vigouroux claims, French scholars have often disparaged globalization as "Americanization"—or even as "McDonaldization" in the example of French linguist Claude Hagège—accusing the US of "making the world more and more uniform, both culturally and therefore linguistically" (Vigouroux, 2013, p. 388). Michael Gueldry argues in "The Americanization of France" that the US exports "certain economic practices to which one must adapt in order to survive," but that the other cultural values and practices are engaged in voluntarily: "No one is forced to eat at McDonald's, watch *Desperate Housewives*, or play with Barbie" (Gueldry, 2009, p. 38). Even so, Gueldry (2009) recognizes that the US has had a profound cultural impact on Europe:

> …the only common culture to all of Europe today is the American commercial-media culture. Its *lingua franca* would be "Globish," a global English that is a repertoire of several hundred words shared by a large number of Europeans (and by the world), allowing one to travel, conduct business, and communicate across cultures. (p. 44)

Gueldry's description of "Globish" makes it clear why French leaders would feel threatened if they seek to retain the status of French as an imperial language; no language can compete globally with the spread of English and American culture to this extent. He attributes the increase of Americanization in France during the last thirty years to increased connectedness between the US and the world—achieved through a decentralized system of production along with new technologies—as well as an improvement in the infrastructure of France where culture spread more easily throughout the whole country and not just in major cities (Gueldry, 2009). Whatever the cause, the impact on French television, music, film, fashion, industry, and language use has been profound.

The Toubon Law

In response to the influx of English loanwords from American commerce, technology, and culture, the Toubon Law was passed in 1994, updated from the similar Bas-Lauriol Law of 1975 to once again guard the French language against infiltration by other languages. However, the French Minister of Culture after which the law was named, Jacques Toubon, discouraged citizens from viewing it as an anti-American crusade: "It is merely France's attempt to protect itself from cultural encroachment, or, as the legislation says, to allow France 'to better assume its responsibility regarding a language of which it is the source, and which nearly 50 countries… share'" (Waxman, 1994, p. 2). The law tightened security around the accumulating anglicisms, reinforcing that "all advertising, contracts, job offers, internal regulations, official memos, public documents, and scientific meetings and colloquia must be purged of foreign terms when a French term or expression of the same meaning exists" (Waxman, 1994, p. 1). Any documents that include other languages must include a French translation in the same font and size to avoid heavy fines. The law is designed to protect the right to speak French exclusively, if so chosen.

The Toubon Law was met with frustration by many; one such Richard Maroko criticized: "No law, no decree will ever keep anyone from using the words they want to…People will talk as they want. You can't force people to use another word for weekend. Weekend is weekend; it's part of the cultural mutation of a language" (Waxman, 1994, p. 2). Perhaps the strongest response was the Young Socialist Movement's creation of the "European League Against Toubonien Fanaticism," through which the group produced a statement written in English, Spanish, German and French accusing Toubon of "trying to turn French into a dead language" (Waxman, 1994, p. 2). Even so, it could just as easily be said that the Toubon Law was neither surprising nor extreme in the long history of language legislation in France, especially coming after its 1975 predecessor.

Terminological Planning in France

To enforce legislation such as the Toubon Law, the French government must have its own solution for proposing acceptable French terminology for any linguistic gaps, and that it does. In 1966, President De Gaulle and Prime Minister Pompidou created the Haut Comité de la Langue Française (High Committee of the French Language), whose purpose was to recommend measures to defend and expand the French language (Thogmartin, 1991). In 1972, the Haut Comité and Prime Minister Chaban-Delmas set up a framework of committees to enact this terminological planning: each government ministry would appoint a commission of part civil servants from their ministry and part outside experts to identify gaps in the language and propose "terms necessary either to describe a new phenomenon, or to replace undesirable borrowings from foreign languages" (Munday, 1985, p. 221). Munday describes that the major complaints against anglicisms were "their dissonance, their frequent failure to comply with received linguistic canons and their tendency to jar with the traditional rhythms and patterns of the French language" (1985, p. 228). To avoid these issues,

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the committees often attempt to base their suggestions off of existing French words, or at least prefer to borrow from ancient languages such as Greek and Latin. After being approved by the Académie Française and the relevant ministers, the new terms are placed in an official journal and become the standard vocabulary for all government materials (Munday, 1985).

Even at the time of one 1979 survey, pre-Internet Era, the French efforts at terminological planning were somewhat unpopular with actual French speakers, with "30% of those surveyed characterizing the government's language directives as 'useless' and 15% as 'ridiculous'…only about 10% found them 'realistic'" (Thogmartin, 1991, p. 1001). 70% of the participants also perceived the legislation as "primarily directed against the spread of Anglicisms" (Thogmartin, 1991, p. 1001). Of the twelve pairs of anglicisms and French neologisms that they surveyed, the French word was preferred in only six cases and tied for a seventh (Thogmartin, 1991). Despite the initial unfavorable public sentiment, these institutions have continued to shape and standardize the French language over the past fifty years.

The Haut Comité was replaced with several different organizations over the years before finally settling on the current administration in 1993, La Délégation Générale à la Langue Française et aux Langues de France (The General Delegation for the French Language and the Languages of France), which calls itself the "indirect heir" of the Haut Comité (Ministère de la Culture, n.d.b). This delegation was integrated with the Ministry of Culture in 1996, where it currently functions. The end of the title "and the Languages of France" was added in 2001 in an uncharacteristic nod toward the linguistic diversity of the country. Among the DGLFLF seven missions are objectives to guarantee the use and spread of French, enrich the French language, innovate in digital language technology, and "make French everyone's business" (Ministère de la Culture, n.d.a).

Despite how their methods might appear, the DGLFLF maintains that their purpose is not ridding French of loanwords: "The legal framework is not intended to preserve the purity of French by driving out foreign words; it is concerned with the presence of French and not its content" (Ministère de la Culture, n.d.c.). Rather, the DGLFLF emphasizes that they protect the "Right to French" by enabling their citizens "to have access to information in French in their daily life, at work, for access to knowledge and culture, in order to ensure particularly their safety and health" (Ministère de la Culture, n.d.c.).

The Controversy of Dialects in France

Though the DGLFLF claims to be inclusive to the diversity of French languages now, some scholars feel that little has changed in the stigmatization of nonstandard dialects. The French concept of *dialecte* differs from its English use in connotation, French researchers Philippe Blanchet and Nigel Armstrong posit: it refers to a second-class language that is not truly a *langue* (language) in their hierarchy, but still more

formal than a *patois* (Blanchet & Armstrong, 2006). Blanchet and Armstrong explain the ideology behind this distinction:

> French is regarded as the reference and almost the sacred *langue*: in this frame of reference the pejorative word *dialecte* simply cannot be applied to it. Worse, this ideology remains generally unconscious, since most French people are not aware of the element of social or ethnic prejudice inherent in this view of *langue* as opposed to *dialecte* or *patois*. (2006, p. 252)

Metropolitan France does in fact have many dialects, however, in the English sense of the word; the Institut Français des Alpes outlines that there are as many as twenty-eight different accents of which to be aware (IFALPES, 2019). Yet, only Parisian French is considered to be the standard which is appropriate for school instruction or professional use. Blanchet and Armstrong describe:

> The "ideology of the standard" is particularly strong in France, so that schoolchildren are taught to see these "dialects" as inferior varieties of French replete with errors…They feel a genuine linguistic insecurity…, as they think they speak a more or less stigmatized variety of French but cannot exactly identify what is good and what is bad in it, nor for what reason. (2006, p. 255)

Because of this perpetual emphasis on standardization, regional characteristics tend to be more apparent in the speech of farmers or other members of the working class, while upper class individuals often attempt to imitate the Parisian standard in order to distinguish themselves as more sophisticated (Blanchet & Armstrong, 2006).

Historically, this dynamic first developed because French began as the language of the upper class and the central administration, while those in lower classes were later taught French in school in order for it to become the standard language. Despite the intention of the upper class to create a monolingual country by replacing all of the regional dialects, most regions continued to be bilingual with their regional dialects for several generations, after which those dialects were absorbed into French—along with some of their unique characteristics (Blanchet & Armstrong, 2006). Hundreds of years later, those regional differences still do not have acceptance because the French are taught to view non-standard regional and social forms as uneducated, lower-class speech. "The French were also taught not to notice the true diversity of French," Blanchet and Armstrong claim, "because French is the symbol of the national unity." As one of Blanchet's interview subjects phrased it, "There can't be any regional French because French is our *national* language" (Blanchet & Armstrong, 2006, p. 263).

An Emerging Southern Standard

Despite the longevity of the language ideology that Parisian French is the only true standard, in the last several generations, Southern French has begun to be viewed as a similarly legitimate dialect. Blanchet and Armstrong describe that contrasts between

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the north and south "created and continue to maintain specific [southern] cultural identities, partly built up in opposition to the northern one(s)" (Blanchet, 2006, p. 263). This Southern standard is based on the Provençal accent from the region of Provence, the location of Marseille, the second-largest city in France. Within the region, an uncharacteristic local pride has developed around the southern culture and dialect, where many consider themselves to be *Marseillais* above French. The dialect is also internationally recognizable—one study showed that students from Milan, Italy, could recognize it 50% more often than Québec French—and so distinct that the expression *avoir l'accent* (to have an accent) has come to refer exclusively to the southern pronunciation (Blanchet, 2006, p. 265).

In a study asking participants which varieties of French were appropriate for formal situations, researchers found that the top three were Standard (Parisian) French (96.4 %), Southern French (70%) and Parisian working-class French (52.8%)—with Southern French being more acceptable than the working class Parisian French and significantly higher than other non-standard dialects (Blanchet, 2006). However, Blanchet and Armstrong note, "Provençal has a double status: it is at the same time considered as 'a real *langue*,' a symbol of a rich culture and literature, and 'a second-class language' that is inferior to French (or worse still, a *patois*...)" (Blanchet, 2006, p. 267). In my home city of Montpellier, a couple hours from Marseille, we spoke with the Languedoc regional accent, which Blanchet and Armstrong describe as an intermediate scenario between the acceptance of the Provençal accent and the general stigma of most regional dialects. It contains many similarities to the neighboring Provençal French, but the differences that do exist mean that it is still one step removed from the Southern standard.

METHODOLOGY

To hear from real French people on their opinions about anglicisms in French, I designed a two-part interview series: a poll where they could rate their agreement with common language ideologies about anglicisms and Americanization, and a set of short answer questions where they could expand on their opinions with more context. My original subjects were students and professors from the Université Paul Valéry Montpellier III, the university I attended in Montpellier. The eight-largest city in France, Montpellier is the third-largest French city situated along the Mediterranean coast. Up to a third of its population are students of the major universities in the city. The regional dialect in the area is Languedocien, which is considered to be one step removed from the Southern (semi-)standard dialect of Provençal, and in direct contrast to the Parisian standard.

My intention was to find a roughly equal sample size from the two categories of student and professor, around 4-6 participants from each group, in order to be able to discuss whether or not I experienced a generational divide in opinions at this small scale. I connected with my first subjects through convenience sampling, beginning with my professors and a French student who I was tutoring in English. I then ex-

panded my student subjects through snowball sampling; I asked other students from the friend group which she had introduced to me. My study was limited in scope by my short timeline of a five-month semester, so I chose to focus on a small number of personal interviews including the poll rather than putting all of my focus into circulating the poll without in-depth explanations. However, I later decided to share the poll on a wider basis, which gave me different sample groups for the two parts of the interview series.

The poll was given first via a Google Form on my laptop, and then it was followed with a recorded in-person interview. I conducted the interviews at the UPV-3 campus in the professors' offices, the library, or empty classrooms. At the start, I asked the participants to mark their age group as either 18-24 or 24+ to see if I noticed a generational divide in opinions. The following poll consisted of ten statements related to anglicisms, Americanization, and language ideologies in France regarding English loanwords. For each statement, participants ranked the idea as "Never True," "Sometimes True," "Often True," or "Always True" based on their personal opinions and experiences. The poll was designed to last 5-10 minutes and give the participants an opportunity to connect the topic to their own lives before broaching more complex issues. It also provided an opportunity for me to collect quantitative data, which would make it more feasible to identify trends in the responses. Here are the translated statements (see Appendix 2 for original French version of poll):

- I am aware of using anglicisms in my daily life.
- I consume American or British television, music, and movies.
- I associate anglicisms with slang and pop culture.
- I think that using anglicisms is fun and cool.
- I prefer to use anglicisms when they are shorter than the proposed French equivalent (such as "webpage" compared to "page sur l'étoile").
- When I know that a word is an anglicism, I try to avoid using it.
- I use anglicisms less often in formal or professional environments
- As a French speaker, I feel guilty for choosing an anglicism over a French word.
- I worry that the spread of anglicisms and American culture will weaken French culture.
- The work of the Académie Française is necessary to protect and regulate the French language.

After the poll, my participants had an audio-recorded interview with me where they had the opportunity to respond to more complex topics and expand upon their views. In the interview portion, I also delved into topics such as the Toubon law and the homogeneity in age, ethnic background, and gender of the Académie Française *immortels*. The interview portion was designed to last 10-20 minutes, and its focus was

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more political than the poll. This was the portion of the interview that was meant to target my research questions about the Académie Française and the response of policymakers. The participants had the opportunity to consent to participating in the study, sharing their names and age groups, and taking an audio recording for my future reference. The translated questions are as follows:

- France has a reputation for carefully guarding their language from outside influences, which can be described as "linguistic purism." This goal is evident in the existence of organizations such as the Académie Française. How has your attitude toward anglicisms been affected by the national discourse about protecting the French language?

- The average age of the Academic Français members is over 70 years old, and over 80% of its members are white males. It sometimes faces criticism for not representing the diverse demographics in France. How might this homogeneity affect the ability of the Académie Français to represent the needs of the country?

- As more English words enter French, we have seen more attempts to control and reverse the spread of anglicisms. Some institutions propose French words to substitute for a concept that began in English, like the phrase "page sur la toile" to replace the anglicism "webpage." Have you ever experienced a word being replaced? How did you feel about it?

- In 1994, the current version of the Toubon Law was established. This law mandates the use of French in government publications, advertisements, workplaces, commercial contracts, government-financed schools, and several other contexts. Ignoring the law can lead to heavy fines. What might be some positive and negative results of enforcing language use with legal action?

- While some claim that English words pollute the integrity of the French language, others believe that changes in the language are a natural part of globalization. Are you inclined to agree with either of these sides, or do you think the truth is somewhere in between?

The equipment that I brought to my interviews was only my laptop for the interview materials, my phone for audio recordings, a pen, and consent forms. I used the laptop to administer the Google Forms poll and then to read off my interview questions. I used my phone to take audio recordings in the Voice Memos app. After the interviews, I saved the voice memo files with the name of my participant. The files were finger-print protected on my iPhone, and the Google Forms responses were only accessible through my personal Google log-in.

After the initial interview series, my methods of data collection had to be adjusted to account for an unexpected mishap: shortly shortly after my return to the United States, my phone was stolen before I had the opportunity to transcribe the interviews, and I had not copied the files yet. Thankfully, my surveys were backed up through

the Google account. In order to preserve as much of my initial format as possible, I reached out to the same participants and asked them to provide written answers to the short answer questions from the interview. Though I would have preferred to preserve the original interviews, which provided more opportunity for spontaneous thoughts and comments, the written versions that I received functioned well for my current purpose of a written study because they were already structured in written form and avoided the possibility of listening errors.

In the end, I had seven participants for the full interview: three professors and four students. Coincidentally, for my interview group all of the professors were male and all of the students were female. After transitioning to email interviews, most of my participants from each category provided new written responses, but one of the professors did not. The transition to online interviews gave me the opportunity to significantly expand my poll results, however, because one of my French friends decided to share the poll with many of her contacts. This introduced a wider group of French students and young adults mainly from Paris and Montpellier, as well as a much more even gender distribution for the quantitative results, for a total of 54 responses. My new groups are best explained as Students (18-24) and Working Professionals (24+), though in retrospect I would have preferred to ask these categories directly on the survey instead of by age group to have a clearer picture of my respondent demographics.

After collecting my expanded poll data through Google Forms, I exported the data to Google Sheets and performed a difference of means test for each of the ten question results to compare the two age groups' responses. Though my sample size was still relatively small, this analysis helped me determine which responses showed a notable contrast between the two age groups versus which statements had similar responses across the generational divide. I evaluated my data sets by mean, median, and mode as well to assess potential explanations for the trends.

FINDINGS AND RESULTS

The Poll

To interpret the results of my poll, I first organized my responses into two data sets separated by age group and arranged this data on stacked bar graphs in order to easily observe both the overall trend of responses and the two distinct data sets per statement. In order to compare the verbal results quantitatively, I assigned the four options a number value from least agreement with the statement to greatest agreement: "Never True" (1), "Sometimes True" (2), "Often True" (3), "Always True" (4). For each of the ten statements, I assessed the mean, median, and mode for both data sets, which I considered to be the most descriptive statistical changes per statement. I determined that a mean response between 1.0 and 1.9 would indicate strong disagreement with the statement, whereas a mean between 2.1 and 2.4 would show moderate disagreement. A mean between 3.0 and 4.0 would indicate strong agreement, and a mean between 2.5 and 2.9 would show moderate agreement. In discussing the modes,

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it is also useful to mention the percentage of participants in each data set that chose the mode response.

With my larger sample size after the online participants joined, there were 32 participants in the 18-24 group and 22 in the 24+ group—an unequal sample size from the two sets, but one that still produced observable patterns. In order to mitigate the potential confusion of comparing numerical values from two sets of different sizes, I also performed a difference of means test on the data using Google Sheets. This test is designed to help determine whether or not the difference between the two groups is statistically significant—simply, is age group actually a solid predictor of the participants' choices on a topic, or were the participants likely to respond similarly regardless of age group? Without adjusting for the different sample sizes, this question is not as easily answered by interpreting the graphs.

The difference of means test is structured around the concept of the *null hypothesis* in statistics, which is the default position that there is no significant difference between the two populations, or in our case, that age group did not affect participant responses. The result of each difference of means test is a probability between 0 and 1, with a P-value of 0 meaning that the null hypothesis is absolutely false (so there is a difference between the sets) and a P-value of 1 meaning that the null hypothesis is
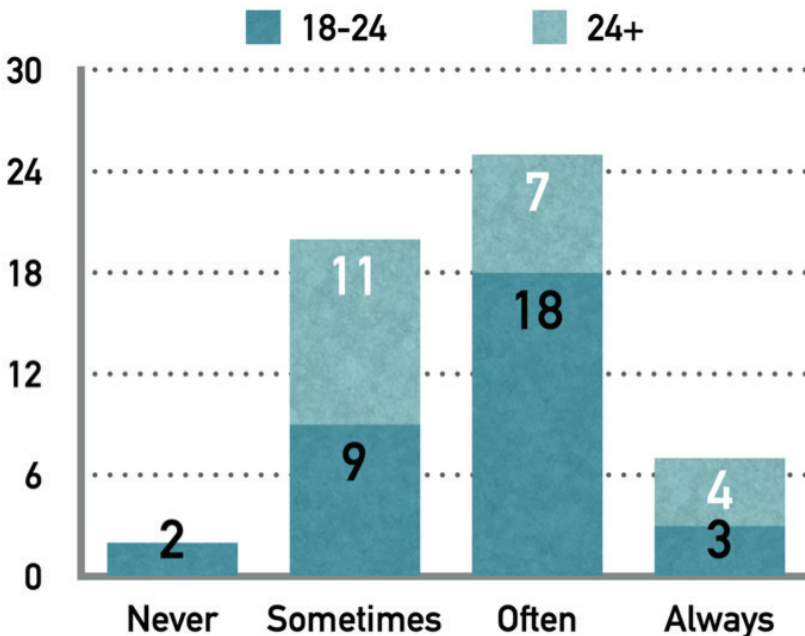
Statement 1: I am aware of using anglicisms in my daily life.

absolutely true (there is no difference between the sets). For our purposes, we will consider P-values < 0.05 to mean that the null hypothesis is disproved and the results are statistically significant, and P-values >0.05 to mean that the null hypothesis cannot be

disproved and the data may not be statistically significant. Including the probability of statistical significance in the discussion provides a valuable opportunity for deeper interpretation—we can discuss with greater insight whether or not a certain view is changing across generations.

It is important to note, however, that we cannot use the term *statically significant* in a strictly formal sense because the 24+ group does not meet the standard minimum boundary of 32 participants. I continue to use this term for the sake of clarity, but the reliability of these statistics is limited by the smaller sample size. Even so, the statistical framework is a useful tool to interpret patterns and observable trends in the data sets, bearing in mind that we could achieve even more clarity with a larger sample size. In the following discussion, I included graphs in which the results were significant or most interesting; additional graphs can be found in Appendix 1.

Poll Results

This statement showed the greatest overall similarity between the two age groups; it is the only one for which both age groups had an equal mean at 2.68 each, representing a moderate agreement with the statement across the board. At first glance, a difference between the two groups might seem to be observed in the modes; 11/22 (50%) participants in the 24+ group responded 2 ("Sometimes"), whereas 18/32 (56%) participants in the 18-24 group responded 3 ("Often"), suggesting that the younger group has a slightly greater awareness of anglicisms in their daily lives. However, after performing the difference of means test, the difference between the two means was very far from statistically significant, with a surprisingly high P-value of 0.9787, all but confirming the null hypothesis. As such, a more likely conclusion would be that age group was not a strong predictor of the participants' responses. Rather, the shared median of 2.68 tells the clearest story: the majority of participants moderately agreed that they were aware of using anglicisms in their daily lives. I included this statement at the beginning because it provides some much needed context on whether or not anglicisms are noticed by native French speakers, because it would be difficult to have opinions or intentions surrounding anglicisms if they are not usually recognized. Though my responses showed that most of the participants recognize anglicisms on a regular basis, the fact that their agreement was only moderate also implied that many felt unsure about how often they were using anglicisms.

Statement 2: *I consume American or British television, music, and movies.* For this statement, the mean responses were 3.06 (18-24) and 2.59 (24+), showing that the 18-24 group agreed with the statement strongly whereas the 24+ group agreed moderately. However, the difference of means test could not disprove the null hypothesis—though its probability was fairly low (P = 0.0855)—so it is uncertain whether or not age group was a strong predictor of response. The two groups shared a mode of 3 ("Often"), with 15/32 participants from the 18-24 group and 9/22 participants from the 24+ group selecting this option. A notable outlier was the all five responses of 1 ("Never") came from participants in the 24+ group, whereas the 18-24 group had a

larger representation in 4 ("Always"). Therefore, most of the French participants indicated that they are consuming media in English to varying degrees, and it is possible that a larger data set would have revealed a stronger propensity to do so among the
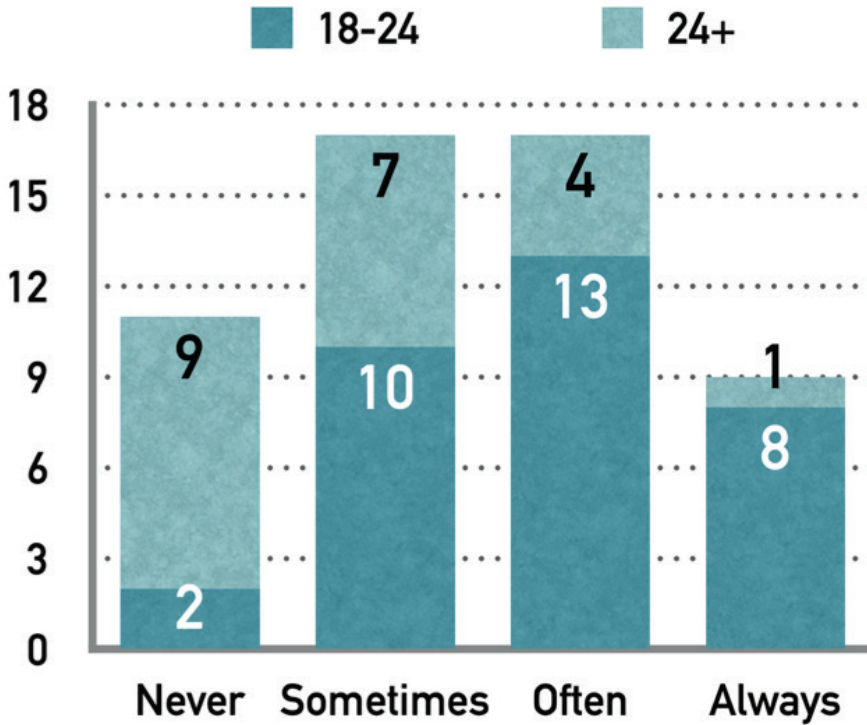
Statement 4: I think that using anglicisms is fun and cool.

18-24 group, though my current results are limited. My results suggest that the action of consuming media in English is quite common, with all but five participants doing so, despite differences in frequency.

Statement 3: *I associate anglicisms with slang and pop culture.* The responses for this statement definitely showed some contrast between generational opinions, but there was not a statistically significant difference between them because we could not reject the null hypothesis (P = 0.2156). The means were 2.03 (18-24) and 1.77 (24+), suggesting that the 18-24 participants moderately disagreed with this statement while the 24+ participants strongly disagreed. In both groups, the mode was 2 ("Sometimes"), which was populated by 15/32 (47%) participants in the 18-24 group and 12/22 (55%) participants in the 24+ group, and another 30% of the participants responded 1 ("Never"). However, it was interesting to note that only two outliers in the 24+ group responded "Often" (1/22) or "Always" (1/22), whereas 28% of the 18-24 group (9/32) responded "Often." We can infer from these results that the participants do not necessarily associate anglicisms with slang and pop culture, but there may be a greater

association among some participants, mostly in the 18-24 group—perhaps those who have been exposed to more English in pop culture contexts.

This statement was the first to show statistical significance between the responses of the two demographics with a strikingly low P-value of 0.0007; an interesting future direction would be to see if this trend is replicated in a larger sample size. The means of 2.81 (18-24) and 1.91 (24+) show that the 18-24 participants moderately agreed with the statement, whereas the 24+ participants strongly disagreed. However, the most striking contrast was in the modes: 13/32 (41%) of the 18-24 participants responded 3 ("Often"), while 9/22 (41%) of the 24+ participants responded 1 ("Never"). Only 5% (1/22) of the 24+ participants responded that anglicisms are "Always" fun and cool, compared to 25% of the 18-24 participants. Thus, the younger age group was significantly more likely than the older age group to agree with the statement that anglicisms are fun and cool. This development provided some insight into why each group might choose anglicisms in conversation and which type of words might be used; for the 18-24 group, trends of pop culture and relevancy might have bigger influences than they do for the 24+ group.

Statement 5: *I prefer to use anglicisms when they are shorter than the proposed French*
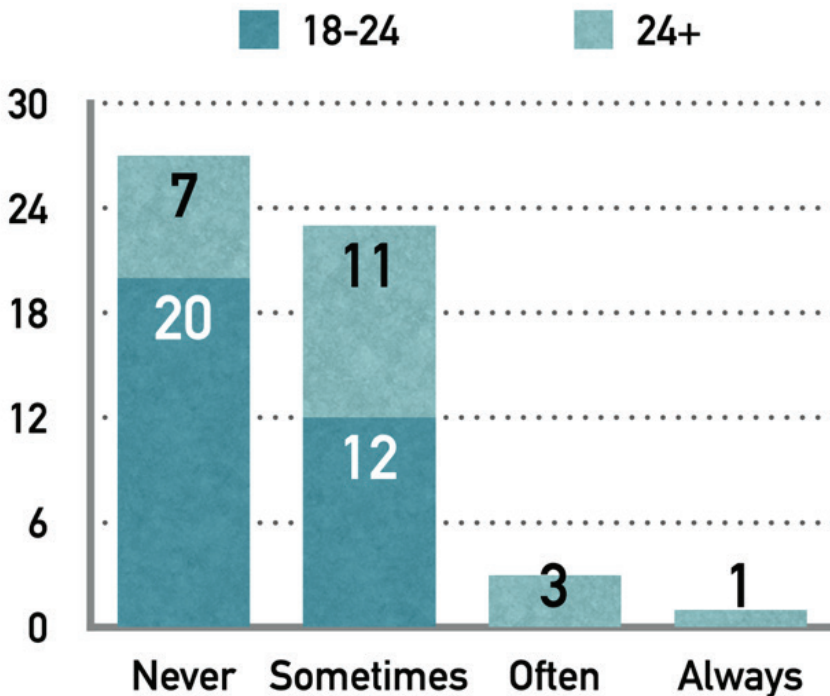
Statement 6: When I know that a word is an anglicism, I try to avoid using it.

equivalent (such as 'webpage' for 'page sur l'étoile'). The mean responses for this statement were 2.72 (18-24) and 2.32 (24+), showing that the 18-24 group moderately

agreed with the statement and the 24+ group moderately disagreed. However, the groups shared a mode of 3 ("Often"), which garnered 17/32 (53%) of the 18-24 responses and 8/22 (36%) of the 24+ responses. Though we could observe that the 24+ group was more strongly represented for "Never" (23% vs 6%) and the 18-24 group was more strongly represented for "Always" (13% vs 9%), the responses across the two data sets were not contrasted enough to disprove the null hypothesis (P = 0.0934). The responses to this statement allow us to reflect on another reason that French speakers would opt to use anglicisms—convenience—and that this purpose had more acceptance among the 18-24 group, though the contrast was limited by our sample size. Even so, the fact that both groups shared a mode of 3 ("Often") reveals that this statement was simply more controversial for the 24+ group, who ended up moderately disagreeing on average despite that the majority moderately agreed. One explanation of the controversy in the 24+ group may be that they have been more strongly impacted by the long-held purist language ideologies, which have lessened
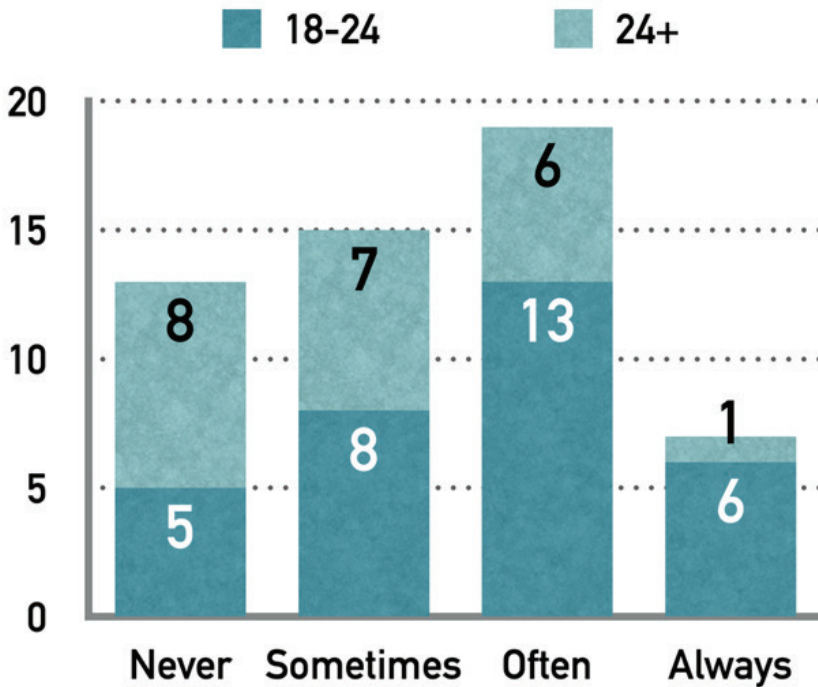
Statement 7: I use anglicisms less often in formal or professional environments.

slightly in recent years, and thus some feel ashamed to use English loanwords out of convenience even if they might acknowledge that the phrases tend to be shorter.

The responses to this statement showed strong disagreement from both groups with means of 1.91 (24+) and 1.38 (18-24). Even so, the stronger disagreement from the 18-24 group led to us disproving the null hypothesis in this data set (P = 0.0096),

indicating that age group likely had an influence on participant responses. The differences in distribution can be observed most easily through the modes; the 18-24 group had a mode of 1 ("Never") with 20/32 (63%) selecting this option, whereas the 24+ group had a mode of 2 ("Sometimes") with 11/22 (50%) of participants selecting this option. All of the participants who selected the higher values were also from the 24+ group, though they were somewhat outliers: only three participants selected 3 ("Often") and only one selected 4 ("Always"). Overall, the responses to this question suggest that the 18-24 participants were very unlikely to avoid using anglicisms, whereas the 24+ participants would do so some of the time, or even very frequently for a few participants.

For Statement 7, the 18-24 group moderately agreed with the statement with a mean of 2.63, while the 24+ group moderately disagreed with a mean of 2.00. This was another statement for which we could reject the null hypothesis (P = 0.0258), suggesting that age group did influence participant responses. The modes once again produce a useful contrast, as the 18-24 group had a mode of 3 ("Often"/Moderately Agree) with 13/32 responses (41%) and the 24+ group had a mode of 1 ("Never"/Strongly Disagree) with 8/22 responses (36%). However, the 24+ responses were spread nearly equally among 2 ("Sometimes") with 7/22 (32%) responses and 3 ("Often") with 6/22 (27%) responses. Thus, the statement proved to be controversial for the 24+ group once again, showing a range of agreement between strongly disagree and moderately agree, with only the remaining 1 participant strongly agreeing. One possible explanation is that the 24+ participants who do not feel the need to avoid anglicisms in professional environments use less anglicisms that might be considered "trendy" or "slang," though it is also possible that some of the 24+ group just feel more comfortable using them. As for the 18-24 group who previously indicated that they were unlikely to intentionally avoid using anglicisms, the same group responded to this statement that they would be less likely to use anglicisms in professional environments—a salient distinction. The implication may be that this age group is comfortable using anglicisms in general but aware that they do not have as much acceptance with older generations in professional environments.
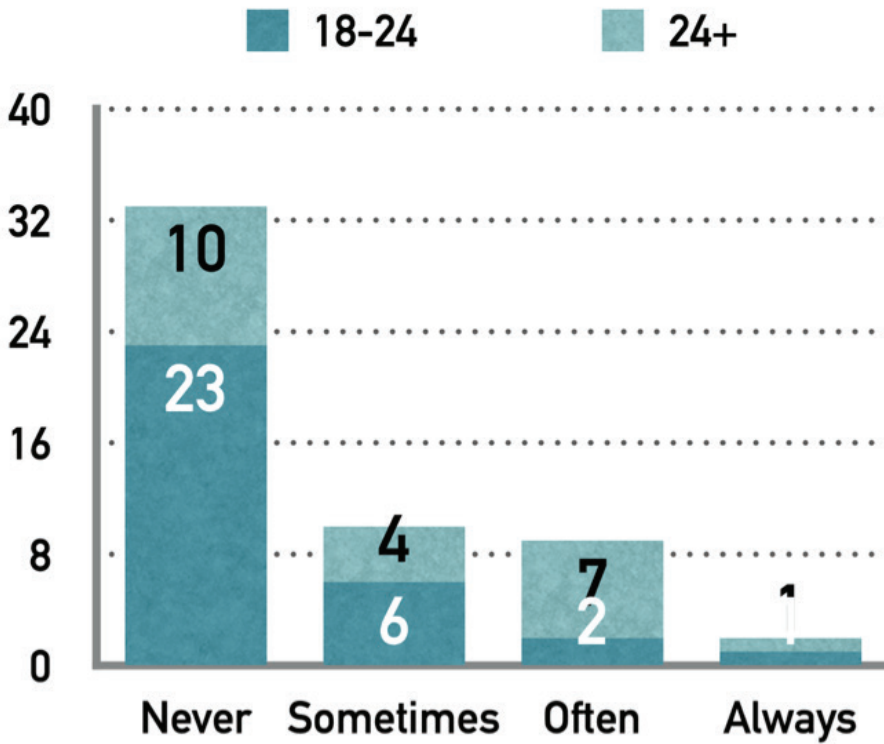
Statement 8: As a French speaker, I feel guilty for choosing an anglicism over a French word.

The responses to this statement were both strong disagreement with a mean of 1.41 from the 18-24 group and 1.95 from the 24+ group. The two groups shared a mode of 1 ("Never"), which was chosen by 10/22 (45%) of the 24+ group and 23/32 (72%) of the 18-24 group. Despite these similarities, we were able to disprove the null hypothesis that age group does not affect this opinion (P = 0.0258); rather, age group was an influential factor. The clearest contrast between the two groups, which likely led to this statistical difference, was that the second-most chosen items were 2 ("Sometimes") for 6/32 (19%) of the 18-24 group compared to 3 ("Often") for 7/22 (32%) of the 24+ group. In other words, both groups were most likely to respond that they "Never" felt guilty choosing an anglicism over a French expression, but a notable portion of the 24+ group responded that they "Often" did so. 91% of the 18-24 responses were strong or moderate disagreement and only 9% were strong or moderate agreement, showing that it was fairly unlikely for the younger group to feel guilty preferring a loanword. Yet, in the 24+ group, 64% responded with strong or moderate disagreement while the other 36% of the 24+ responded with strong or moderate agreement, showing that a decent portion of the 24+ participants did feel guilt when preferring a loanword. This data may suggest that the older demographic has been more impacted by the political discourse around anglicisms that discourage French people to use them, and therefore are more likely to feel ashamed by choosing a loanword. It could

also imply that these purist ideologies are gradually losing hold on the younger generation, perhaps as a result of greater cultural mixing in the Internet Era.

Statement 9: *I worry that the spread of anglicisms and American culture will weaken French culture.* This statement showed strong disagreement across the board, with little distinction between the demographics such that the null hypothesis was relatively likely to be true (P = 0.7570). The means were 1.72 for the 18-24 group and 1.64 for the 24+ group, explained by the fact that both groups had a mode of 1 ("Never"). Not only that, but the mode was strongly represented with 14/22 (64%) of 24+ responses and 16/32 (50%) of 18-24 participants. However, an outlier of 3/22 (14%) of 24+ participants selected 4 ("Always"), in addition to 2/32 (6%) of 18-24 participants. It is difficult to draw a single conclusion from the results, but the overall trend was that most participants never worried that Americanization would weaken French culture, or only did so occasionally. This might imply that culture threat is feared more by those in academic and elite circles, such as the Académie Française *immortels* and the Minister of Culture Jacques Toubon. Even so, fewer participants were indeed concerned that French culture was at threat from the influence of American culture and anglicisms.

Statement 10: *The work of the Académie Française is necessary to protect and regulate the French language.* For this statement, the 18-24 group had a mean response of 2.69 while the 24+ group had a mean response of 2.90, both of which show moderate agreement. The groups had a modal difference where 15/32 (47%) of the 18-24 group selected 2 ("Sometimes") and 8/22 (36%) of the 24+ group selected 3 ("Often") showing a higher agreement. The 24+ group also had 7/22 (32%) of the participants select 4 ("Always"), overall having a larger representation in the highest two choices. Interestingly enough, the only two respondents who chose 1 ("Never") were both in the 24+ group, despite that the 24+ group overall seemed to agree with the statement. However, the difference of means test did not disprove the null hypothesis (P = 0.3453), so we cannot draw a conclusion about whether or not age group influenced responses in this small sample size. Even so, we know that all of the participants, on average, moderately agreed with the statement and thus found the Académie Française to be an important institution to protect their language.

The Interview

After adjusting my format to email interviews, six of the seven original participants were able to provide me a written form of their responses. From each question, I selected parts of several responses that I felt gave a good survey of the different opinions. I translated these responses here, but I included the original French responses in Appendix 2 in order to share the direct quotes. Comparing these questions with the poll allowed me to understand the nuances of opinions in my smaller sample size, who ultimately surprised me with very complex and varied responses from such a small group. Like the survey, I found that there was generational consistency on some topics, such as the controversy about whether or not to create French neologisms to

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replace English terms, whereas others saw a sharp generational divide, such as the appropriateness of the homogeneity in the Académie Français and how that affects its ability to represent the people. I observed many of the ideas I had heard surrounding this discussion, but I was also interested to see some variation that I did not expect, such as the strongest linguistic conservatism appearing in an 18-24 group student participant instead of a 24+ professor.

Selected Interview Responses

Question 1: *Linguistic Purism in the National Discourse*

France has a reputation for carefully guarding their language from outside influences, which can be described as "linguistic purism." This goal is evident in the existence of organizations such as the Académie Française. How has your attitude toward anglicisms been affected by the national discourse about protecting the French language?

> The langue is not fixed, and I think that it's normal that it is evolving. Furthermore, anglicisms permit inter-comprehension between the languages. The cultures reflect through each other. —Sarah, 18-24

> I can say that the purism associated with the French language really influenced me regarding anglicisms. For a long time, I had the impression that the usage of anglicisms was a way to show off or give yourself a "type." But I changed my opinion on the subject while growing up and becoming more open-minded. —Alizée, 18-24

> Anglicisms are perceived quite negatively in education and all the administrations or official structures…The national discourse tends to urge the public to use French words…but with globalization and the Internet Era, English prevails as the language of influence (economically and culturally) and France's language policy aims to limit the development of the English language in its territory. —Laura, 18-24

> My opinion on anglicisms is not really affected by the national discourse. I already thought that anglicisms could be useful if they permit [someone] to refer to a referent that cannot already be found in a French word. Otherwise, their usefulness may be disputed. —M. Dimeck, 24+

The concern that too much prescriptivism will treat French as a dead language first appeared in the responses to Question 1, and this theme continued to present itself in many of the questions. Sarah's contention that the language is not fixed (or, more literally, not "congealed into a solid form") implies imagery of the French language drying up, in a sense, if it did not continue to evolve with the times. Laura also makes a connection to the internet era cementing the economic and cultural power of English, which makes it harder than ever for France to intervene in the changes. Sarah also points out one strength of anglicism use: it gives a speaker greater access to comprehension in English, while also making French more accessible to English speakers.

Several of the participants stated that they were not personally affected by the national discourse, including both in the 24+ group, but all of them were well aware of the controversies. Alizée, on the other hand, describes being deeply affected by the stereotypes that using English was a form of boasting or chasing a certain image for yourself, which caused her to have a negative view of peers who used anglicisms until she grew older. M. Dimeck, on the other hand, did not have a negative view of anglicisms, but believed that they should be used exclusively in cases where a French equivalent did not exist. This opinion appeared at other points in the interview as well, but it contrasted with some others who believed that the French language should always adapt to include new concepts instead of leaning on English to do so.

Question 2: *Homogenous Demographics in the Académie Française*

The average age of the Academic Français is over 70 years old, and over 80% of its members are white males. It sometimes faces criticism for not representing the diverse demographics in France. How might this homogeneity affect the ability of the Académie Français to represent the needs of the country?

> This homogeneity is not representative of the actual composition of the French people. Thus the relationship between the French language and [a group of] men over the age of 70 with social and economic privilege, on average, only represents the same demographic of French people. These individuals are a minority. Thus the Académie Français cannot describe the language spoken by the majority of the French, nor respond to its needs. —Isabelle, 18-24

> The inexorable oldness of the members of the Académie Française, as well as the little parity present, demonstrates well the firmness or close-mindedness of this organization regarding changes in the language and its evolution. A language is living, and the rules recommended by the Académie (who does not have authoritative/prescriptive power…) do not correspond with the social objectives of the country. The controversy over representation of the feminine in the language reveals their incapacity to choose to let the French language evolve. —Laura, 18-24

> I think that the homogeneity of Académie Française members is one of the main symptoms of language discrimination in France. Effectively, in France, speaking French is not only communicating but also demonstrating your social status and education. There is a real taboo of "bad French," easily resulting in a negative judgment of your person. The standard (Parisian) French that we know today was imposed on the French after the revolution…a privileged minority decides the correctness of our words on an arbitrary basis. — Alizée, 18-24

> Without doing a thorough scientific study, one can easily imagine that white men of a certain age in the same academy will not be revolutionar-

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ies, but more likely conservatives! At the same time, the Académie Français is composed of intellectuals—of people who think and reflect—which may counterbalance this conservatism. Therefore, the homogeneity of the academy members might not be a problem, if it is tempered by their "enlightenment."   —M. Buissière, 24+

In my opinion, this is a false problem. I think that the Académie Française is composed of persons who have a clear view of language and the world. I am certain they are capable of detaching themselves from their particular milieu to take a general look at the "needs of the country."   —M. Dimeck, 24

Though all of the 18-24 group mentioned concerns about representation in the Académie Française, neither of the 24+ participants saw reason for concern; granted, they were both white, educated male professors, whereas the 18-24 group were females from three racial backgrounds. M. Dimeck, in particular, seemed to take a sarcastic tone toward the question by quoting "needs of the country" as if these needs are imagined or exaggerated. The implication from the two professors that education is enough to overcome privilege, rather than something that can perpetuate privilege, formed an interesting contrast to the students' views. This question appeared to be the most controversial of the set, eliciting strong opinions about the role and effectiveness of the Académie Française, as well as the language of the elite on the whole.

Alizée connected the Académie to the historical legitimizing of Parisian French which, by default, declared other dialects to be less valuable or cultured. Since these participants lived in or near Montpellier, a city in Southern France roughly 370 miles away from Paris, none of them spoke with a Parisian French dialect. Her description of speaking French as "demonstrating your social status and education" reflects back to Simpson, Mayr, and Stathan's assertion that "Every time people interact, they enact, reproduce, and sometimes resist (institutional) power relationships through language" (Simpson, 2018, p. 11). Alizée and Isabelle both connect the Académie to the idea of a privileged minority, and Alizée also asserts that their decisions are based on arbitrary ideas of what constitutes correct French.

Laura cited the Académie's resistance to feminine language—referring to the initiative to introduce feminine noun spellings for traditionally male professions—as a proof of their failure to allow the language to evolve to meet the needs of the people other than their own demographic, which was a common concern I found in my research. Laura's example contradicts M. Bussière's opinion that the Académie members are educated enough to put aside their conservatism to address the needs of the people, seeing as they only relented on their point after sharp outcry to their initial rejection.

Question 3: *Neologisms as Countermeasure to English Loanwords*
As more English words enter French, we have seen more attempts to control and reverse the spread of anglicisms. Some institutions propose French words to substitute

for a concept that began in English, like the phrase "page sur la toile" to replace the anglicism "webpage." Have you ever experienced a word being replaced? How did you feel about it?

> I think that anglicisms allow for the enrichment and evolution of the French language. I understand that some seek to protect it, but I don't understand doing so in excess; creating new expressions to replace an anglicism after it appears seems to me quite useless. However, seeing an anglicism appear when there is already an equivalent French word disturbs me more. —M. Dimeck, 24+

> It's probably rare that the replacement will work, to begin with, for aesthetic reasons. The speakers find the anglicism more beautiful, and more efficient as well, more fluid…And when anglicisms have success, it bypasses the question of linguistics: the American capitalism-liberalism has been flooding its products and ideology across the Western world for a long time, and the Western world is fond of it. It's logical, therefore, that the words that accompany this overflow reach us as well. The problem is not only linguistic—it is just a consequence—the "problem" is the globalized liberal logic led, symbolized, and defended by the Americans. —M. Buissière, 24+

> I discovered the expression "courrier électronique" to say "e-mail," and I find it perfectly logical, transparent, and comprehensible for all of the French population, every generation included. I find the translation of anglicisms pertinent because it allows for the conservation of the common linguistic code on the territory, where not everyone has the chance to know how to speak English (some also have an insecurity, a complex, about saying English words). This also allows those who do not speak English to continue to practice the French language, their native language in which they are comfortable. —Isabelle, 18-24

> Why change an anglicism that everyone understands? Words like "e-mail" or "spoiler" are anchored in the French language, and I don't see the point of inventing new ones so that they are supposedly more "French." —Sarah, 18-24

In general, many of the interviewees were against the replacement of anglicisms with French neologisms, but Isabelle was a notable exception. The others who gave examples for this question criticized the replacement words for feeling stilted or unnatural, but Isabelle praised the replacement of "e-mail" with "courrier electronique." Sarah, on the other hand, used the same example to make the opposite case, implying that the replacements are pretentious. While M. Dimeck opposed the creation of French neologisms, however, he shared Isabelle's concern about not wanting anglicisms to supplant existing French words, which he called disturbing.

M. Buissière was more inclined to agree with Sarah, however, describing that there is not public demand for word replacements and the public will be unlikely to use them. His assertion that the anglicisms are preferred for aesthetic reasons, such as their fluid and efficient forms, is line in with the poll results for Statement 5 that showed that the shorter length of anglicisms was a significant factor in their use. Furthermore, M. Buissière identifies the larger pattern of globalization and the spread of American ideologies and culture as the source of this language shift—one in which the Western world is complicit because they are "fond" of the US culture.

Question 4: *Mandating French Use with Legal Action*

In 1994, the current version of the Toubon law was established. This law mandates the use of French in government publications, advertisements, workplaces, commercial contracts, government-financed schools, and several other contexts. Ignoring the law can lead to heavy fines. What might be some positive and negative results of enforcing language use with legal action?

> I am not against this law, but I doubt its actual application and efficacy. What fills the lives of people are not administrative documents, but advertisements and works of fiction (movies and television). English is extremely present there, sometimes just for aesthetic reasons (brand slogans in English even though the advertisement is in French and made for the French public). I am obviously not in favor of defending a language by force or punishment. There are methods to defend a language that are much more interesting to imagine and put in place, such as art…and fiction. This is the sense in which we should defend the language. —M. Buissière 24+

> I have a different example: in France there's a law which stipulates that radio stations must play at least 40% French songs. I find this to be positive because if this law did not exist, American music would surely be omnipresent, and the francophone artists also deserve to be recognized. —Sarah 18-24

> The negative points of this law could be that it would prevent language in France from evolving naturally. I think that if there is a need for a law to maintain French in our institutions and our media, this proves that our language is evolving…I consider this evolution natural, and I think that it cannot be stopped by a law because it is the nature of language to vary over time and to be affected by external influences. On the other hand, I think it is still important to preserve French in our media because French music (for example) is listened to mainly in France, while English music is listened to all over the world. —Alizée, 18-24

Sarah and Alizée both identified French music as a usage of French that they are glad has legal protection, whereas M. Buissière suggested that French should be main-

tained with the arts. This recurring theme in their responses exposes a crucial caveat to the resistance expressed against some forms of standardization: they are more concerned with protecting the culture of France than forcing out English. All three of them indicated on the poll that they consume American or British media "Often" or "Always," but they shared here that they want to have the option to participate in both cultures, rather than having the artistic culture of France struggle to compete against American culture. As M. Buissière points out, administrative documents are not what fills their lives; they interact with English mainly in advertisement and media. And it is in this sphere, where English is most obviously present, that they acknowledge the need for protection of their own culture so that both can coexist.

Alizée also presents a concern that the French language cannot evolve naturally if the government tries to keep it separate from outside influences. She views this evolution as a sign of the vitality of the French language because it is versatile and adaptable enough to shift with the changing times. The legal pushback, in her mind, is only a sign that the language is experiencing natural change over time, whereas the actual law is not needed. On the other hand, she does approve of protecting French music, as discussed above.

Question 5: *Linguistic Purity and Culture Threat in France*

While some claim that English words pollute the integrity of the French language, others believe that changes in the language are a natural part of globalization. Are you inclined to agree with either of these sides, or do you think the truth is somewhere in between?

> I tend to consider, rather, that French is enriched due to other languages…But, in my opinion, this enrichment is more solid and interesting when it has a linguistic need as its starting point rather than a commercial, or other, need. It would thus not act to enrich the language for the sake of enriching it, but rather to let it live, and to accept that it integrates foreign words into its vocabulary—English or others—to do so.—M. Dimeck, 24+

> A language is living—its speakers make it live. I don't see any problems integrating borrowings into the French dictionary, as well as neologisms for example. It is always a proof of cultural richness to have words from all origins. I think that the phenomenon of anglicisms is also democratizing, compared to the new communication media and other networks, and surely that certain anglicisms are only used by the same type of speaker (young people). The influence of de the Académie Française on debate of spelling simplification debates prove to us that citizens are the "protectors" of the French language…why fear anglicisms? — Laura, 18-24

> English must enrich the language used in France and not impoverish it…. [We] must already be using French consciously and mastering it. It must

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already be a formidable source of inclusive communication. Then, English can be used to bring benefits that French could not give…Some abuse anglicisms when the same concept already exists in French. The anglicisms that cannot be translated into French are the ones that concern me.   — Isabelle, 18-24

Each of these participants expressed that the French language could be enriched by linguistic borrowing, from English or otherwise. Isabelle and M. Dimeck, however, have also shared concerns about English words supplanting existing French terms. Isabelle asserts that the French have a responsibility to master their own language first, implying that this will make it easier for French speakers to be aware of when an English word is really the only translation. In this case, M. Dimeck describes allowing borrowings as "letting the language live," but he still makes the point that he would prefer to see linguistic mixing on cultural basis rather than out of commercialism. The recurring theme of vitality connected to linguistic borrowings, on the other hand, suggests that the participants are more concerned about French becoming an out-moded language due to excessive prescriptivism than about the increase of globalism.

Laura finishes with some interesting topics, here; she comes out in support of neologisms as a form of cultural richness despite previously describing them as feeling unnatural. She also makes an association between anglicisms and youth culture, which I expected to see frequently in the interview, but found it to be a minor topic. It seems that anglicisms are integrated across the generations in France, but that different words may be popular in different groups. Laura also gives a unique counterpoint to the purpose of the Académie Française: the reason there are controversies over spellings, she says, is that the citizens are the true "protectors" of the French language, whereas the Académie tries to control them from a distance. And the speakers do not fear English as the Académie does. "The language is living—its speakers make it live."

CONCLUSION

It is not difficult to identify weaknesses in the French approach to maintaining and protecting their language, whether that is the exclusive and untouchable nature of the Académie Française, persistent ideologies of disdain for non-standard dialects, or many examples of stilted neologisms facing public rejection. However, it is illuminating to consider that, despite their proud facades, the French administrations are likely quite aware that only a certain portion of their replacements will reach public use, but have concluded that any progress is worthwhile. In Clyde Thogmartin's (1991) neologism survey in 1991, for example, we saw that seven of the twelve French terms were widely preferred, while the others were rejected. Many of his participants, even thirty years ago, stated that the French neologisms were "ridiculous" or "useless"—but if over 50% of the terms gained public acceptance, their initiatives clearly had an impact on the language. It is impossible to determine the overall percentage of accepted vs rejected neologisms, but in that small sample size, the French legislation had succeeded in creating seven widely accepted terms. Though these efforts have always been con-

troversial, and indeed seem unnatural to many French speakers as well as to foreigners, there is no way to determine how French might have evolved without any attempts to protect the language by filling semantic gaps otherwise occupied by loanwords.

As such, even if the French administration has garnered criticism for their technological planning and combatted inconsistent results among French speakers, their efforts are deserving of respect. The strict regulation of French is likely to seem excessive to English speakers, as English does not have any language academy regulating it. But in our fast-paced global society, for the French language to modernize amidst instantaneous exchange of ideas, it certainly can benefit from institutional support. Furthermore, as several of my interviewees explained, many French citizens desire a continuation of French culture such as their music and arts, even if they are less concerned with the amount of anglicisms that show up in their speech. The "Right to French" which the DGLFLF seeks to protect was in fact a priority of some of my interviewees, though articulated indirectly. Isabelle, for example, mentioned that she found neology valuable because it "allows those who do not speak English to continue to practice the French language, their native language in which they are comfortable." Similarly, M. Dimeck consistently mentioned that anglicisms should only be used to fill semantic gaps, rather than being in competition with existing French terms. Overall, it may be easy to identify weaknesses in the French language protection strategy, but many of my participants expressed that they appreciated certain facets of the Académie Française and related language legislation. "I love my language," Isabelle expressed to me earnestly during our spoken interview—"I want to speak my language."

Appendices

Appendix 1 contains additional graphs depicting the poll results.

Appendix 2 consists of the original French versions of interview materials and full responses. Note that this appendix is in French.

Both appendices are located in the online edition of Proceedings of GREAT Day 2020, found at https://knightscholar.geneseo.edu/proceedings-of-great-day/vol2020/iss1/17

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Community Policing: From Broken Windows to a Broken System, An Analysis of the Effects of Community Policing on American Society

Evan Schenker

sponsored by William Lofquist

ABSTRACT

Crime in any society is inevitable. From its inception, the United States has dealt with crime in different manners. In the mid-20th century, federal and local governments turned their attention to stopping crime preemptively rather than reacting to it after the fact. This analysis looks at the history of policing in the United States, discusses the development of community policing based on Wilson and Kelling's 1982 "Broken Windows" article. It also takes a sociological approach to analyzing the effectiveness of community policing in New York City as well as its relationship to: racial biases, police violence, police culture, and police reform. For the purposes of this analysis, the terms "broken windows policing," "community policing," "quality-of-life policing," and "order-maintenance policing" are all meant to refer to the use of high frequency and discretionary policing to target public disorder and prevent the further spread of crime.

The United States was not the first country to implement community policing tactics. During the 19th century, Robert Peel conceptualized the London Metropolitan Police as a means of targeting civil agitators in urban London. This meant police could canvas communities and remove those they deemed nuisances and threats to public safety as a way of maintaining order. This urban tactic later took hold in large U.S. immigration hubs like New York, Boston, and Philadelphia, where Catholic migration threatened Protestants who believed immigrants were criminally inclined and racially inferior (Sekhon, 2019). This tactic served a similar purpose of using police to target those that were deemed threats to the public in order to preserve communities. Decades later, beginning in the 1960s, policing roles in the United States shifted from

order maintenance to stopping crime before it happened. This saw ex-criminals conducting detective work, and an increase in police departments nationwide funneling resources into stopping crime proactively (Wilson & Kelling, 1982).

Crime was not solely a concern of police. Beginning in the 1960s, crime became a hotbed topic of American politics. In 1971, President Richard Nixon announced a national War on Crime, saying, "Doubling the conviction rate in this country would do more to cure crime in America than quadrupling the funds for [Hubert] Humphrey's war on poverty." This began the use of federal and state funding to put more police in communities, such as New Jersey's Safe and Clean Neighborhood Program in the mid-1970s that funded foot patrolling, and Washington D.C.'s Policing Foundation doing the same (Wilson & Kelling, 1982). In the next decade, President Ronald Reagan expanded the U.S.'s crusade on crime, announcing the "War on Drugs" in 1982 (Cover, 2014, p. 1142). These "wars" sparked the use of aggressive policing tactics. Investigatory stops, deemed racially discriminatory prior to the 1980s by the Kerner Commission, regained popularity in the 1980s and 1990s. These practices regained legitimacy through studies such as Lawrence Sherman's Kansas City Gun Experiment, which found stopping vehicles with the intent to search for firearms correlated to a reduction in gun-related crime (Epp et al., 2014, p. 27, 32). An additional development was the Supreme Court's decisions in the 1970s and 80s striking down public disorder laws for their vagueness which, according to William Stuntz at the University of Virginia, led police back to patrolling in cars, increasing the volume of police interactions with citizens (Rosen, 2000, p. 24). Prior to "Broken Windows," the U.S. approach to crime varied widely.

Introducing "Broken Windows"

In 1982, *The Atlantic Monthly* published an article by James Q. Wilson and George Kelling titled "Broken Windows: The Police and Neighborhood Safety." The ten-page article described the blight of inner-city disorder, proposing that preventing public disorder and cleaning up city streets would decrease the amount of crime. Wilson and Kelling base their theory on Philip Zambardo's famous Palo Alto car experiment, which found the presence of a broken window on a car will lead others to break more windows. This led Wilson and Kelling (1982) to link disorder and crime, with the idea that disorder in cities breeds an environment for crime to occur. Under their theory, the presence of disorder leads to crime, which leads to a loss of order. Teens standing outside a storefront may be asked to leave and may refuse. The result is the potential for fights to break out, littering, and disorder both from a visual aspect and a communal aspect (Wilson & Kelling, 1982, p. 3). In their research in Newark, New Jersey, Wilson and Kelling (1982) found the public assigned a higher value to public order and felt safer when police were present to help maintain said order. What all of their research translated to was the proposal that police departments begin targeting minor infractions to avoid their prediction of a wider crime outbreak. Under "broken windows policing," police can target "suspicious persons or 'vagrancy' or 'public drunkenness'—charges with scarcely any legal meaning," inferring police are allowed

to use their discretion to determine what causes disorder (Wilson & Kelling, 1982, p. 6). In summation, a Broken Windows policy proposes that by allowing police to patrol streets using their discretion, they can prevent disorder that leads to an environment of lawlessness and crime.

A Critique of "Broken Windows"

Before analyzing how Broken Windows policing has affected the U.S., it is important to look at the sociological issues within the work itself. While the association between disorder, crime, and a total loss of order seems to be a legitimate argument, a deeper look at Wilson and Kelling's article finds highly problematic proposals and language. First, Wilson and Kelling write, "The process we call urban decay has occurred for centuries in every city" (1982, p. 4). By making this claim, Wilson and Kelling seem to naturalize the disorder and blight found in many major cities. This is to say they do not give historical or socioeconomical explanations, like racial discrimination or generational economic distributions, as to why problems like poverty, crime, and a lack of mobility are such frequent characteristics of urban environments, but rather are content with just attributing these characteristics to urban areas and leaving it without question. They create the same issue when they refer to the "Nature of community life" in the Bronx that allows for crime to occur (Wilson & Kelling, 1982, p. 3). Their language makes crime and disorder seem inherent and natural in these environments. Not only do they naturalize disorder, they outright use problematic and charged language, such as referring to the urban environment as an "inhospitable and frightening jungle" (Wilson & Kelling 1982, p. 3). The usage of the term "jungle" evokes racially charged feelings towards minority individuals. Though they also claim that the lack of mobility among poor urban citizens is related to racial discrimination, they fail to discuss the role of aggressive policing in that discrimination (Wilson and Kelling, 1982). In the same breath, Wilson and Kelling (1982) fail to make an argument for how race would not play a key role in how police conduct themselves.

Initial Scholarly Response to "Broken Windows"

Upon its publication, "Broken Windows" was praised by many scholars as "attractive and eminently plausible" (Matthews, 1992, p. 21). However, many others found Wilson and Kelling's thesis problematic. Some argued that order-maintenance policing would allow police to avoid accountability for the objectives of policing that actually matter, specifically crime reduction (Matthews, 1992). Other arguments were made that police would not treat instances like gang violence and domestic disturbances as actual crime, but rather take extralegal means to disperse disruptions and make communities feel and appear safer (Matthews, 1992). Rather than focusing on crime reduction, police would be performing a satisfactory job to the public by cleaning up the appearance of society (Bain et al., 2014). In addition to the above critiques, other scholars made claims that sociological research found little correlation between "incivility" and increased crime rates, meaning advocacy of order-maintenance policing is unnecessary (Matthews 1992, p. 27; Williams, 2014, p. 10). However, none

of the initial scholarly responses found issues with the inherent racially charged and discriminatory aspects of Wilson and Kelling's language and proposals.

THE ADOPTION OF BROKEN WINDOWS INTO POLICY

After its publication, the media and the public praised "Broken Windows" as the "bible of policing" (Harcourt, 1998, p. 292). In 1994, New York City Mayor Rudy Giuliani and Commissioner of the New York City Police Department William Bratton instituted "zero-tolerance" policing policies based on Wilson and Kelling's "Broken Windows" article (Howell, 2016, p. 1059). "Zero-tolerance" policing was a part of Giuliani and Bratton's "quality-of-life" initiative introduced to NYC in 1993, which sought to crack down on low-level offenses and misdemeanors like turnstile jumping, panhandling, and public drinking to lessen what was considered public disorder. Order-maintenance policing was initially called the "Holy Grail of the 90s" (Harcourt, 1998, p. 292). Bratton realized targeting low-level offenses was effective, finding 1 in 7 turnstile jumpers had arrest warrants. Between 1990 and 1997, directly after the appointment of William Bratton, misdemeanor arrests in NYC increased by 80% (Rosen, 2000). Wanting to expand on Giuliani and Bratton's initiatives, scholar Dave Kahan suggested a "new path of deterrence," which expanded quality-of-life initiative to include curfews, loitering laws, reverse sting operations, and shaming penalties, with the continuation of order-maintenance policing (Harcourt, 1998, p. 295-296). Giuliani and Bratton's quality-of-life policing initiative seemed to interpret Wilson and Kelling's correlation between disorder and crime to mean the eradication of low-level offenses would reduce the crime rate and better public welfare through increased police-community interactions and arrests.

The introduction of community policing ("order-maintenance") to New York City was mostly achieved through a drastic increase in misdemeanor arrests. 133,446 misdemeanor arrests were made in 1993, increasing to 205,277 by 1996 (Harcourt, 1998). Nationwide, the number of departments implementing community policing rose from 24% in 1997 to 64% by 1999. Between 2002 and 2011, stop, question, and frisk (SQF) searches increased by 603% nationwide (Mummolo, 2018,). In NYC alone, the court system handled 675,000 misdemeanors. Compare this to NYC in 1989, and there were an estimated 200,000 more nonfelony arrests made in 2014 (Howell, 2016). Besides arrests for misdemeanor offenses, summonses are a high-volume enforcement procedure police have used in NYC. Between 2003 and 2013, an estimated half million summonses were issued annually, an average of 1,200 to 1,600 a day. In 2013, the most frequent charges were those Giuliani and Bratton sought to target: public urination, park offenses, public intoxication, disorderly conduct, and bicycle infractions (Fagan & Ash, 2017). As Wilson, Kelling, Giuliani, and Bratton had intended, the utilization of community policing has led to a crackdown on low-level offenses in an effort to mitigate a loss of order and prevent the spread of crime.

THE LEGALITY OF BROKEN WINDOWS POLICING

Broken Windows policing means the adoption of high frequency stops and arrests of low-level offenders. It also includes the use of investigatory and SQF stops for police to prevent crime and disorder before it occurs, meaning police must use their own discretion and judgement to determine what poses a threat to public order. For police departments and policymakers advocating community policing, multiple Supreme Court decisions afford opportunities to undertake such procedures. *Graham v. Connor* in 1989 permitted the use of police force reasonably necessary given the circumstances of an arrest (Sekhon, 2019). In *Whren v. United States* in 1996, the Supreme Court ruled that investigatory stops did not violate an individual's Fourth Amendment protection from unreasonable search and seizures if the stop was related to any violation of the law, regardless of its severity. Two years later, police were given the right to perform pat-down searches during traffic stops via *Knowles v. Iowa*, and later given the pretextual usage of "reasonable suspicion" through the decision in *United States v. Arvizu* in 2003 (Epp et al., 2014, p. 34-35).

While these legal developments benefited police departments nationwide, it can be argued they drastically impacted the effects of policing on the public. With the right of police to use pretextual stops and "reasonable suspicion," very little reason needs to be given for individuals to be stopped and searched by officers. Appearance alone can lead police to stop people, which if one considers the volume of policing and the concentration of minorities in urban areas, poses an unfair and dangerous situation for people of color. A person of color in a majority white neighborhood to police may pose "reasonable suspicion," meaning they would be unfairly targeted. Stereotype bias can play a role in police discretion, leading to discriminatory practices (Spencer et al., 2016). The right to use force in a system where police-civilian interaction is increased inherently poses a threat to public safety if officers deem force necessary based on their discretion (a subject that will be touched upon in a later section).

CRIME RATES IN NYC AND NATIONWIDE

According to the Uniform Crime Report, crime has been on the decline across the nation since 1993 (Sozer & Merlo, 2013). It should be noted, however, that statistics suggest this decline was occurring years prior to the implementation of community policing. Between 1985 and 2009, homicide decreased by 71%, rape decreased by 82%, robbery decreased by 80%, aggravated assault decreased by 55%, burglary decreased by 87%, auto theft decreased by 88%, and larceny decreased by 63% (Lieberman & Dansky, 2016). Government statistics show that between 2008 and 2015, violent crime rates have fallen by 19%, while property crimes have fallen by 23% (Gramlich, 2016). Since 2000 in NYC, the only crimes that have increased are forgery and identity theft, rising from 1,702 to 2,337 in 2013, along with misdemeanors such as DUIs, endangerment, and public administration offenses like bail jumping (Lieberman & Dansky 2016). Through the rise in arrest rates, incarceration rates have soared. In 1980, the combined U.S. jail and prison population was at an estimated

500,000 people. In 2011, that population was at an estimated 2.2 million (Cover, 2014, 1142).

Despite falling rates of crime nationally, 57% of individuals polled before the 2016 presidential election believe crime rates have increased since 2008 (Gramlich, 2016). Based on this polling, it seems Wilson and Kelling's original goal of strengthening the public's feeling of safety has failed. If this is true, then negative impacts of community policing this analysis looks to discuss are worsened by the fact that the entire "Broken Windows" system is flawed.

The Logistical Issues of Community Policing

Besides the public not feeling safe, a plethora of other issues come with community policing. First, community policing relies on the use of police discretion. It is commonly held by the public that police are "crime-control professionals." This is despite the fact that police themselves have very little control over rates of criminal misconduct and the victimization of the public (Sekhon, 2019). For instance, between 2008 and 2012, summons and arrests were not issued or made in 90% of SQF stops, and 90% of these stops were of nonwhite civilians (Mummolo, 2018). It was also found that 82% of stop and frisk subjects in 2014 were innocent (Lieberman & Dansky, 2016). In 2017, New York was ordered to pay $75 million in settlement claims after *Stinson v. City of New York* found 900,000 summonses issued between 2015 and 2017 lacked legal justification (Fagan & Ash, 2017). Police can always be wrong. As briefly mentioned before, discretionary policing allows, and inherently expects, officers to use their personal biases to conduct stops under the guise that they are acting within the law (Epp et al., 2014). This is bound to lead to errors in judgement, and furthermore comes down to "biased officer, biased arrest." In the same sentiment, "by promising more than it can deliver, [community policing] inevitably prompts charges of selective reinforcement and discrimination" (Rosen, 2000, p. 4). An emphasis should be placed on the subject of "selective reinforcement." As Rosen puts it, "If Giuliani were serious about zero tolerance, he could arrest Wall Street brokers who smoke pot in Battery Park and use the search as an excuse to look for evidence of Securities and Exchange Commission violations in their briefcases" (2000, p. 4). The issue with community policing is that it is not equally spread and undisputedly biased towards those in lower-income areas and problematic environments.

Another issue is that of the differences in police departments across the United States. It has been found that in larger departments, officers are less respected and supported by their communities, and conversely officers are less responsive to the needs of the communities (Sozer & Merlo, 2013). It has also been studied that negative police interactions affect political participation and enhance negative views of the state (Mummolo, 2018). A lack of civil engagement by those who are negatively affected by community policing means these groups will continuously be underrepresented and in turn, further marginalized, which would likely create a cycle of inequality. An additional issue between small and large police departments is the difference in atten-

tion to public safety. For example, a study of 207 small departments found that 84% ranked property crimes as their top priority, the same as their larger counterparts, yet ranked violent offenses against individuals fifth on a list of seventeen crimes (Sozer & Merlo, 2013). This would suggest again that the original goal of public safety in "Broken Windows" and community policing is lost.

It should also be noted that the introduction of quality-of-life policing coincided with an increase in complaints of police brutality. In 1993, the NYC Civilian Complaint Review Board received 3,580 complaints of police misconduct. In 1996, the Board received 5,550 complaints, and then 4,816 in 1997. The use of force and police discretion breeds an environment in which civilians can be victimized, worsening police-civilian relations and creating the opportunity for the previously mentioned cycle of inequality.

Police Themselves

Having touched on the logistical issues of community policing, it is important to look at the police as a force themselves before analyzing the bigger issues of policing. First, there is the personality of the police. Studies show policing creates authoritarian personalities, while other studies show police behavior to be linked to aggression, conservative ideologies, and substance abuse (Epp et al., 2014). In positions of authority and responsibility, these characteristics can clash with the public, creating a hostile environment. Another point should be made that assigning officers to an area proportionally is one matter, but how police choose to patrol said areas can be problematic when considering they use their personal discretions (Fagan & Ash, 2017). In the 2000s, police reported that failing to produce "Stop-and-Frisks" resulted in punishments from the department and hindered opportunities for vertical career growth (Mummolo, 2018, p. 4). This speaks to the incentivized culture of policing, which likely creates further bias in individual officers to make stops. Sociological studies refer to the common issue of the "thin blue line paradox." This paradox states that while police guarantee law and order, they themselves cannot be forced to submit to said law and order (Sekhon, 2019). This is to say that by acting in a system where supervision is minimal, police can act independently and take extralegal steps to meet their goals.

On the issue of culture, it would be cavalier to not look at police training and the culture it breeds in analyzing the issues of community policing. First, socialization and on-the-job training can make misconduct a norm. After the beating death of Rodney King in 1992, the Christopher Commission was formed to investigate the Los Angeles Police Department. Their report found multiple areas in which misconduct was ingrained in LAPD culture. Officers often discouraged filing reports of misconduct, being uncooperative and extending time periods to do so. Training programs also emphasized the use of physical force rather than verbal communication (Rushin, 2016). This is clearly an issue in a system where face-to-face interactions are the focal point of policing. In the Bronx, New York, residents report that police often draw their firearms early in civilian interactions. Undercover officers often dress out of uniform,

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making it hard for civilians to identify them (Harring, 2000). These training tactics are all problematic when taking into account selective reinforcement of the law, and observing who is victimized by these tactics, which will be touched upon in another section.

While race is an issue among those that are policed, race within the police is of equal importance. In Ferguson, Missouri, 50 of 53 officers are white in a city whose population is two-thirds black. In Hartford, Connecticut, 66% of officers are white in a city where only 16% of the population is white (Weitzer, 2015). When looking at the racial aspect of policing, and the sociohistorical context of racial discrimination and oppression, the lack of diversity in police forces creates a power complex between white officers and minorities. Not only does it create a power struggle between white elites and less powerful minorities who are responsible for abiding by the law, but for police themselves it is hard to lose the image of "racist police" when the majority of those officers are policing are people of color.

The Cost of Community Policing to Police and the Public

The first of the two major issues this analysis looks to discuss is the cost of community policing on the public and police and its socioeconomic repercussions. With the implementation of community policing, there has been a rise in fines and fees on the incarcerated population. This puts low-income individuals, who comprise the majority of the incarcerated population, at an economic disadvantage moving forward (Fagan & Ash, 2017). Those who are not arrested, but issued summons, are just as monetarily burdened with the cost of legal fees (Fagan & Ash, 2017). In a policing system where low-income urban areas are a high target for policing, it is apparent how low-income individuals are caught in a disadvantaged role economically. Fagan and Ash explain this issue the clearest:

> Poor defendants may be unable to pay for filing fees to determine their eligibility for indigent defense. Exercising the right to obtain a lawyer at the state's expense cannot constitutionally be conditioned on ability to pay. In arguing their case, poor defendants may be unable to pay fees to obtain documents such as medical, employment, or housing records. If these imposed processing fees—taxes, in effect—are skewed racially by selective enforcement targeting black or Latino persons—or neighborhoods with high concentrations of black and Latino residents—the Sixth Amendment concerns multiply, raising both due process and equal protection claims under the Fourteenth Amendment. (2017, p. 46)

Lieberman and Dansky expand on this issue, explaining that concentrated poverty is a continuing issue, especially in black and Latino neighborhoods. In New York City, the poverty rate in white neighborhoods is 10.4%, while the poverty rates in black and Latino neighborhoods are 17% and 24.4%, respectively (Lieberman & Dansky, 2016). Considering NYC alone in 2014 generated $32 million from misdemeanor-based offenses, mainly from impoverished, aggressively policed neighborhoods, there

is a clear presence of economic and racial inequality perpetuated by aggressive community policing (Howell, 2016). Criminologists have used the term "million-dollar blocks" to refer to neighborhoods in which the state spends millions to incarcerate most residents. After residents are released, without money and unemployed, they return to spaces considered to be the most impoverished areas of the poorest neighborhoods, like East New York and Brownsville in NYC (Lieberman & Dansky, 2016). Looking at these observations, it is not hard to argue there is a correlation between aggressive community policing of impoverished neighborhoods and socioeconomic inequality among people of color.

A reason this aggressive policing may persist is the advantage civil asset forfeiture (CAF) affords state and federal governments. CAF has become more prevalent since the pronouncement of the War on Drugs in 1982. The Comprehensive Drug Abuse and Prevention and Control Act of 1970 allowed for the seizure of illegal drugs and any means of production during arrests. Profits from said crimes were later amended into the Act. Then, the Comprehensive Crime Control Act of 1984 introduced Federal Equitable Sharing, which allowed police departments to keep seized assets. Later, Congress passed the Civil Asset Forfeiture Reform Act (CAFRA) in 2000, which established the need for "a preponderance of evidence that property is subject to forfeiture," and now most states have their own forfeiture laws based on CAFRA. Forty states place the burden of proof on citizens to prove their property was not part of criminal activity (O'Connell, 2017). According to O'Connell (2017), even when states control 100% of a criminal investigation, the federal government is entitled to 20% of assets seized. This potentially acts as incentive for states to continue community policing for its monetary value and discourages federal governments from reforming policing because they too benefit from asset forfeiture. The payoff of CAF is large, with an estimated 56% of assets seized being valued over $1,000 (O'Connell, 2017). CAF, according to O'Connell (2017), disproportionately affects minorities and the poor. As sociological studies of communities have shown, large banking firms have historically refrained from opening branches in minority neighborhoods, leading minorities to carrying larger sums of cash on their person, and results in a greater loss of assets when stopped by police (Murphy, 2010). In 2014 alone, the federal government seized $4.5 billion worth of assets from citizens, and in 2015, the government took more property from citizens than actual criminals did (O'Connell, 2017). With monetary incentive behind community policing and CAF procedures, one can understand why the socioeconomic marginalization of the poor and minorities persist.

THE ISSUE OF RACE

The most critical issue regarding community policing is arguably race. The history and effects of policing and its relationship to race, specifically people of color, is expansive, and therefore requires multiple discussions to highlight.

There is a long history of racially charged criminal law enforcement in the United States. In the 18th century, white colonial militia oversaw enforcement of New York

slave laws. During the Civil War, violent draft riots occurred between white and black civilians, leading most police at the time to side with white rioters out of a fear of a "Negro invasion" after the Union won the war. Decades later, police oppression in Harlem, New York, led to riots in 1935, 1943, and 1964 (Fagan & Ash, 2017). In 1969, after a series of race riots in 1967, President Lyndon B. Johnson established the Kerner Commission, tasked with cracking down on aggressive policing and the "wholesale harassment by certain elements of the police community, of which minority groups, particularly Negros, frequently complain" (Huq, 2017, p. 2413). While this section barely scratches the surface of police-race relations, it demonstrates the continuation of issues between race and policing throughout centuries of U.S. history.

Community Policing and Race

Current stop-and-frisk policing is a result of the increase in violent crime in the 1980s that at the time was deemed a result of "ghetto poverty." Proponents of community policing at its inception made the claim that violent crime was being committed mainly by the black population, therefore policing would be focused on those communities considered problematic (Huq, 2017). As Fagan and Ash describe, "First, as practiced in New York, police presence and activity in minority neighborhoods seemed to have more to do with race than simply with crime. After controlling for local crime rates, a neighborhood's racial composition predicted the police response in terms of proactivity. In other words, proactivity was about more than crime; it was also about race" (2017, p. 34). Immediately, one should recognize that basing policing methods on the assumption of racial bias is highly discriminatory. Secondly, assuming that "poor" translates to a negative connotation of "ghetto" is also problematic in that "ghetto" infers that individuals in this area are of a lower status than the rest of the community. Between the 1970s and the 1990s, the number of black citizens arrested for violent crime decreased, yet the number of blacks incarcerated in the same time period drastically increased (Filimon, 2015). This is largely due to the fact community policing focuses on minority neighborhoods. At the peak of stop-and-frisk in New York City alone, black citizens had a 92% chance of being stopped in the period of a single year (Huq, 2017). This type of racially biased policing has affected many states. In Maryland between 1995 and 1996, data on suspected stops showed that while blacks comprised 70% of drivers searched, only 28.4% were discovered to be in possession of narcotics, while 28.8% of white drivers were found to also be in possession. In New Jersey, data from 2000 indicated blacks and Latinos comprised 78% of drivers stopped and searched, yet the hit-rates for blacks and Latinos were 13% and 5% respectively, while the hit-rate for whites was 25% (Murphy, 2010). So, while police have targeted minorities in most traffic stops, most of the crime lies elsewhere. This data exemplifies the unnecessary targeting of minorities in search and seizures.

Discriminatory policing and selective enforcement means that only certain demographics are being punished for the same crime. Frank Zimring of the UC Berkeley School of Law conducted a study between 2004 and 2008 of police stops in New York City in which he found that blacks and Latinos constituted 28% and 28.6% of

the city's population yet made up 52% and 31% of misdemeanor marijuana arrests. Whites constituted 35% of the city's population, but only accounted for 10% of the same arrests (Lieberman & Dansky, 2016). In regards to stop-and-frisk in general, other data on NYC shows that while blacks constitute roughly 22,6% of the population, they make up 54.6% of those stopped, whereas whites constitute roughly 32.8% of the population but only 12.2% of those stopped (Lieberman & Dansky, 2016). Another study conducted by Judge Noah Dear in Brooklyn, New York, analyzed summonses for public drinking in 2012 in a one-month span. The study found 85% of summonses were issued to blacks and Latinos, while only 4% were issued to whites, despite Brooklyn's population being 36% white (Fagan & Ash, 2017). This data unveils a disturbing proposition about community policing. Despite making up a smaller percentage of the population in NYC and the U.S. in general, people of color are stopped by police far more than white civilians.

This only enhances the discussion of the racially discriminatory practices of community policing. What this means for people of color is that they are likely to be targeted, more likely to be arrested, and more likely to have to face the consequences that come during and post incarceration, like unemployment and poverty. This is despite evidence that people of color are not more inclined to be involved in criminal activity. In fact, the data offered in this analysis suggests inclination for criminal behavior is equal if not lower for people of color when compared to whites (Lieberman & Dansky, 2016). These data play into a study that showed 70% of blacks in NYC have issues trusting law enforcement and believe they are treated unequally, which actually has the reverse effect in keeping communities safe when law enforcement does not have the support of the public (Lieberman & Dansky, 2016).

Discriminatory practices in community policing are not limited to New York City and other large urban areas. Ferguson, Missouri, is two-thirds black. Blacks accounted for 57.3% of radar-based stops on state roads, and 73.1% of non-radar-based stops. However, there is no logical empirical evidence that suggests black and white driving habits could explain such a large disparity in police stops (Fagan & Ash, 2017). Nationally, blacks and people of color have always been arrested more often for crimes that community policing looks for; drugs, vagrancy, vandalism, and disorderly conduct. The graph below provides evidence of this by compiling data on the arrest rates of blacks and whites between 1980 and 2014 for crimes community policing often targets:
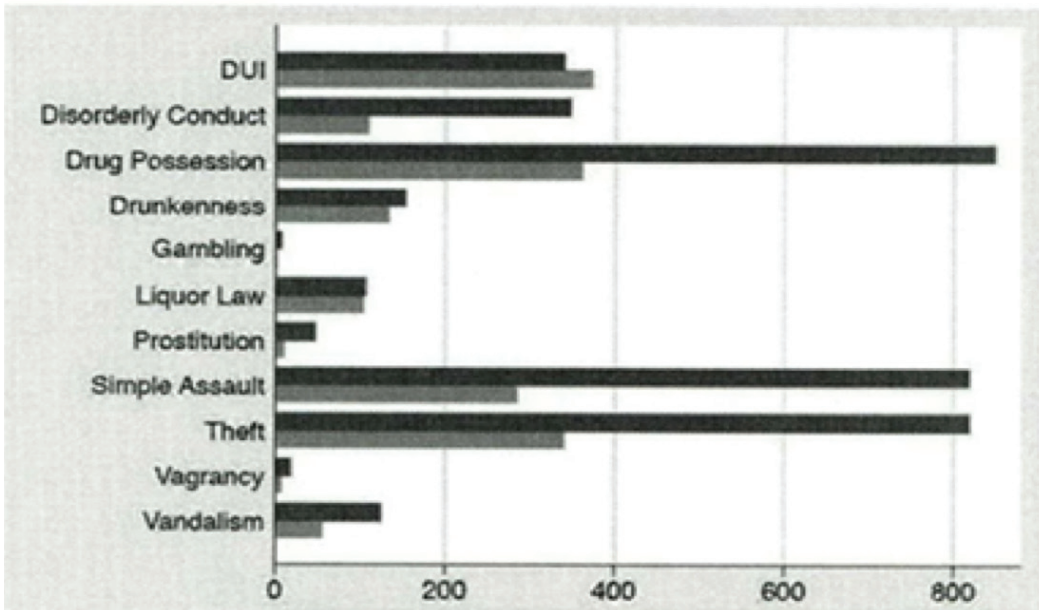
Figure 1. Arrest Rates by Offense and Race (Stevenson & Mayer, 2018, p. 259)

In terms of why the statistics look the way they do, it can be argued that historically the crimes people of color are arrested more for are crimes with victims. Vandalism, theft, selling drugs, prostitution, and assault are all crimes we think of as being committed at someone else's expense; therefore, they are more detrimental to the public. So if the goal of community policing is to clean up the public image, and we know that there is an association of inner-cities with poorer public images, and we also know that these areas are predominantly inhabited by people of color, it is inevitable that this selective disparity would result in such an outcome.

Other studies support Stevenson and Mayson's findings. In cities across the U.S., 46.4% of people arrested for vagrancy and 58.7% of those arrested for suspicion in 1995 were black (Harcourt, 1998). Based on the assumption by community policing advocates that minorities and "ghetto poverty" are associated, there is a clear problem in community policing targeting minorities and low-income areas (Huq, 2017, p. 2413-2414). Based on the proponents' assumptions, fewer resources for minorities and the poor would mean less transportation and fewer cars. Low employment rates mean neighborhoods are likely to have more residents around daily. Therefore, those living in these areas may be more likely to be on the streets or outside their homes, becoming targets for the crime community policing focuses on, such as loitering and suspicion. Combine that with the use of stop-and-frisk, and it becomes apparent that community policing and police discretion is inescapable for many in these areas. This may lead to the associated issues already discussed, like cyclical unemployment and poverty.

As data has shown, community policing targets minorities and the poor. This has had an alarming effect on incarceration rates in the United States. Studies found that black-white incarceration ratios increased from 3:1 around the inauguration of Richard Nixon to 8:1 around the year 2000 (Filimon, 2015). This increase coincides with Nixon's declaration of the "War on Crime" and the attitudes towards crime that inspired "Broken Windows" and community policing. Data from the Bureau of Justice Statistics show that by 2002, out of two million men incarcerated in the U.S. serving more than a one-year sentence, 586,700 were black and 235,000 were Hispanic, disproportionately making up much more of the population than the 436,800 that were white (Filimon, 2015). As of 2007, 1 in 11 black adult males, compared to 1 in 45 white males, were in correctional facilities. In 2011, between 6.6% and 7.5% of black males between the ages of 25 and 39 were incarcerated, and among men between the ages of 18 and 19, black males were imprisoned more than nine times the rate of white males of the same age (Cover, 2014). What this all means is that minorities in the U.S. suffer the consequences of incarceration at a higher rate than whites. Former prisoners are denied Pell grants for education, denied access to public housing, cannot vote, and face struggles of unemployment. Community policing and the disproportionate targeting of minority neighborhoods by police undoubtedly contributes to perpetuating a cycle of inequality for those who may already be disadvantaged.

Police Violence, Fatalities, and Race

Community policing requires heightened interactions between police and the public. What this means is that there is a higher likelihood of innocent civilians becoming victims of aggressive policing procedures that can lead to death. This is a problem that has been seen across the United States for decades. Amadou Diallo generally fit the description of a black rape suspect in Bronx, New York. When he entered his home after seeing an unmarked tactical squad vehicle, police took his behavior as suspicious and entered his home. After being told to stand still, Diallo reached for his pocket to grab his wallet, prompting four officers to shoot at him forty-one times, hitting him nineteen times and killing him. All four officers were found not guilty of Diallo's death (Harring, 2000). In response to Diallo's death and the death of Patrick Dorismond, defenders of Mayor Rudy Giuliani's zero-tolerance policy claimed that the shootings were inevitable side effects to aggressive policing needed to keep the community safe. Their arguments in effect came down to "stop us from shooting the occasional innocent man, and criminals will rule the street once more" (Rosen, 2000, p. 24). The troubling inference that supporters of Giuliani's zero-tolerance policy made was that aggressive policing was necessary to prevent crime, even at the cost of innocent lives.

Amadou Diallo is unfortunately only one of many victims of police violence that come from community policing. Between 1980 and 2005, it is estimated 9,500 people were killed by police nationally (Marcus, 2016). In 1994, Anthony Baez died in a police chokehold after being stopped for throwing a football in the streets (Howell, 2016). Patrick Dorismond was killed in 2000 by police after being approached by an undercover officer who was looking for Dorismond to sell him drugs as part of a

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police sting (Fagan & Ash, 2017). Rosan Miller, 7-months pregnant at the time, and while not killed, was put in a chokehold by police for grilling on a public sidewalk outside her home (Hamilton & McCall, 2018). Eric Garner was killed from a police chokehold after selling loose cigarettes on the street in Staten Island, a misdemeanor offense in New York. The chokehold used was banned by the New York Police Department in 1993 (Marcus, 2016). In August of 2014, Michael Brown was stopped by police in Ferguson, Missouri, for walking down the street. After a struggle through the police car window, Brown ran roughly 15 feet before being shot in the back and killed. It was later established police were instructed that 15 feet was a distance that could permit use of lethal force (Marcus, 2016). In February 2015, 57-year old Sureshbai Patel, an Indian immigrant who spoke little English, was partially paralyzed in a police altercation after being stopped on the street while visiting relatives in Alabama (Onyemaobim, 2016). In April 2015, Baltimore police executed a stop and seizure on Freddie Gray after Gray fled from police after making eye contact. Gray died from a severed spinal cord after police took him on a fatal ride in the back of a police van with his ankles shackled on his stomach without a seat belt. In July of 2015, Sam Dubose was shot in the head through his driver side window after he was stopped for a missing license plate tag. The officer reported that Dubose reached for the ignition and was going to run him over (Marcus, 2016).

These incidents are not isolated. In Philadelphia, where the city's population is less than 50% black, 80% of police shooting victims were black between the years of 2007 and 2013. In Ferguson, the Department of Justice found that nearly 90% of the police's use of excessive force were against black residents (Marcus, 2016). The most notable fact of all these police-related deaths are that they resulted from tactics used under community policing. Stopping someone from playing or walking in the street, preventing someone from grilling on a sidewalk, and going out of the way to look for drugs are all methods that require police to go out of their way to find disorder in order to prevent crime and a loss of order. Unfortunately, the increased likelihood of face-to-face interactions also means that police are more likely to see the need to use force. It also should be noted all the victims of these incidents were people of color. Since community policing targets areas highly concentrated with minorities, it is likely that minorities and people of color are more at risk than whites to be victimized by excessive force.

The Cost of Violence to Police

Aggressive community policing and police violence come at a high cost to police departments and state governments. The city of Baltimore paid over $6 million in restitution for police brutality between 2011 and 2015. In 2014, the city of Chicago paid $50 million in restitution to victims of police violence. In 2015, New York City settled with the family of Eric Garner for $5.9 million. Again in 2015, Baltimore settled with the family of Freddie Gray for $6.4 million (Marcus, 2016). Not only do the negative impacts of community policing and police aggression come at the cost of innocent civilians, it also places a financial burden on state funds. With the same

money used to pay for restitution and settlements, states could be reforming police departments and improve the areas that they deem so blighted that they necessitate aggressive policing.

"Broken Windows" and Community Policing Today

After decades from the implementation of community policing and the publication of "Broken Windows," some sentiments have changed in the eyes of scholars and the public on the effectiveness and necessity of community policing. First, George Kelling, along with William Bratton and the police commissioners of the Boston and Los Angeles Police, still defend community policing and its usefulness in maintaining order. Kelling and Bratton argue that the type of policing "Broken Windows" advocates for is not the same as stop-and-frisk. To them, stop-and-frisk is different in that it is based on reasonable suspicion of illegal activity, which they recognize as constitutional under the decision of *Terry v. Ohio* in 1968. They argue that "Broken Windows" is not tactically instructive, but rather a proposal of policies that would mitigate disorder and prevent crime. Kelling and Bratton also cite a poll conducted by Quinnipiac University pertaining to support for order-maintenance policing that found "African-Americans supported it by 56 to 37 percent, whites by 61 to 33 percent, and Hispanics by the largest margin of all—64 to 34 percent" (Kelling & Bratton, 2018).

Some scholars, however, have found flaws in "Broken Windows" and community policing. One scholar found the history of the authors to be highly problematic. James Q. Wilson was a student and colleague of conservative urban theorist Edward Banfield, whose work in the 1960s included statements that claimed African Americans were immobile because of "Negro culture," inferring Black families lived off of welfare, and claims that low-income individuals supported communal disorder to keep rents low. Additionally, Wilson was an early advocate for mandatory sentencing and increased imprisonment of "wicked" people (Thompson, 2015, pp. 44-45). He described "wicked" people as including

> A teenager hanging out on a street corner late at night, especially one dressed in an eccentric manner, a Negro wearing a "conk rag" (a piece of cloth tied around the head to hold flat hair being "processed"—that is straightened), girls in short skirts and boys in long hair parked in a flashy car talking loudly to friends on the curb, or interracial couples—all of these are seen by many police officers as persons displaying unconventional and improper behavior. (Thompson, 2015, p. 45)

To scholars, Wilson's association with such racially charged academic work and his co-authoring of "Broken Windows," which has undertones of discriminatory language, is highly problematic, especially when "Broken Windows" became the basis for such a widespread police movement (Thompson, 2015, p. 45). Others find that "Broken Windows" disregards verified research that offers alternate explanations as to why issues like poverty correlate to crime. Poor individuals have fewer resources, such as living space, that offer areas to partake in activities that are otherwise seen as illicit

and disorderly when done in public, such as drinking and socializing (Thompson, 2015). The sentiments of scholars on "Broken Windows" and community policing are shared by policymakers like New York Senator Jesse Hamilton and the National Crisis Director for the National Action Network Rev. Kevin McCall. They find these methods of policing exhaust resources. They cite that in a court report from 2015, a three-month observation period of minor crime cases in Manhattan, Brooklyn, and the Bronx found that 86% of defendants were released without charge (Hamilton & McCall, 2018). The realization that "Broken Windows" and community policing have these effects on society is important for the opportunities to reform policing for the betterment of communities.

Opportunities for Reform

The first potential step to reforming community policing is the diversification of police departments. In cities like Ferguson, the disparity between white police and largely minority populations is not without notice. Diversification has been suggested by both the Obama Administration and the 1967 Commission on Law Enforcement and the Administration of Justice. While little research has been conducted on what effects diversification has on policing, it is not implausible to think that diversification would help to strengthen community relations and legitimize police departments nationwide (Weitzer, 2015).

Section 14141 of the 1994 Violent Crime Control and Law Enforcement Act states any "pattern or practice of conduct by law enforcement officers…that deprives persons of rights, privileges, or immunities" is prohibited under federal law. Violations of Section 14141 are investigated by the Special Litigation Section of the Justice Department's Civil Rights Division. The Department of Justice has conducted sixty-eight investigations of misconduct, including excessive use of force in Washington DC and Miami and discriminatory policing in New Jersey and Arizona. 53% (36 cases) have produced enough evidence to confirm cases of misconduct (Chanin, 2017). These numbers seem low, and that is because they are. The DOJ only has enough resources to investigate 0.02% of Section 14141 cases (Rushin, 2016). By expanding the resources available for Section 14141 violations, the federal government could begin to expand investigations, and this has the potential to make clear patterns that lead to misconduct, which then could lead to reform.

Congress has yet to mandate the reporting of police conduct complaints to the state and federal government. The DCRA, FBI, and BJS databases on police violence are not public record but could be made so under command from the Attorney General. The FBI manages the Uniform Crime Report, and the federal government periodically collects data on police training and budgets for the Law Enforcement Management and Administrative Statistics (LEMAS), but neither database provides much insight on police misconduct (Rushin, 2016). Information transparency is yet another way that patterns of misconduct can be uncovered and reformed. By making records public, mandating reports of misconduct and abuse, and requiring agencies to collect

more complete data, policymakers and police departments could use this information to alter methods of policing, specifically community policing.

Finally, Congress can take action to monetarily incentivize police reform. Congress, under the Spending Clause of the US Constitution, can implement conditional funding under the Community Oriented Policing Services (COPS) program from the Violent Crime Control and Law Enforcement Act of 1994 to withhold federal police funding to departments that do not meet criteria for implementing policing procedures that cut-down on problematic tactics (Ristroph, 2011). By withholding funds, Congress could incentivize police departments to limit their high-frequency usage of SQF stops and other tactics that have led to racial inequality. Section 1983 of federal legislation on Civil Liability for Police Misconduct allows victims of police misconduct to file civil suits for damages due to unconstitutional treatment or violations of federal law by local and state police. However, Congress has not allowed for a private right of action to grant citizens the ability to pursue legal action towards the DOJ's pattern or practice legislation (Ristroph, 2011). Therefore, citizens cannot take action against the DOJ's lack of investigations into alleged misconduct. As a "one size fits all" initiative may not address the needs and issues of every department, the amendment of a COPS reform mandating certain procedures for each department can make funding conditional and help mitigate issues caused by community policing (Ristroph, 2011, p. 384). This would help departments of all sizes advance efforts to limit misconduct and behavior that also breeds unequal treatment of citizens. Title VI of the 1964 Civil Rights Act links federal funding to nondiscrimination, therefore giving statutory legal backing to reforming community policing, which studies have shown have discriminatory effects (Ristroph, 2011, p. 393).

CONCLUSION

Since the 1970s and the declaration of the "War on Crime," local, state, and the federal government have instituted tough-on-crime measures to proactively stop disorder and prevent the spread of crime. Wilson and Kelling's "Broken Windows," one of the largest influences on the community policing movement, was hailed for its proposals of retaining law and order through targeting areas of disorder. However, through the use of stop-and-frisk searches, high-frequency police interactions with the public, and the targeting of "problematic" areas, notably low-income and majority minority areas, community policing has created a system of enforcement that revolves around selective reinforcement, flawed police bias, and racially-charged assumptions of crime. In breeding this system, community policing has contributed to the marginalization of people of color and minorities, along with the poor, and has perpetuated cycles of inequality and racial discrimination. Community policing has had an adverse effect on communities nationwide.

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Aspiration and Implementation: County-Level Domestic Violence Programs in a Human Rights Context

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sponsored by Joanna Kirk

ABSTRACT

This paper analyzes and compares domestic violence policy and outcomes in municipalities in Western New York, specifically in two that have adopted resolutions recognizing freedom from domestic violence as a human right (Erie and Tompkins counties). These resolutions are based on the tragic story of Jessica Gonzales' children who were killed by her husband and the lack of due diligence by police on behalf of the Gonzales children. Through primary research with people who work in the domestic violence field in both counties, the impact of these similar resolutions is compared and contrasted. The pair of resolutions were found to be largely representative of a commitment to domestic violence issues in both counties, rather than instrumental in bringing about tangible programming.

INTRODUCTION

In 1999, Jessica Gonzales' three daughters were taken by her estranged husband and subsequently killed (ACLU, 2020). In the wake of this tragedy, Gonzales worked her way through the American justice system to the Supreme Court in order to prove that the police did not fulfill their due diligence. When the Supreme Court ruled against her, she then brought her case to the Inter-American Court of Human Rights. The Inter-American Court of Human Rights decision has since become the basis of a number of resolutions in municipalities in the United States affirming that freedom from domestic violence is a human right. The effectiveness of two such resolutions on domestic violence outcomes, from Erie and Tompkins County, New York, are analyzed. Phone interviews with individuals who work in the domestic violence sphere in each county, including a sheriff, a district attorney, and a victim services provider among others, represent primary

research on the impact of these resolutions eight years (in the case of Erie County) and six years (in the case of Tompkins County) after their passage.

Castle Rock v. Gonzales **(2005), and** *Jessica Gonzales v. United States of America* **(2011)**

The two resolutions of interest are based on two cases, *Castle Rock v. Gonzales* (2005), and *Jessica Gonzales v. United States of America* (2011). In the case of Castle Rock v. Gonzales, Jessica Gonzales' three daughters were taken by her husband, after he had violated an order of protection that Jessica had gotten against him by doing this (ACLU, 2016). The order required that the police arrest the husband if he did not obey the order (ACLU, 2020a). Gonzales called the police multiple times, yet they did not act on her requests for assistance (ACLU, 2016). Tragically, the three children were killed. The Supreme Court found that the police had filled their due process, interpreting a restraining order to not require that any action be taken by the police (*Castle Rock v. Gonzales* 2020). Jessica Gonzales petitioned the Inter-American Court of Human Rights (IACHR) (ACLU, 2014). "Two pivotal issues in the case were the affirmative obligations of law enforcement to respond to domestic violence and protect victims, and the United States' responsibility to provide a remedy when those obligations are not fulfilled" (Human Rights Institute, 2020). The court found that the United States had failed to protect Gonzales' human rights (ACLU, 2014).

Since the IACHR decision, thirty-five municipalities and counties in the United States have affirmed their belief that freedom from domestic violence is a human right by passing resolutions to this effect. Eleven of these county and town governments are in New York State (Cornell Law School, 2018). The adoption of the human rights-based domestic violence resolution "…served as a catalyst for collaboration between local government and communities and provided a model of unified protection and support for domestic violence survivors" (Advocacy Center of Tompkins County, et al., 2014). The resolutions analyzed here are those from the county governments of Erie County and Tompkins County, both in New York. These resolutions will be discussed after a brief consideration of the human rights framework in the context of domestic violence.

Human Rights Framework

Human rights ideas are not typically applied to domestic violence. One of the reasons for this is because women and men historically occupy different spheres in society. "In a very real sense, gender-specific abuses… have until recently been 'privatized' internationally and either go unchallenged or are left out of human rights practice altogether" (Thomas & Beasley, 1993, p. 58). Jessica Gonzales believed that the police's persistent beliefs about the severity of her situation impacted their (lack of) response to her children being taken from her. "If I had told them that a stranger had taken my daughters… then I think the reaction would have been different. But Simon was the girls' father, and the police saw this as a domestic issue, which was clearly not a

priority for them" (ACLU, 2020a). The "U. S. approaches to domestic violence have largely focused on remediation - interventions that take place after violence occurs" (Bettinger-López, Lapidus & Ward, 2014, p. 8). The human rights framework is employed in an attempt to target systemic domestic violence in a society by using a proactive, rather than reactive, response to domestic violence (Bettinger-López, Lapidus & Ward, 2014).

Comparison of resolutions from Erie and Tompkins Counties

The Erie County and Tompkins County resolution are similar, but it is important to recognize the language that was chosen for each of them. The following excerpts are quotations of the specific part of each resolution that includes the assertion that freedom from domestic violence is a human right. From the Erie County resolution in 2012:

> Resolved, that this Honorable Body recognize that freedom from domestic violence is a fundamental human right and be it further resolved, that the Erie County Legislature commend the policies and actions of local and state police agencies that bear the primary responsibility of securing this fundamental human right on behalf of their citizens.

From a similar Tompkins County resolution in 2014:

> Resolved, on recommendation of the Public Safety Committee, That the Tompkins County Legislature joins world leaders and leaders in the United States in recognizing domestic violence is a human rights concern and declares that freedom from domestic violence is a fundamental human right, resolved further, that the Tompkins County Legislature believes the state and local governments should continue to secure this human right on behalf of their citizens.

Both resolutions reference *Jessica Gonzales v. United States of America* (2005) from the IACHR. The Tompkins County resolution also referenced *Castle Rock v. Gonzales* (2011) and provided a summary of the events that led to the case. The Erie County resolution primarily focused on stating statistics relevant to the severity of domestic violence in the United States, whereas the 2014 Tompkins County Resolution, in addition to including such facts, also framed the adoption of the resolution as an opportunity to be a "leader in acknowledging and responding to the existence of domestic violence." Prior to the passage of the resolution, a report was produced about its potential passage noted that Tompkins County could become a leader in this legal and social movement (Advocacy Center of Tompkins County et al., 2014). Deputy Brian Mohr from the Erie County Sheriff's department attributed the creation of the Erie County Legislature Resolution primarily to Suzanne Tomkins, professor of law at University of Buffalo Law School and co-founder of the Women, Children, and Social Justice Clinic (University at Buffalo School of Law, 2020). It is important to note that

both resolutions originated in a semi-academic sphere, at University of Buffalo Law School and Cornell Law School.

Overview of demographics and domestic violence statistics for Erie County

919,866 people reside in Erie County (United States Census Bureau, 2020a). Erie County is characterized primarily as an urban county, with Buffalo, the second-largest city in New York State, as the county seat (Erie County Department of Health, 2019). The population of the city of Buffalo is 258,612, with a victim rate of 13.4 per 1,000, the nineteenth highest rate of domestic violence among cities and municipalities in New York State (Axelson, 2019). A total of 5,191 domestic violence cases were reported in 2018 in the whole of Erie County (New York State Division of Criminal Justice Services, 2018). Since the Erie County resolution passed, there does not seem to be any noticeable link between a marked change in the number of domestic violence cases and the passage of the resolution (*Figure 1*).
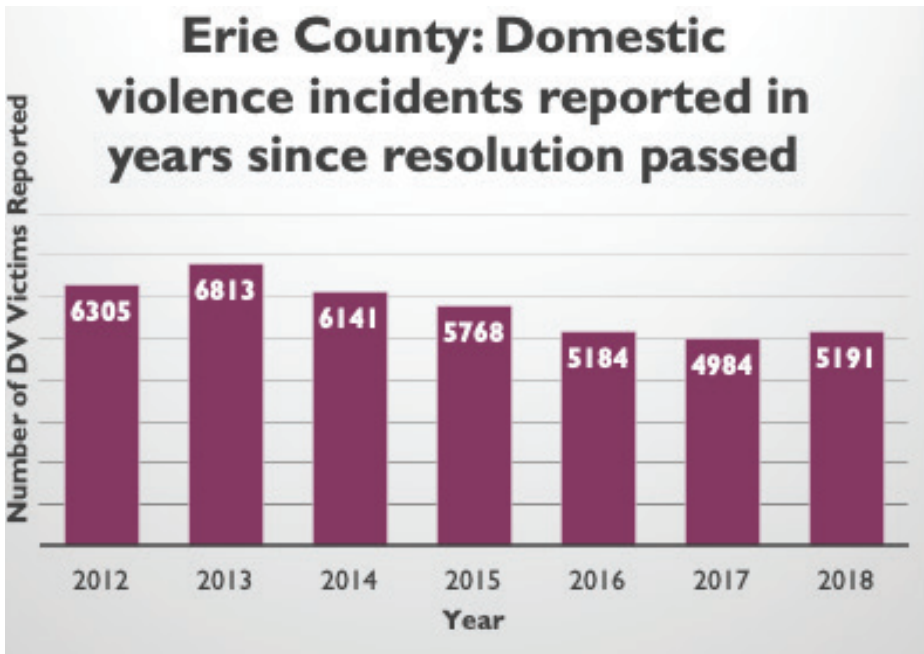

Figure 1: Domestic Violence Incidents Reported in Erie County in Years since Resolution Passed (Data taken from New York State Division of Criminal Justice Services, 2018).

Overview of demographics and domestic violence statistics for Tompkins County

Tompkins county has a population of 102,962 (United States Census Bureau, 2020b). Tompkins county is considered 58% urban (Tompkins County Health Department, 2010). A total of 249 domestic violence cases were reported in 2018 in the whole of Tompkins County (New York State Division of Criminal Justice Services, 2018). In

Tompkins County, there is no apparent link between domestic violence incidents and the passage of the resolution (*Figure 2*).
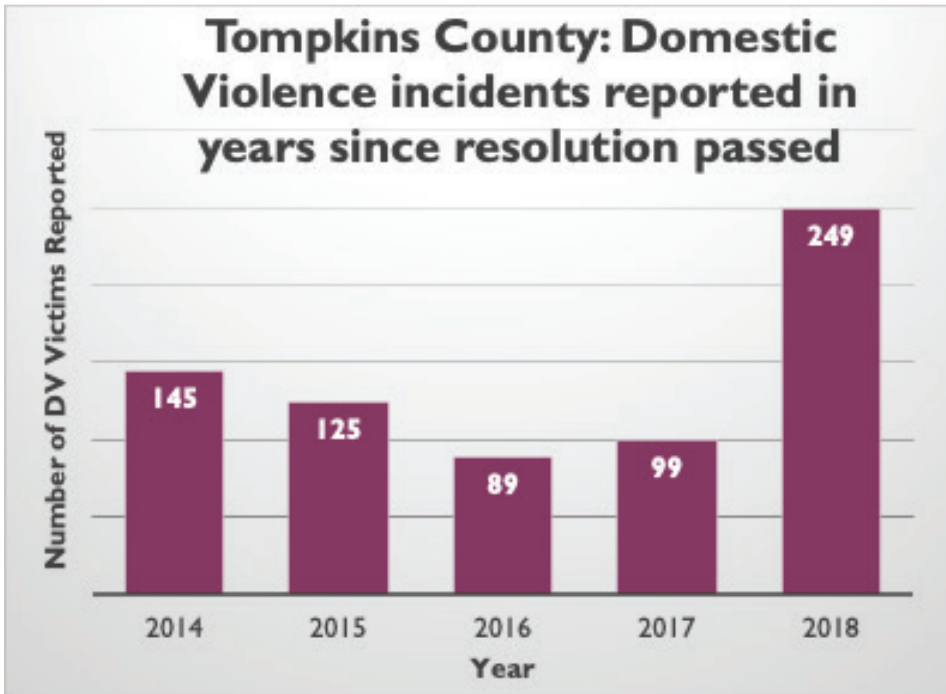

Figure 2: Domestic Violence Incidents Reported in Tompkins County in Years Since Resolution Passed (Data taken from New York State Division of Criminal Justice Services, 2018).

Personal Communications

I had the opportunity to speak with five individuals who work in the gender and domestic violence fields, three of whom were from Erie County and two of whom were from Tompkins County. I asked each of these individuals a list of semi-structured questions tailored to the particular sector of domestic violence they work in. Each person was asked whether or not they had perceived the resolution to have made an impact on domestic violence outcomes. The following is a summary of their responses.

Erie County Personal Communications: Erie County Sheriff Deputy Brian Mohr

Deputy Brian Mohr is the coordinator of the Domestic Violence Unit of the Erie County Sheriff's Department. Deputy Mohr stated that the Erie County Coalition Against Family Violence comprises the Sheriff's Department, the District Attorney's office, Family Justice Center, Hispanic United Hub, Haven House, and Crisis Services. A member of each of these organizations meets once a month and collaborates

"for the core services of domestic violence" (B. Mohr, personal communication, February 14, 2020).

Deputy Mohr was not aware of *Castle Rock v. Gonzales* (2005), nor the subsequent case brought to the Inter-American Court of Human Rights (2011). When I asked if he perceived domestic violence outcomes to have improved since 2012 when the resolution was passed, he said yes and stressed the implementation of Domestic Incident reports and the Primary Aggressor law, passed in New York in 1998, which takes "the burden off the victim… and putting it onto law enforcement" (B. Mohr, personal communication, February 14, 2020). In addition, he said that the Integrated Domestic Violence court has been very important in domestic violence outcomes and stated that Erie County was one of the first counties to open up a court of this kind. To his knowledge, the resolution was not conveyed to himself or his colleagues at the Sheriff's department when it was passed. Finally, when asked if there were any other noticeable changes in the operation of his sector of the sheriff's department that have changed, either positively or negatively, that he had perceived since 2012, he described the creation of a "team of advocates with specialized areas" within the Sheriff's department (B. Mohr, personal communication, February 14, 2020).

Erie County Personal Communications: Executive Director, Erie County Commission on the Status of Women, Karen King

Karen King is the Executive Director of the Erie County Commission on the Status of Women. It should be noted that no equivalent to this commission exists in Tompkins County, therefore, one cannot compare King's responses to any counterpart. King described her position as a "community outreach touchpoint" in the county, mentioning her work on a Tribute Garden to bring light to the pervasive nature of domestic violence in Erie County (K. King, personal communication, March 3, 2020; Commission on the Status of Women, 2019). King does not believe that domestic violence outcomes have improved since 2012 when the resolution was passed. She cited the rise in the number of domestic violence related homicides in 2019 as a reason for her assessment of the resolution. King believed that the resolution was a symbolic indication of the county's support for victims (K. King, personal communication, March 3, 2020).

Erie County Personal Communications: CEO of Erie County Family Justice Center, Mary Murphy

Mary Murphy is the CEO of the Family Justice Center, a domestic violence service provider with four locations and partner organizations within the community (Family Justice Center, 2018). Murphy was introduced to the resolution when she attended a University of Buffalo Law School seminar on the subject. Murphy described the efforts Erie County has taken in order to create a united response to domestic violence, noting the 12-13 partners that the Family Justice Center works with. In addition, she described that there is a courtroom in each of the center's three satellite offices (M. Murphy, personal communication, March 4, 2020). These courtrooms are likely part

of the Integrated Domestic Violence Court, wherein one judge hears all cases that deal with the same family in order to create a uniform response to domestic violence and reduce court appearances required for family members (Center for Court Innovation, 2018). Murphy did not believe that the resolution made any difference in domestic violence outcomes, citing the number of domestic violence homicides in 2019.

Domestic Violence Related Homicides in Erie County

Both Karen King and Mary Murphy mentioned a spike in the number of domestic violence related homicides in Erie County. Domestic violence related homicides increased threefold from 2018 to 2019 from four to twelve (Smith, 2019). King and Murphy linked their impressions that the resolution has not made a positive impact on domestic violence in Erie County to this spike in homicides. These numbers suggest that domestic violence is still a prevalent issue in Erie County. For comparison's sake, Tompkins County had zero intimate partner homicides in 2016, one in 2017, and zero in 2018 (New York State Division of Criminal Justice Services, 2020). No one else that I spoke to from either Erie or Tompkins discussed domestic violence homicides.
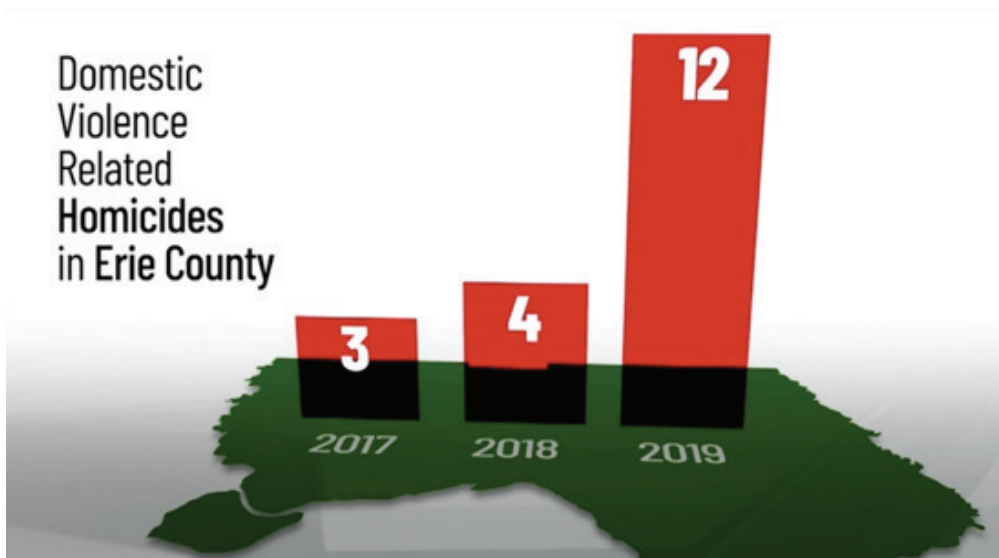

Figure 3: Domestic Violence Related Homicides in Erie County (Image from Smith, 2019).
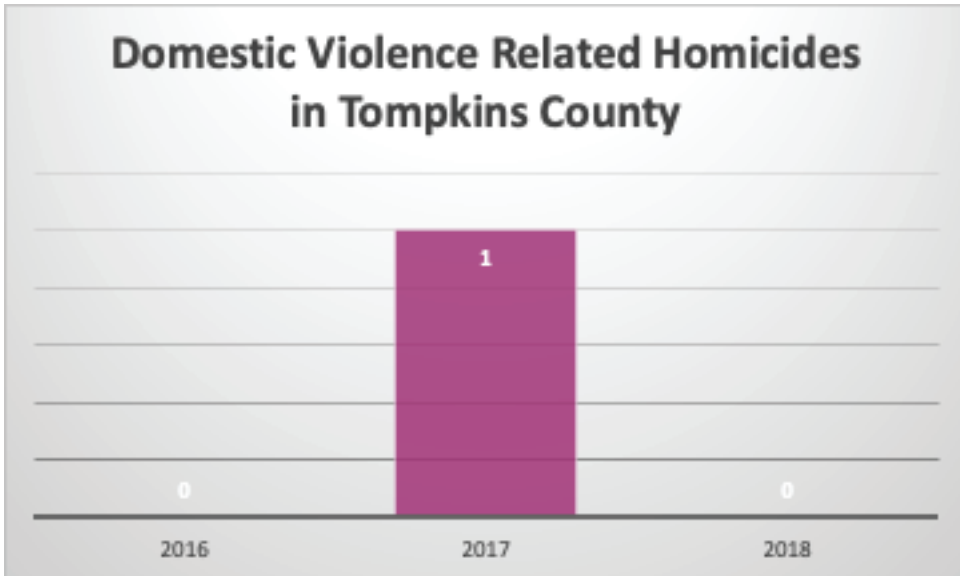
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Figure 4: Domestic Violence Related Homicides in Tompkins County (Data taken from New York State Division of Criminal Justice Services, 2020).

Tompkins County Personal Communications: District Attorney of Tompkins County, Matthew Van Houten

Matthew Van Houten is the District Attorney of Tompkins County. He did not have knowledge of the resolution before I reached out to him for an interview. Van Houten noted that the District Attorney's office participates in a domestic violence team that coordinates responses to domestic violence in the county. He found that the resolution does not "change the day-to-day operation of how [the District Attorney's office] do[es] things" (M. Van Houten, personal communication, April 6, 2020).

Tompkins County Personal Communications: Education Director at Advocacy Center of Tompkins County, Kristi Taylor

Kristi Taylor is the Education Director of the Advocacy Center of Tompkins County, the only domestic violence service provider in the county (K. Taylor, personal communication, March 2, 2020; Advocacy Center, 2020). Following the passage of the resolution in Tompkins County, Taylor worked on an awareness campaign with Jessica Gonzales (K. Taylor, personal communication, March 2, 2020). Cornell Law School screened *Home Truth*, a documentary that followed Jessica Gonzales for nine years through both of her court cases. The screening was co-sponsored by nine partners including the Advocacy Center (Cornell Law School, 2020). Taylor noted that following the initial passage of the resolution by the Tompkins County legislature, similar resolutions were passed in various permutations of local government in the county, including by two townships, a council of local governments, one village, and the city of Ithaca (K. Taylor, personal communication, March 2, 2020; Cornell Law School, 2018).

As a direct result of the resolution, Taylor worked to train 500-600 employees from Cornell on domestic violence and the workplace. A resource workbook from Tompkins County on Domestic Violence in the workplace states "Freedom from domestic violence is a fundamental human right that must be protected and fulfilled" (Domestic Violence and the Workplace Toolkit, 2016). This suggests that there was a strong connection between the human rights framework, the 2014 resolution, and these trainings. When describing the passage of the resolution, Taylor said "…[the legislature] didn't want just a rubber stamp and a photo opportunity, they really wanted to know how this would make a difference for survivors" (K. Taylor, personal communication, March 2, 2020). Finally, similar to Deputy Mohr from Erie County, Taylor noted that the resolution strengthened relationships between organizations working on domestic violence in the community. In particular, the resolution strengthened the relationship between the Advocacy Center where Taylor works, and the Human Resources Department of Cornell Law School (K. Taylor, personal communication, March 2, 2020).

CONCLUSION

The resolutions based on *Jessica Gonzales vs. United States of America* in both Erie and Tompkins County appear to be largely symbolic in nature, rather than instrumental in positive outcomes for domestic violence cases. There does not appear to be a discernible, uniform outcome of the resolution between the two counties. Kristi Taylor of the Tompkins County Advocacy Center was the only person interviewed who identified concrete program implementation as a result of the resolution. Two common responses from the rest of the interviewees from both counties were that they either had no previous knowledge of the resolution but stated their support of the resolution's assertions during our interview, or they had heard of the resolution but found it to be a symbolic gesture in their work in the domestic violence field. Deputy Brian Mohr from the Erie County Sheriff's Department and Kristi Taylor from the Tompkins County Advocacy Center both noted that community partnerships were either created or strengthened as a result of the resolutions passed in their respective counties.

Before the passage of the Tompkins County resolution, a report on the advantages of its passage stated that it would have positive "symbolic benefits." Some of the benefits enumerated included recognizing that "domestic violence is a societal problem requiring a societal solution, the first important step in moving this issue from the private sphere" (Advocacy Center of Tompkins County et al., 2014). The awareness campaign that Kristi Taylor worked on appeared to accomplish this, shedding light on a domestic violence story by bringing it into mainstream academia. No equivalent report was written on the passage of the resolution in Erie County, however, considering that the online hub of information on all local resolutions based on *Jessica Gonzales vs. United States of America* was created and published on the Cornell Law School website, one can assume that the target outcomes of the resolutions were similar to that of Tompkins County.

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Development of a Time of Flight Spectrometer for Rutherford Backscattering Studies with keV ions

Ethan Smith

sponsored by Kurt Fletcher

ABSTRACT

The solid-state silicon surface barrier (SBD) detectors used in conventional Rutherford backscattering spectroscopy necessitate the use of MeV ion beams, as lower energy ions are stopped in the detectors' dead layer. However, the particle accelerators needed to reach such energies are expensive and often have long startup times. A time of flight spectrometer has been developed at SUNY Geneseo's Low Energy Ion Facility to perform Rutherford backscattering studies using ions with energies in the 10-50 keV range. It has been demonstrated that this spectrometer can accurately measure the kinetic energies of ions scattered off of targets. The spectrometer can also be used to measure the composition and thickness of thin targets. Initial results show good agreement between the results obtained with low energy ions from Geneseo's Duoplasmatron ion source and those obtained via conventional RBS with MeV ions from Geneseo's Pelletron tandem accelerator. Although initial results are encouraging, improvements in resolution and sensitivity must be made before the spectrometer offers the expected advantages.

Rutherford backscattering (RBS) has long been used as a means for characterizing the elemental composition of targets. In Rutherford backscattering experiments, a beam of positively charged ions is incident upon a target sample. The incident ions interact with the nuclei of atoms in the sample via the Coulomb potential and scatter off at an angle, losing some of their energy to the target nucleus. The amount of kinetic energy lost by the incident ion in this collision is characterized by the kinematic factor, k. For an incident ion of mass m scattering off a target nucleus of mass M at an angle θ, the kinematic factor is given by

$$k = \frac{E_f}{E_0} = \left[\frac{(M^2 - m^2 \sin \sin \theta \,)^{\frac{1}{2}} + m \cos \cos \theta}{M + m} \right]^2$$

Since the kinematic factor is dependent on the mass of the target nucleus, the energy loss of the scattered ion can be used to determine the identity of the target atom. Thus, by measuring the energies of scattered ions, the elemental composition of the target can be determined.

In typical RBS experiments, a beam of high energy particles in the MeV range is directed onto a target, and the energy spectrum of the elastically scattered particles is measured and analyzed. One disadvantage of MeV RBS is that it necessarily requires a particle accelerator able to accelerate ions to those energies. Such particle accelerators are extremely costly and have fairly long start up times. Additionally, beams of such high energy are not as sensitive to trace elements on the surfaces of targets, since a thicker region of the target is sampled by the penetrating ions.

Using lower energy ion beams in the keV range allows for the use of much cheaper and faster ion sources, such as Geneseo's Duoplasmatron ion source at the Low Energy Ion Facility (LEIF). The differential cross section for an ion with energy E and charge Z_1 undergoing Rutherford backscattering off a target nucleus of charge Z_2 at an angle θ is given by

$$\frac{d\sigma}{d\Omega} = \left(\frac{Z_1 Z_2 e^2}{4\pi\epsilon_0 E^2 \left(\frac{\theta}{2}\right)} \right)^2$$

where ϵ_0 is the permittivity of free space and is the charge of the electron. Due to the factor of E^2 in the denominator, lower energy ion beams should offer a higher absolute cross section than high energy beams. In addition, low energy ions have a much shorter range in the target, which makes them more sensitive to trace elements on the surfaces of targets.

However, there are no commercially available detectors able to directly measure the energy spectra of elastically scattered ions in the 20-50 keV range. The standard silicon surface barrier (SSB) detectors used in high energy RBS are not sensitive to ions in this range, as such ions would stop in the dead layer of the SSB detector. Additionally, standard energy detectors are not sensitive to neutral particles.

This paper will discuss the development of a time-of-flight spectrometer based on the design originally laid out by Mendenhall and Weller (1989). The spectrometer will be used for Rutherford backscattering studies using keV ions from a Peabody Scientific Duoplasmatron Ion Source. The start signal will be produced by the scattered ions as they pass through a 5 μg/cm² carbon foil, causing it to emit electrons. The secondary electrons are collected by a Channeltron electron multiplier (CEM). The stop signal is

produced by the backscattered ions collected by another CEM at the terminus of the spectrometer. The time between the start and stop detector is the time-of-flight for the ion, which can be used to determine the kinetic energy of the ion.

THE SPECTROMETER

The spectrometer described in this paper was designed as part of the Low Energy Ion Facility (LEIF) at SUNY Geneseo (*Figure 1*). The main component of the LEIF is the PS-120 Peabody Scientific Duoplasmatron ion source. The Duoplasmatron typically produces beams of up to 25 keV deuterons or 50 keV alpha particles, but higher energy beams of heavier ions are possible. The typical beam current output for 50 keV alpha particles is about 20-40 nA, and the ion source can usually be started up in a matter of minutes. The short start up time of the Duoplasmatron confers a distinct advantage over the MeV particle accelerators conventionally used for RBS studies, which can have start-up times on the order of several hours. Used in conjunction with the time-of-flight spectrometer described in this paper, the Duoplasmatron allows for much quicker characterization of surfaces with far less down time.
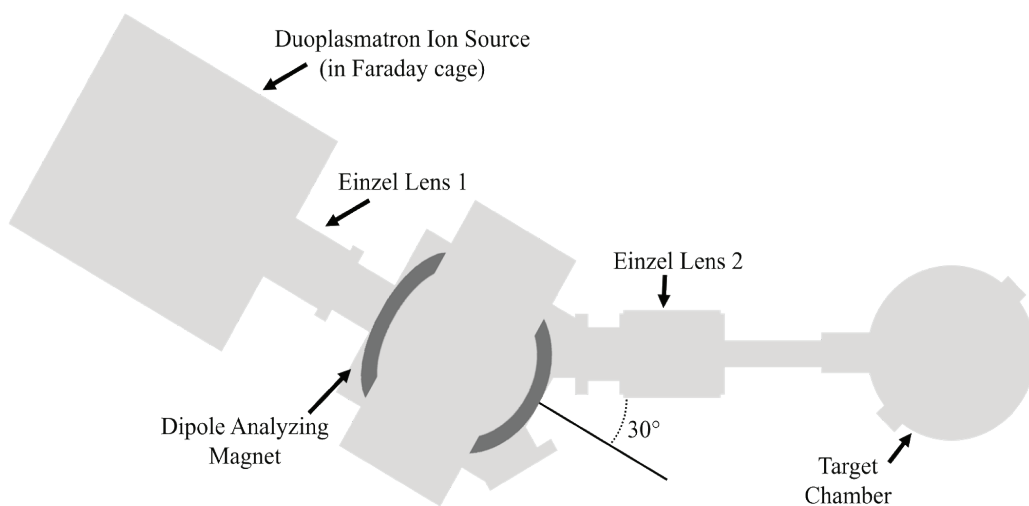

Figure 1: A schematic of the Duoplasmatron ion source at SUNY Geneseo's Low Energy Ion Facility. Ions are extracted from the Duoplasmatron and directed to the target chamber by an analyzing magnet and focused by two einzel lenses along the beam line.

In typical operation, gas is leaked through a needle valve into the Duoplasmatron, where it is ionized into a plasma. The positively charged ions in the plasma are accelerated by an extraction voltage of up to 25 kV. Because the ions exist in multiple charge states inside the plasma, this process allows for the creation of singly charged 25 keV ^{4}He beams or 50 keV beams of doubly charged ^{4}He, for example.

The extracted ions are focused by an electrostatic einzel lens before entering a dipole analyzing magnet, which bends contaminant ion species out of the beam, creating a

high purity monoenergetic beam. In addition, since the entire system is evacuated to pressures on the order of a micro Torr, the ions are able to traverse the entirety of the beam line without significant energy loss. The mean free path for helium ions at these pressures is about 30m.

The ions are then refocused by a second electrostatic einzel lens before being sent through a collimator to the target chamber. The target is held at the center of the scattering chamber by a moveable aluminum arm. The mobility of the target allows for multiple targets to be rotated in and out of the way of the beam without breaking vacuum.

Ions that scatter off the target at an angle of 135° pass through a collimator, entering the time of flight spectrometer arm The scattered ions strike a 5 μg/cm2 (221 Å) carbon foil mounted on a 95% transmission nickel mesh causing the emission of electrons which are accelerated by a voltage of -1500 V toward the start detector. The carbon foil assembly is placed between two grounded nickel grids, so that the path of the incident ion is not significantly altered (*Figure 2*).
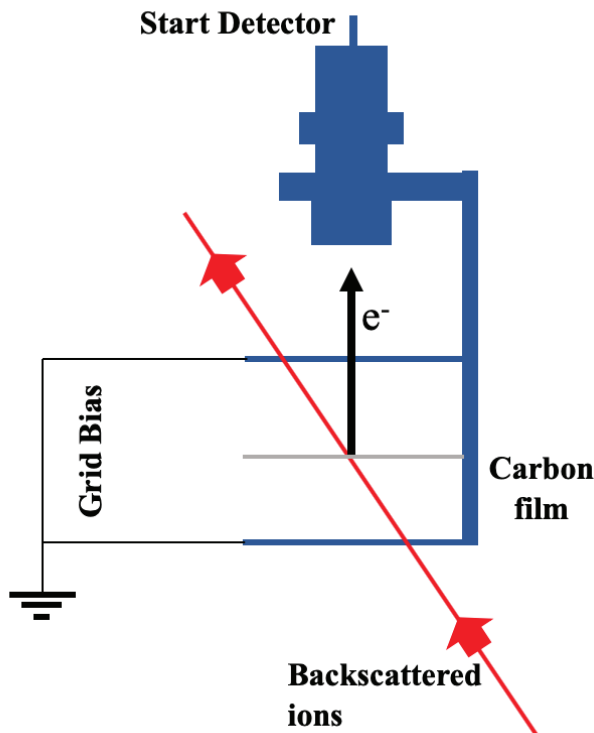

Figure 2: A schematic of the carbon foil assembly used to generate electrons for the start detector. The efficiency of electron production by ions passing through a thin carbon foil is discussed at length (Weller et al., 1994).

There is some energy lost by the scattered ions as they pass through the carbon foil, but this loss can easily be calculated using the free software program Stopping and Range of Ion in Matter (SRIM). For a 50 keV alpha particle scattered off of a gold foil, the energy loss in the carbon foil would be about 4.6 keV or ~10% of the scattered ion's energy. Slower moving ions will tend to lose a greater percentage of their kinetic energy in the foil, and the deviation in that loss will tend to be greater, leading to broader peaks for lighter elements (*Figure 7*).

One drawback of this setup is that ions which undergo charge exchange while passing through the carbon foil will feel a different acceleration between the foil and the second grounded nickel grid than the ion did between the first nickel grid and the foil before the charge exchange took place. This causes some backscattered ions to lose or gain energy in multiples of the foil bias. This effect is presumed to be negligible, as the fraction of ions undergoing charge exchange is small (2014).
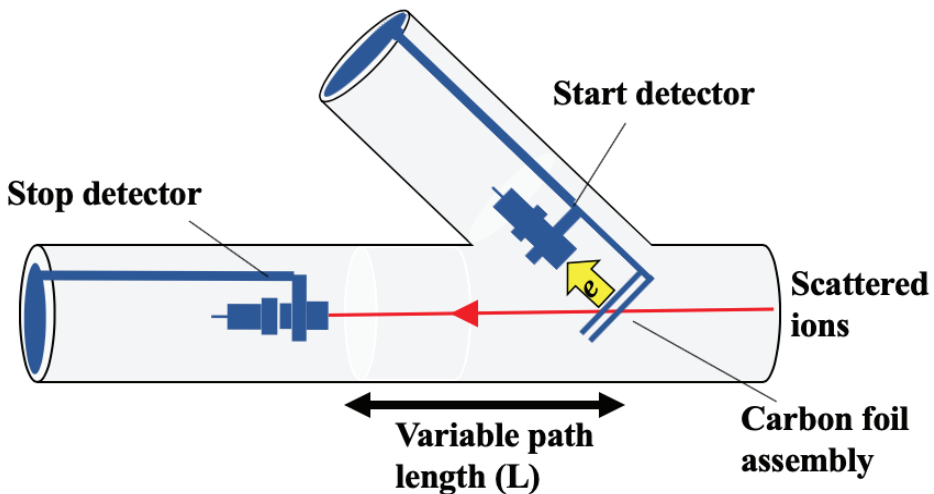
Figure 3: The scattered ions strike the biased carbon foil, causing electrons to be emitted, which are accelerated by a negative bias into the start detector, creating the start signal. The ions continue down the arm of the spectrometer to strike the stop detector.

The scattered ions continue through the carbon foil down a variable path length toward the other CEM, where they produce the stop pulse. Both the start and the stop pulses are fed through an Ortec 579 Fast Filter Amplifier and Ortec 584 Constant Fraction Discriminator to shape the timing pulses before being sent to an Ortec 566 time to amplitude converter (TAC) connected to an Analog Digital Converter (ADC), which collects and bins the signals, producing a time-of-flight spectrum. The time elapsed between when the ADC receives the start and stop pulses is taken to be the time of flight of the particle. Figure 4 shows a typical TAC spectrum for a 50 keV α^{++} beam incident on a 100 Å gold film on a carbon substrate.

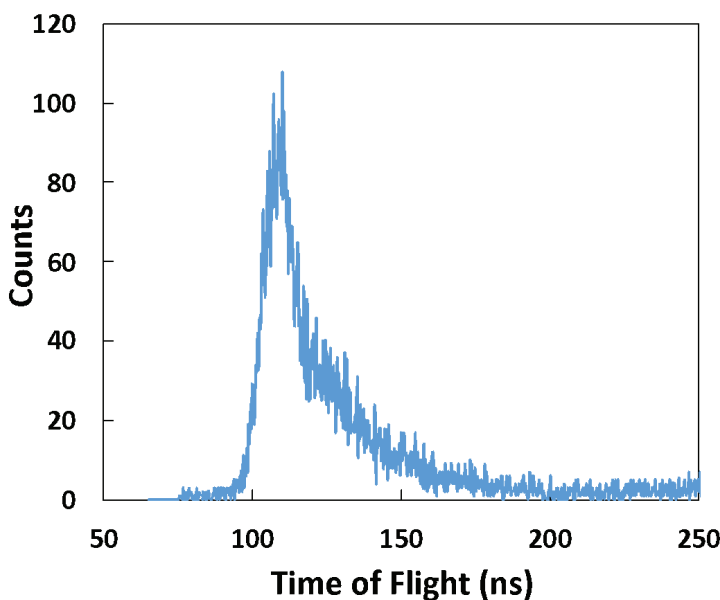*Figure 4: A standard TAC peak for 50 keV α⁺⁺ on a 100 Å gold film on a carbon substrate. The leading edge of the peak represents the time-of-flight of the fastest backscattered ions- i.e. those that scatter directly off the outermost layer of the target.*

To verify that the kinetic energies of backscattered ions could be measured using the time-of-flight spectrometer, the path length from the carbon foil to the stop detector was varied, by means of an adjustable, vacuum-tight bellows and the movement of the leading edge of the TAC peak, which represents the time-of-flight of the fastest back-scattered particles, was used to calculate the velocity of the backscattered particles (*Figure 4*).

This process was repeated for thick targets of tantalum and aluminum using both 25 and 50 keV α as well as 25 keV deuterons. Table 1 shows the measured energy values of various ion species on heavy metal targets and theoretical values. The kinetic energy of the ion after scattering off the target nucleus was calculated from kinematics, and the average energy lost by the ions passing through the carbon foil was calculated using the program SRIM.

For example, the kinematic factor for a 50 keV alpha particle scattering off of a 181Ta nucleus at 135° is about 0.927, corresponding to a scattered energy of 46.36 keV. SRIM calculates an average energy of 41.69 keV for an alpha particle of this energy passing through a 221 Å carbon film. The expected deviation in exit energy is ± 0.63 keV or about 1.5%.

Table 1
The kinetic energies measured by tracking the movement of the leading edge show reasonable agreement with theoretical calculations.

Ion Beam	Target	Measured KE (keV)	Predicted KE (keV)
50 keV α^{++}	Gold	43.0 ± 4.4	41.9
50 keV α^{++}	Aluminum	26.3 ± 2.9	26.1
25 keV α^{++}	Tantalum	19.9 ± 1.6	19.7
25 keV d^+	Carbon	11.80 ± 0.52	12.23
12.5 keV d^+	Tantalum	8.86 ± 0.86	10.36

ANALYSIS

In order to determine the energy of the scattered ions from the measured time of flight, two things must be known: the first is the absolute path length between the carbon foil and the stop detector, and the second is the time of flight of the electrons from the carbon foil to the start detector. The measured time-of-flight, t_m, is related to the actual time of flight of the scattered ion, t_α, by the expression $t_m = t_\alpha - t_e$, where t_e is the transport time of the electron. Therefore, in order to calculate the actual time of flight of the scattered ion, we must add the electron transport time to the nominal time-of-flight read by the TAC.

Based on relativistic kinematics calculations, the maximum kinetic energy imparted to a stationary electron by a head-on collision with a 50 keV α^{++} particle is about 27 eV. Since this is much less than the foil bias, we can assume all emitted electrons start from rest when calculating the transport time for the electrons.

When calculating the time of flight of the electrons, we must consider two regimes: one where the electron is undergoing constant acceleration due to the electric field from the biased foil, and one after it exits the acceleration gap and moves with a constant velocity toward the start detector.

In the acceleration gap, the time of flight of the electron is found using standard constant acceleration kinematics. The emitted electrons feel an electrostatic repulsion that is proportional to the grid bias, and are accelerated across the gap between the carbon foil and the second nickel grid. Thus, the total time for the electron to cross the acceleration gap of length d and bias voltage V is given by

$$t_1 = \sqrt{\frac{2dm_e}{q_e V}}$$

where m_e and q_e are the mass and charge of the electron, respectively.

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Given the assumption that the electrons started from rest, the velocity of the electrons after exiting the electric field, v_e is given by

$$v_e = \sqrt{\frac{2q_eV}{d^2m_e}}$$

Thus, the electron drift time t_2 can be calculated by dividing the distance between the second nickel grid and the start detector, l, by the drift velocity. Then the total electron collection time, t_e given by

$$t_e = \sqrt{\frac{2dm_e}{q_eV}} + \sqrt{\frac{l^2d^2m_e}{2q_eV}}$$

A conservative estimate of t_e puts it on the order of 1 ns, which is less than 1% of the typical time of flight of the low energy ions used with this spectrometer. Nevertheless, the collection time should be taken into account when calculating the time-of-flight of the backscattered ions in order to make more accurate measurements.

The spread in electron collection times is likely the main limiting factor on the resolution of this spectrometer (Mendenhall & Weller, 1990). This is a systematic effect that could potentially be corrected for with alternative geometries or bias schemes, but for now the spread is assumed to be negligible on the scale of the large times of flight of the low energy ions used with this spectrometer.

Since the total flight path is difficult to measure directly, the flight path length can be calculated from the intercept of a plot of extension distance versus leading edge time-of-flight. The intercept of the linear fit represents an effective path length from the start detector to the stop detector.

Once the time-of-flight of the scattered ion has been calculated, it must be converted into an energy in order to perform standard RBS analysis. Since the low energies we are dealing with place us squarely in the nonrelativistic regime, the kinetic energy of a scattered ion with mass m and time-of-flight, t, can be calculated by $E=1/2\ m(L/t)^2$, where L is the path length from the carbon foil to the stop detector. Once the energy corresponding to each time-of-flight has been calculated, the time spectrum must be transformed into an energy spectrum by re-binning the data and multiplying by the Jacobian:

$$\left|\frac{dt}{dE}\right| = \frac{t^3}{mL^2}$$

This reshapes the time domain and can amplify any noise in the long-time region of the time-of-flight spectrum due to the factor of t^3 in the numerator. This becomes a problem especially at high beam currents, as the high flux of particles passing through

the spectrometer at these beam currents leads to a higher rate of accidental coincidences especially in the long time-of-flight portion of the spectrum.

Results / Limitations

Time-of-flight spectra for various targets were taken and converted into energy spectra for analysis. These spectra were fit using the simulation software SIMNRA from the Max Planck Institute for Plasma Physics. Figure 5 shows the converted energy spectrum for a 50 keV α^{++} on a 100 Å gold film deposited on a carbon substrate, as well as the fit obtained from SIMNRA. Preliminary results are consistent with results obtained from MeV RBS studies done with Geneseo's 1.7 MV Pelletron tandem accelerator, but at this time the spectrometer does not reach the expected improvements in resolution and sensitivity.
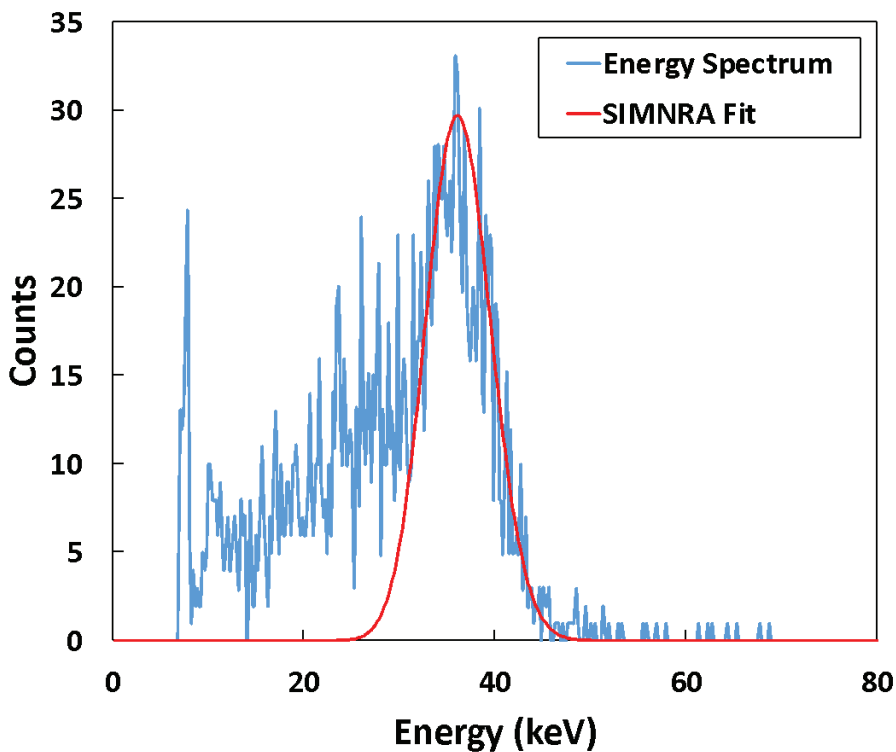
Figure 5: An energy spectrum for a 100 Angstrom gold film deposited on a carbon substrate. Simulation gives a thickness of (103.3 ± 3.1) Å. This agrees with analysis from Geneseo's 1.7 MeV Pelletron linear accelerator, which found a thickness of (101.77 ± 0.71) Å for the same gold target.

One proposed application of the detector described in this work would be for detecting impurities in semiconductors. The increased sensitivity and depth resolution provided by low energy ions should make it easier to detect trace layers of contaminants while providing an accurate measure of a semiconductor's purity. However, the spectrometer was unable to distinguish any difference between a

sample of GaAs doped with carbon, and a sample of GaAs doped with silicon, demonstrating that the spectrometer does not yet possess the resolution and sensitivity necessary for it to be a useful tool.

One reason for this shortfall is that the ion beams used in this study were exclusively isotopes of light ions such as H and He. Due to their low masses, these ions do not offer very good mass resolution for high target masses. Figure 6a shows the kinematic factor for the light deuteron and alpha particle beams, as well as for a heavy ion such as argon. Notice that, for high masses, the curves for d and He beams level off to near constant. Due to this leveling off, it becomes increasingly difficult to distinguish between heavy ions of similar masses. For this reason, the light ion beams used in this study are best suited for lower mass targets, as the difference in kinematic factor is great enough to be detected in that regime.
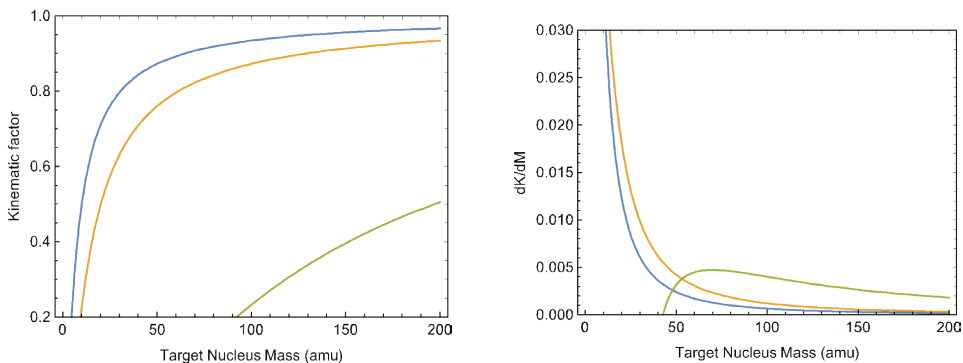
Figure 6: 6a. shows the kinematic factor for d, He, and Ar beams incident on nuclei of various masses. While d and 4He beams have great sensitivity to low mass target nuclei, this is impractical due to physical limitations of the spectrometer, as well as a lower cross section, as dictated by equation (2). 6b. shows the derivative of the kinematic factor with respect to target mass for d, He, and Ar beams. The ion with the greatest value for dk/dM over a particular range has the greatest sensitivity to target nuclei in that range.

However, this poses another problem for the spectrometer, as ions passing through the carbon foil experience a much greater deviation in exit energy, leading to much broader peaks, which further limits the resolution of the detector. Figure 7 shows the effect that this spreading has on the width of the TAC peaks for various elements. In addition, the spectrometer is much less efficient for detecting very low energy scattered particles. Backscattering off of low-Z materials has a much lower differential cross section, making it much more difficult to observe peaks for low-Z elements in the presence of broad, indistinguishable high-Z peaks.
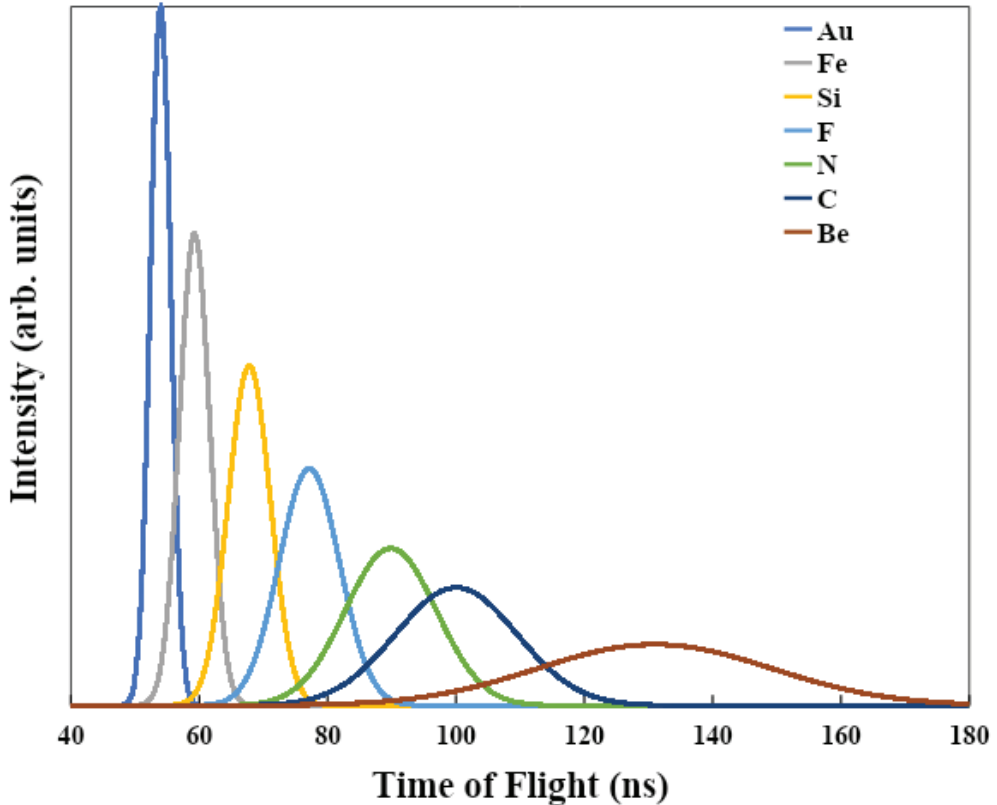
Figure 7: This plot shows the expected spread in measured time of flight for a 50 keV α particle scattering off of various targets before passing through a 5 µg/cm2 carbon foil. This causes time-of-flight peaks for lighter elements to appear more spread out.

At this time, the main issue with the spectrometer is that it is not well-suited for light ions, which are the most easily made and readily available. The easiest solution to this problem would be to switch over to using heavy ion beams such as argon. Heavy ion beams could also potentially allow the Duoplasmatron ion source to operate at energies above the current limit of 50 keV, as heavy ions have a greater number of accessible charge states, allowing them to reach higher kinetic energies when accelerated by a potential difference, as the ions in Geneseo's Duoplasmatron are.

There are, of course, other shortcomings of the spectrometer that need to be addressed in later models. For one, the electron collection method introduces a good deal of uncertainty in the time-of-flight that likely leads to further unnecessary broadening of the peaks. Alternative geometries and bias schemes such as the one described by Mendenhall and Weller (1990) may be able to minimize this effect.

Furthermore, there is the problem that the spectrometer is not well-suited to operate with high beam currents. Due to the nature of the detector, if the beam current is

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too high, it tends to overwhelm the system and create far more random coincidences. This can be easily circumvented by applying lower beam currents, but this necessitates longer run times and lower count rates, which worsens the statistics of the spectrum.

CONCLUSION

The time-of-flight spectrometer described in this work is capable of measuring the energy spectra of ions backscattered off of various targets and does so without the need for an MeV particle accelerator, which are costly in terms of both time and money. However, it is not yet sensitive enough to confer any practical advantage over conventional MeV RBS. While the results obtained to date provide an encouraging proof of concept, limitations on the spectrometer's resolution cast doubt on its future viability. Hopefully, with the requisite improvements the time-of-flight spectrometer can be turned into a powerful tool for surface analysis.

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Multiliteracies, Multimodalities, and Social Studies Education

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sponsored by Brian Morgan

ABSTRACT

This project explores multiliteracies, multimodal education, and its use in designing social studies curriculum. Specifically, multiliteracies provides a framework for understanding and productively using multiple modes in social studies education. Supported by a survey of literature, and an analysis of current pedagogical practices, an example of multimodal social studies curriculum will be provided.

Educational theory and pedagogy are constantly developing, as evident by the changing trends and supporting research from throughout the last century in the United States. Since the 1990s, literacy research and practices have taken a social turn, in comparison to previous pedagogy with a more behaviorist or cognitive approach. Current pedagogical research supports the development of literacy practices and the reading of "text" that goes beyond traditional print-based forms to include digital and multimodal forms of reading. This shift also emphasizes the idea of connecting literacy learning from inside school to students' everyday experiences outside of school. Additionally, there is a strong movement to include disciplinary literacy practices as a form of teaching and learning within adolescent classrooms.

This project advances the current field of educational scholarship by arguing that social studies is multimodal by nature and therefore would be a beneficial way to design the curriculum to enhance the accessibility and relatability of learning within social studies lessons. This paper explores the theories of multiliteracies, multimodal education, and its use in designing social studies curriculum. Specifically, multiliteracies not only provide a framework for understanding these multiple modes but also how to productively use these multiple modes in social studies education. Supported by a survey of literature and an analysis of current pedagogical practices, an example of multimodal social studies curriculum is described. This proposed curriculum demonstrates the possibilities and benefits of teaching social studies through a multimodal lens.

Survey of Literature

When analyzing the current literature surrounding the topics of multiliteracies, multimodalities, and literacy in social studies, there have been clear trends developing in recent years. These trends provide a framework for proper implementation of this theory into practice. Most broadly, the theory of multiliteracies, introduced by The New London Group (Cazden et al., 1996), raises the point that learning should go beyond traditional language-based approaches to support the multiplicity of communication methods and the increasing linguistic and cultural diversity of the world. Current educational scholarship has built on this seminal work to reveal other trends related to the use of digital technologies, interactive activities, supporting multilingual learners, and making connections between school learning and the modern world.

Major Themes

As teaching methods over the last few decades have been developed to address the idea of learning beyond school, the learning structure has developed to include multimedia and other elements relatable to students in their broader lives. Scholarship in this field argues that using a multiliteracies approach increases digital literacy skills and also emphasizes the connection between school learning and outside learning. Several seminal works and research-based studies argue that students can translate their skills from school and apply them to the world around them, not just within the classroom (Al-Hazza, 2017; Chisholm & Whitmore, 2016; Cloonan, 2011; Cole & Pullen, 2010; Dalton, 2015; Dingler, 2017; Lankshear & Knobel, 2006; Education Queensland, 2003; and Cazden et al., 1996). To address the multiple communication channels of learners in modern society, teaching must adapt to teach students growing abilities and diversifying interests. Creating a more accessible version of learning allows students to make meaningful connections between school and their lives, translating their content and skill knowledge into their actions in the world around them.

Additionally, the importance of connecting classroom learning to a modern multimodal society has been emphasized in a variety of scholarly works. These studies argue that education must adapt to meet the needs of the current society (Al-Hazza, 2017; Dalton, 2015; Lankshear & Knobel, 2006; Cazden et al., 1996). This explores the aforementioned idea that learning must be transferable to life beyond school and that it must use tools that students can then bring into their communities. The pioneering research of the New London Group (Cazden et al., 1996) indicates that the modern shift in teaching literacy must consider the multiplicity of discourses, especially in an increasingly diverse, globalizing, multimedia engaged world. Teaching with multiliteracies addresses this local and global interconnectedness.

Another major theme is the promotion of inquiry-based learning or creative and interactive activities. Scholarship encourages the use of multimodalities to enhance the educational experience for students. This is most frequently revealed through the idea of inquiry (Al-Hazza, 2017; Chisholm & Whitmore, 2016; Dalton, 2015; Miller, 2018; Education Queensland, 2003). Since social studies is a discipline focused on in-

quiry, designing a curriculum with multimodalities aligns well with the goal of making education more accessible to students' motivation and increasing the relevance of historical content by exploring the past with historical literacy skills.

Sub Themes

Seminal research of Gee (1989) and The New London Group (Cazden et al., 1996) promote the idea of making learning more accessible, addressing supporting the needs of multilingual learners. It is argued by both works of scholarship that it is essential to consider the variety of discourses students use and to build upon their socially accepted communication methods within classroom learning. Gee (1989) specifically analyzes the significance of discourse in literacy and introduces the definitions of acquisition as subconscious learning, and learning as knowledge that is actively taught. In a growing globalizing society, it is imperative that our education system support the language demands of all learners, and to recognize that there is no longer a single form of canonical English that should be taught anymore (Cazden et al., 1996). Schools must plan to support success for all students, regardless of linguistic or socioeconomic boundaries.

Using multiple modes also makes content more transferrable to students, giving them the tools to lead civically engaged lives. Several scholars address that by using multimodalities in social studies learning, students can build up the skills necessary to be active and informed participants in the civic, economic, and personal aspects of our modern society (Al-Hazza, 2017; Chisholm & Whitmore, 2016; Dingler, 2017; Lankshear & Knobel, 2006; Cazden et al., 1996). The nature of learning has changed, and the New London Group argues that there is a need for literacy teachers and students to see themselves as the designers of social futures (Cazden et al., 1996). New discourses are emerging through different ways of thinking and acting, which must be recognized to be active civic participants and advocates.

Lastly, adolescence education scholarship highlights that encouraging student choice in learning and providing various project opportunities leads to increased investment in-class tasks. Chisholm & Whitmore (2016) and Dalton (2015) point out that increasing the modes that students can use for class activities, leads to motivation for participating and taking a more active role in their learning. Dalton particularly determined that using digital tools for project design enhanced students' goals, processes, and projects (2015). A connection is made here to students outside of school, as he argues that teaching with these tools and multimodalities must explicitly connect the skills from the projects to the world beyond school, indicating that students are social designers (Dalton, 2015). Art and project-based learning also embrace multiliteracies, as students engage themselves gesturally and emotionally, learning them to opportunities to make meaning from complex historical narratives (Chisholm & Whitmore, 2016).

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Modes of Meaning Making

The modes of meaning making are derived from the theories of multiliteracies, which provides a framework for understanding how to teach productively with multimodalities. Multiliteracies is a broader view of literacy that overcomes traditional language-based approaches (Cazden et al., 1996). It makes literacy more accessible by considering how linguistic and cultural differences contribute to the lives of students inside and outside of the classroom. Literacy incorporates more than one mode to communicate ideas, express perspective, and evoke emotion. Thus, multiliteracies demonstrate that all meaning making is multimodal. Multimodalities, or the multiple modes to make meaning, are a natural part of social studies since students can access, interpret, and interact with the past in a variety of ways. Multimodal texts and other sources do not necessarily have to be digital but do need to include more than one of the five modes. These modes are linguistic design, audio design, spatial design, gestural design, and visual design (Cazden et al., 1996).

Each of these modes highlights a different method of meaning making. Linguistic design means to make meaning from spoken or written language. In social studies, linguistic design includes elements like text features, word choice, and debates. Audio design means making meaning from sound or noises. In social studies this may be in the form of videos, speeches, oral histories, lectures, music, tone, and accent. Spatial design, which is making meaning from an organization of objects in a space, would be visible in social studies through the use of maps, physical classroom layout, placement of information on a page, positioning of historical figures in a primary source. Gestural design is meaning making from movements of the body. Social studies may feature this mode in facial expressions, Socratic seminars, theatre, role play, debate. Lastly, is visual design, which is making meaning from images. Social studies visual design includes political cartoons, photographs, maps, logos, blueprints, text, transcriptions, books, newspaper articles, advertisements, perspective, and color.

All of these modes can occur simultaneously to make meaning, but cannot function independently to be considered a multimodality. Many social studies teachers already use multimodalities in their daily pedagogy, due to the multimodal nature of the topic, but understanding the purpose and function of each modality is significant to supporting students' accessibility to the texts and their development of disciplinary literacy skills. Although digital tools are not necessary for multimodality learning, the multimedia component would likely enhance the amount of modes accessible to the learners, since digital sources may introduce elements beyond traditional text-based sources.

In social studies, some examples of sources for multimodal meaning making are historical photographs, Google Earth digital mapping, graphic novels, oral histories, portrait studies, blogs, music, sound bites, video clips, debates, political cartoons, quote analysis, simulation activities, project and arts-based learning approaches, and classroom set-up. These types of sources, activities, and assessment must be approached cautiously, to ensure that they are meaningful, education-enhancing tools, and not

random or put together without deeper significance. Introducing different elements into social studies instruction also requires the instructor to explicitly teach students how to use these tools or methods and introduce how they support students' use of meaning making through the specific modes.

IMPLICATIONS

A sociocultural lens is necessary for understanding the significance of the multiliteracies framework, as it describes learning as relevant to the unique social, cultural, and linguistic experiences of each student and how it influences their education. Although social studies is arguably one of the most valuable school subjects, it is often the case that students find these courses to be dry or unengaging. Teaching with multiple modes, or multimedia, allows students to draw connections between their learning in school and the world around them. Social studies is multimodal by nature, involving the critical analysis of a variety of primary or secondary sources to draw conclusions on historical phenomena. With this approach, students actively engage with historical inquiry and think creatively about the past, motivating them to create a synthesis of ideas and projects that are modern and relevant. By incorporating multimodalities into social studies instruction, learning is scaffolded to be accessible to all learners through multiple modes, whether visual, gestural, audio, spatial, or linguistic. All classrooms have the potential to become multimodal, whether it be with the layout of the physical space, the inclusion of a variety of sources, or the way lessons are presented to the class.

SAMPLE OF CURRICULUM

Context

This sample curriculum is designed for the course of eighth grade United States History in New York State. The multimodal lesson ideas focus around the unit of *Industrialization and Urbanization.* Specifically, it aligns with the New York State Social Studies Standard: 8.2, "A Changing Society: Industrialization and immigration contributed to the urbanization of America. Problems resulting from these changes sparked the Progressive movement and increased calls for reform" (Standards: 1, 2, 4; Themes: MOV, SOC, TECH, EXCH). This unit typically takes place in the beginning, or fall semester, of eighth grade, if teaching history chronologically.

Prior knowledge that is needed in preparation of this unit is about Reconstruction. Details such as the migration patterns of freed African Americans, and labor shifts from a predominantly agricultural-based economy to a more industry-based economic system set the stage for urban development. This unit of the Gilded Age includes topics like technological advancement, monopolies, the immigrant experience, the development of cities, working conditions, and the formation of labor unions. Learning about this American Industrial Revolution prepares students to critique the

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growth of industry, immigration policy, and labor conditions, leading their learning into the Progressive Era.

Activity 1: Argumentative Writing

Argumentative and critical writing is a major component of social studies curriculum. Using disciplinary analysis skills to interpret historical primary and secondary source documents, identify perspective and bias, and then cohesively synthesize ideas is the main focus for social studies writing. In order to support the skills needed to develop their own argumentative writing, multiple modes should be emphasized to increase their understanding of different elements within a historical writing piece. To do so, a text-coding activity, designed to build up discipline-specific writing skills, activates multiple modes in a student's learning of the content to enhance their understanding of writing structure and to build historical writing skills.

For the text-coding activity, students create a key with a partner, highlighting what they see, what it means, and what the overall section of text means based on their coding system (Dingler, 2017). By doing so, the color-coordinated text identification process supports the students comprehension of the text as a whole and the specific components that are within it. This strategy can be modified to be for persuasive writing pieces as well, demonstrating to students how to write their own arguments, based on the structure and academic language they identify from their model text. It can also be used with the goal of pointing out key ideas and information in a historical document. This activity involves the linguistic, visual, and spatial meaning making modes.

Using a digitized book, such as Jacob Riis's 1890 *How the Other Half Lives*, contributes to this unit by activating multiple modes of meaning making, and emphasizing a multiliteracies and New literacies approach to teaching pedagogy. This well known primary source describes tenement life, working conditions, and immigration from a bottom-up perspective. By engaging readers directly into the source with the text-coding activity, students develop a closer understanding of Jacob Riis's perspective, his written language, and his photographs, sparking inquiry and presenting a framework for argumentative writing.

Activity 2: Interpreting Speeches

A prominent resource used in many history units are popular historical speeches. Typically, lessons may be designed to include a written version of a speech, an audio recording, or a video, depending on the historical era and the available technology at the time. A beneficial way to teach with a speech in social studies is to encourage students to make meaning through many modes, taking the analysis further than by only activating a singular mode, such as a speech transcript.

For this activity, students are first given a written transcript of a speech and are tasked with reading it to identify key elements such as the speaker, context, audience, tone, and purpose. It is important to design this lesson with key speech elements in mind

that align with the broader content of the unit and the skills being developed in the course. After drawing conclusions from the transcript, an audio recording of the original speech is played for the class. The goal of this is to support students in further identifying how the information was portrayed and how rhetoric influences the quality and impact of speech. The modes of meaning making in this activity are linguistic, spatial, visual, and audio.

For this unit, it may be challenging to activate all of these modes, as video and audio recordings were not popularized until after this era. However, it is necessary to think like a historian and to draw from sources beyond the typical content, to include people or events that are significant to history in their own way. A speech resource fitting for this unit is William Jennings Bryan's "Cross of Gold" speech, given on July 9, 1896, at the Democratic National Convention in Chicago. At a time when prosperity took on different forms, this speech is noted as one of the most famous of its time. Although the speech was not recorded by Bryan until years later, listening to his voice while reading the transcript allows students to make meaning of it in a variety of ways.

Activity 3: Digital Inquiry Stations

The National Council for the Social Studies embraces the C3 Framework, encouraging a focus on inquiry, which is at the core of social studies learning. Modern pedagogical shifts towards participation within the disciplines and an inquiry-based learning structure align with the inquisitive nature of historians and the many ways to interpret the past. Station activities expose students to a variety of source types and historical documents, allowing them to make inquiries and interpretations based on the evidence they see, and also from what is missing.

For this activity, the teacher will develop a lesson that encourages students to take the lead on their learning, by providing them with ample historical resources to explore significant topics to this unit. Industrialization and urbanization within the United States has so many different types of sources available, focusing on topics like child labor, regulations in the workplace, factory conditions, and city planning. For this structured digital inquiry, students would need access to 1:1, or 1:2 computer or tablet technology, since it can be done independently, or collaboratively with a partner. The stations would be organized on Google Slides, each correlating with a question on the inquiry packet students making their observations on. The students answer scaffolded questions, by analyzing documents to reveal elements of history that stand out to them. This inquiry allows students to work at their own pace, self-monitoring, or collaboratively with a partner, sharing their analysis or questions related to the historical documents. The modes of meaning making emphasized by this activity are linguistic, spatial, audio, visual, and gestural.

For this activity, many teachers may already have an ample amount of primary or secondary source documents related to this historical era. However, to add to their teaching resources, the Library of Congress has a primary source collection titled "The Industrial Revolution in the United States." This database includes digitized

maps, infrastructure blueprints, advertisements, telegrams, political cartoons, images, and primary source video clips of working conditions and urban development. All of these documents can be used to create teacher-designed themed stations or to allow students to explore the collection in their inquiry, choosing areas that interest them to develop their historical understanding.

Additional Multimodal Activities

In addition to the activities described in this sample curriculum, there are many other ways to teach industrialization and urbanization in a multimodal way. Other examples of prospective activities that can be designed with a multimodalities and multiliteracies framework are political cartoon analysis, a Captain of Industry vs. Robber Baron debate, a manager vs. laborer contract meeting simulation, an interactive mapping project via Google Maps for the growth of cities and industry, and a Salad Bowl vs. Melting Pot demonstration with props. These activities support the use of multiple modes by including design elements that go beyond the traditional text-based approach to learning. They each include more than one of the following modes: visual, linguistic, audio, spatial, or gestural, and enhance learning from lecture-based to interactive, inquiry-based learning experiences.

CONCLUSION

Multiliteracies and multimodalities are a natural enhancement to social studies instruction, as the discipline is multimodal by nature. Within the themes of social studies, including culture, economics, geography, government, and historical perspective, educators have the opportunity to enhance students' content understandings by designing instruction with multiple modes. Social studies is an irreplaceable school subject, revealing the trends, perspectives, injustices, and triumphs of the past, locally and globally. By teaching social studies with a mindfulness of multiliteracies and multimodalities, students can be supported to engage with complex ideas through a variety of modes. With this approach, students actively collaborate with historical inquiries and think creatively about the past, creating a synthesis of ideas and projects that are modern and relevant. Teaching with multiple modes also allows for students to draw connections between their learning in school and the world around them, acknowledging their role as designers of the social future. Moving forward, educational scholarship should address multiliteracies within the content areas and provide additional framework to support learners with multiple modes, per discipline-specific goals and ideology. Continuing on a path of modernity, educators must be adaptable, global-minded, and informed, understanding the influence that they, and their students, have on the interconnected society around them.

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Far-Right Populists in Western States of the European Union: Who They Are and What They Want

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sponsored by Robert Goeckel

ABSTRACT

The past decade has been a tumultuous period in European politics. Despite the unique economies, histories, and cultures of Western member-states of the European Union, many of these countries are alike in seeing the rise of far-right populist political parties that have challenged the status quo. This project seeks to describe the general character of these parties. They are defined by their far-right positions on social issues – namely their calls to restrict immigration and reestablish the nation-state as the basis for sovereignty – and their populist themes, wherein they deride the mainstream as a corrupt establishment that has forsaken the common people. Outside of these definitional parameters, however, these parties are a fairly diverse set. Their electoral success is varied. They have different origins and structural characteristics. It is difficult to establish a common profile of their supporters. Their positions on numerous issues, like European integration, economics, and matters concerning traditional values, contain various nuances. These factors might challenge the ability to draw accurate generalizations about them. Nevertheless, they may in fact be united in their reason for being: they could be just one symptom of a larger, albeit diffuse, social movement seeking to affect issues of European identity and culture.

The past decade has been a tumultuous period in European politics. Despite the unique economies, histories, and cultures of Western member-states of the European Union, many of these countries are alike in seeing the rise of far-right populist political parties that have challenged the status quo. Established party systems have been revolutionized by these newcomers, and many mainstream parties have had to shift their platforms in response. Not only have these parties challenged traditional powerholders, they have even challenged the left-right political spectrum, with their

simultaneous support for liberal and illiberal policies featuring heavily in their platforms. Far-right populist political parties have the potential to fragment governments in Western European states by drawing voters away from moderate parties, making coalition-building more difficult, and undermining the legitimacy of longstanding elites. Nonetheless, despite the significance of these parties and the momentum behind them, they remain poorly understood by many due to their complicated histories, nebulous voter bases, and ambiguous messaging.

This project seeks to describe the general character of these parties, especially in terms of their histories, political platforms, and rationale for these platforms. They are defined by their far-right positions on social issues—namely their calls to restrict immigration and reestablish the nation-state as the basis for sovereignty—and their populist themes, wherein they deride the mainstream as a corrupt establishment that has forsaken the common people. Outside of these definitional parameters, however, these parties are a fairly diverse set. Their electoral success is varied. They have different origins and structural characteristics. It is difficult to establish a common profile of their supporters. Their positions on numerous issues, like European integration, economics, and matters concerning traditional values, contain various nuances, though there is some alignment. These factors might challenge the ability to draw accurate generalizations about them. Nevertheless, they seem to embrace a similar ideology and may have some common reasons for being. Their long-term trajectories and true intentions, however, remain uncertain.

Definition of "Far-Right Populism"

In order to discuss far-right populist (FRP) political parties, the parameters for this set must first be established. Although there is a growing consensus on how these parties can be defined in more recent academic literature, their common character can be somewhat ambiguous. The parties themselves almost never self-identify with the word "populist," and they tend not to self-identify with the far right, with many eschewing an identity on the left-right political spectrum altogether (Mudde, 2017, pp. 3-4). Instead, distinctions by these terms are established by external observers. Such external methods of categorization face a few problems, however. There is no universal manifesto for these parties, no single work that they claim to champion the cause of, making the development of their shared ideology rather piecemeal. It can therefore be difficult to determine which of their beliefs are central to their ideology, versus those that are more peripheral or are disingenuously adopted out of political opportunism (Mudde, 2017, p. 6). Furthermore, there is a problem of bias in the existing scholarship on these parties. Few academics who study FRP parties claim to support them, so the literature is dominated by those that are openly critical of them and those that claim neutrality, creating an overall air of distrust toward them, especially since many of these parties are political newcomers (Mudde, 2017, pp. 2-3).

Nevertheless, a rough category for these parties can be established by defining "far-right" and "populism" in the context of their ideology. Dutch political scientist Cas

Mudde provides a good framework for understanding this ideology, which is broken down into three elements: nativism and authoritarianism—which inform the far-right element—and populism (Mudde, 2017, pp. 4-5)

The nativist element of far-right politics denotes the espousal of nationalism and xenophobia. FRPs idealize a conception of a homogeneous nation-state, and demonize those that do not fit into this conception (Mudde, 2017, p. 5). For FRPs, however, this homogeneous nation-state is not an ethno-state per se; FRPs embrace more of a rigid cultural conception of the nation, based in shared values and identity, as other definitional features of the nation—like religion, interstate conflict, and political ideology—have seemingly become irrelevant (Lochocki, 2018, p. 25). They are quintessentially opposed to multiculturalism and resist immigration not on the grounds that these things threaten the state's racial purity, but because foreign cultures are incompatible and risk destabilizing or replacing the native culture. These views have been called "new racism" or "culturalism" to differentiate them from classical racism, which is based in supposed biological differences (Carter, 2017, p. 33). The authoritarian element, meanwhile, indicates support for a strictly ordered society per the belief that inequality is natural. FRPs call for stricter law and order policies and view social problems, like drug abuse, as primarily security issues, not as health or economic concerns (Mudde, 2017, p. 5).

The populist component of FRP, on the other hand, is more difficult to define. Some have called it a rhetorical style or a political strategy, while others have called it a soft ideology (Betz & Johnson, 2017, p. 69). Mudde falls into this latter group, describing populist ideology as a worldview that pits a good, pure, common people against a corrupt, exploitative elite that has betrayed the people's interests. The mainstream parties are said to actually be a homogeneous political class that feign opposition to obscure their collusion. Populists seek to overthrow this class and return government to the popular will (Mudde, 2017, p. 5). The specifics of populist messaging will depend upon their environment, as the ideology adapts itself to whatever notions are popular in a local context (Rooduijn, 2018, p. 352). For FRPs, the elites are often defined as wealthy, hypocritical, deviant, and self-righteous leftist intellectuals and technocrats (Betz & Johnson, 2017, pp.69-70).

These three elements are often interconnected insofar as they inform core FRP policies. Authoritarianism and nativism both fuel anti-immigration stances, for example, as immigrants are blamed for higher rates of crime, making them a security threat. Nativism and populism combine to produce rhetoric accusing mainstream elites of suppressing discussion on the drawbacks of immigration via political correctness (Muddes, 2017, p. 5). Authoritarianism and populism can combine to create a pseudo-fascist image of a FRP party rising against the decadent old regime to revitalize the nation under its stern leadership.

These elements sometimes clash, however, especially in a European context due to the form that nativism takes. The conception of the cultural nation embraced by West-

ern European FRPs often includes Judeo-Christian, democratic, and liberal values as necessary elements, values that stress the importance of individual liberty, respect for human rights, and pluralistic decision-making (Zúquete, 2017, pp. 103-123). This conception challenges the internal coherence of Western European FRP nativism: universal human rights conflict with the logic of exclusion (Griffin, 2017, p. 23). Furthermore, authoritarianism, which might suggest the replacement of democracy with a more oligarchic or despotic system, appears to challenge these norms, and thus the nativist element. Authoritarianism seems to also contradict populism in this way, as the view that democracy is the only legitimate basis for political power and change is especially popular in Western Europe (Betz & Johnson, 2017, pp. 68-69).

Nevertheless, the discourse of these FRPs attempts to accommodate such conflicting ideas. They embrace a sort of culture-based ethnocratic liberalism, wherein the cultural in-group is allowed to enjoy the full rights and benefits afforded by liberal democracy as legitimate members of the nation, while out-groups—primarily non-European immigrants—are viewed with suspicion, being subjected to limitations on their rights and social benefits until they assimilate or integrate into the in-group (Griffin, 2017, p. 23). They do sometimes seem to support the universalizability of a kind of human rights, but as group rights rather than individual rights. Though they may be critical of foreign customs, these FRPs do not typically demand that foreign states conform to liberal norms developed in the West and oppose a globalist view that gives nations the right to interfere in the affairs of other nations; instead, they support the right of other nations to practice and define themselves by their own exclusive culture, so long as they remain confined to their own borders (Betz & Johnson, 2017, pp. 76-77). Western FRPs also do not oppose the democratic system outright, and in fact, as a reflection of their populist anti-systemness, often call for the implementation of more direct democracy through referendum (Carter, 2017, pp. 49-50). They satisfy the authoritarian parameter through their calls for reform involving stricter law and order policies: expansions of police forces, the curtailment of certain rights protections, and, in some cases, increased executive power (Mudde, 2017, p. 5). Still, these apparent contradictions, especially between authoritarianism and democratic values, may be a source of mistrust toward them. It is unclear whether these parties truly embrace democracy thanks to its place in European identity, or if this position is maintained purely out of opportunistic political necessity, in order to gain support and obscure ulterior motives (Mudde, 2017, p. 6).

Differentiating far-right populism from other ideologies may be conducive to a better understanding of it. Far-right populism is not synonymous with neo-fascism or neo-Nazism, which constitute the extreme right. Both of these ideologies are opposed to democratic systems out of principle, while FRPs seek to reform the system by working within it democratically, and Western European FRPs in particular seem to embrace democracy. The extreme right also tends to embrace traditional racism, defining the nation on essentialist ethnic grounds and touting the natural supremacy of certain races over others, rather than culturalism (Carter, 2017, pp. 31-32). FRPs are harder to distinguish from mainstream conservatives, particularly because views considered

mainstream may vary from country to country; in some countries, the far right might be considered mainstream (Carter, 2017, pp. 33-34). They might be distinguished by their reactionary stances. Conservatives tend to call for the maintenance of the status quo, while FRPs tend to be more reactionary, calling for a return to an older mode of governance, namely the re-establishment of the nation-state and the exclusive legitimacy of governance by in-group members of the governed population (Betz & Johnson, 2017, p. 78). FRPs can be distinguished from the political left by their acceptance of inequality as fundamentally natural. Lines can be blurred, however, especially with the populist radical left, as FRPs often call for increased spending on social welfare programs, though they also usually embrace welfare chauvinism, seeking to deny access to those that do not rightfully belong to the nation (Lochocki, 2018, p. 7).

The Diverse Who: Historical Background, Internal Characteristics, and Voters

Modern FRP parties first appeared in Western Europe in the 1970s, but they did not materialize as a serious political force until the 1980s. Jean-Marie Le Pen's National Front (FN) of France and Jörg Haider's Freedom Party of Austria (FPÖ) became the movement's first successful forerunners after 1986 (Camus & Lebourg, 2017, pp. 12-14). They emerged from the context of a largely fragmented, diffuse, and unpopular radical right wing, owing to competition between various different sects with conflicting ideas and personalities (Griffin, 2017, pp. 21-22). The extreme right had failed in almost every country to garner support in national elections, with neo-Nazi parties never rising above 1% of the popular vote and moderately successful neo-fascist movements being restricted to a few countries, namely Italy (Carter, 2017. p. 61). In order to be successful, these movements would need to consolidate and abandon ideas that had largely fallen out of fashion. Still, there is no single story of how modern FRPs emerged. The FN appears to have represented a consolidation and moderation of more extreme elements into an attempt at a catch-all party, with Le Pen's daughter, Marine, continuing to moderate and sanitize the party's image after assuming leadership in 2011; but Haider's FPÖ represented the radicalization and revitalization of a party that, though it was founded by ex-Nazis in the 1950s, had been a fairly centrist liberal party in the years prior (Camus & Lebourg, 2017, p. 14).

Likewise, there is no common profile or ideological trajectory of the parties founded in the following years. The Sweden Democrats (SD), founded in the late 1980s, brought a number of white nationalists and Neo-Nazis into its membership, but has succeeded in moderating these tendencies under Jimmie Åkesson's leadership (Camus & Lebourg, 2017, p. 192). The Italian Northern League (LN), founded as a party in 1991, began as an alliance of independent regionalist parties calling for independence or autonomy for Padania, the richer parts of Northern Italy, and originally included a number of leftists within its ranks. Since the leadership of Matteo Salvini in 2013, however, it has moved to become a distinctly right-wing party with more of a national program (Camus & Lebourg, 2017, pp. 183-184). The Finns Party (PS) was founded as a de facto successor to the bankrupted Finnish Rural Party in 1995, an

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agrarian populist party, marking a transformation from a special interest party to one with broader appeal, prompted in part by changes in the Finnish economy due to the success of Nokia and other tech companies (Arter, 2010, pp. 485-487). The Dutch Party for Freedom (PVV) was founded in 2004 by Geert Wilders after he broke from the center-right liberal People's Party for Freedom and Democracy, and quickly filled a void left by the assassinated Pim Fortuyn by taking a particularly forceful stance against Islam and immigration (O'Leary, 2017). The Alternative for Germany (AfD) had been founded by a group of economists as a fairly moderate right-wing party in 2013, with its soft Eurosceptic position and neoliberal economics platform being its main emphasis, but it was radicalized toward a FRP direction after 2015 over the issue of immigration (Baluch & Usherwood, 2018, pp. 117-188).

FRP parties have enjoyed electoral success in many Western European countries, but this success has neither been universal nor equal. This graph shows the historical success of nine extant parties—which were picked because they have been successful, having earned more than 10% in one year—with the popular vote in their country's preeminent national election (UKIP, 2017):[1]

Popular Support for Select Far-Right Populist Parties in National Elections
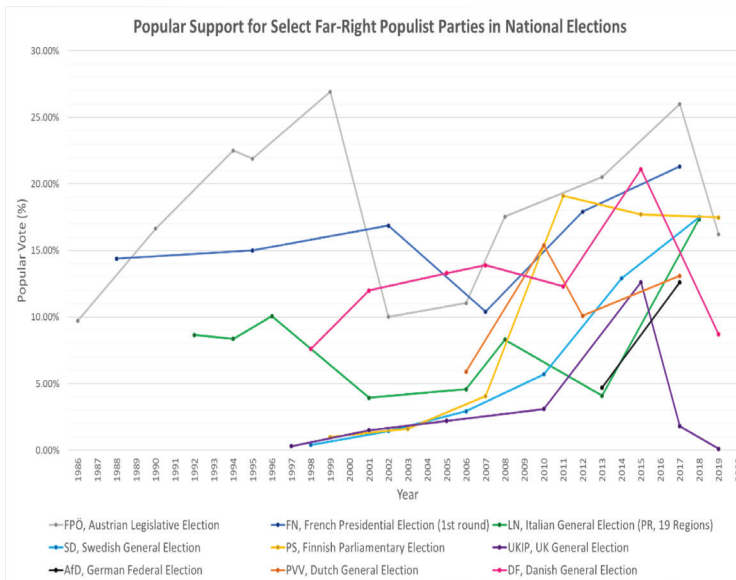
A first major wave of support for these parties can be identified as appearing during the late 1980s and was sustained through the 1990s, though less widespread. Multiple countries, namely Sweden and Germany, lacked a significant FRP party on the

1: These parties were chosen for analysis throughout this paper because they meet the FRP definitional parameters, and because they have been called FRP parties by other academics (namely, Mudde, preface to *Reader*, 7; and Lochocki, *Rise of Populism*, 6). Note that some parties that were successful during this period have since been dissolved, and therefore are not reflected on the graph; one example is the Danish Progress Party, which the Danish People's Party more or less supplanted. The Flemish party Vlaams Blok, dissolved in 2004 and rebranded to Vlaams Belang following a court case, also flourished after 1990, but has been excluded from this study as the subnational divisions that pervade Belgian politics can present a challenge to comparative analyses.

national level during this period. The parties that were successful during this period appear to have lost some momentum during the mid-2000s, but then a second, more widespread wave seems to have begun prior to the start of the 2010s, which also brought parties to prominence in countries that had not previously had one. Some of these parties look to remain strong, while others have lost support in more recent years. Furthermore, some Western European countries, like Ireland, have never seen a modern FRP party, while in Spain, their FRP party, the Vox party founded in 2013, has only had such a successful election more recently, in 2019 (Mudde, 2017, p. 6). Overall trends for Western European FRP electoral history are therefore somewhat rough and difficult to establish without delving into their particular characteristics and national contexts.

All of the parties included in the graph have earned seats in national government, at least during their peaks. The United Kingdom Independence Party (UKIP) and the FN, however, have earned significantly fewer seats than their popularity would suggest, likely as a result of these countries' respective single member district plurality and runoff systems. Only three of these parties have ever been in governing coalitions: the FPÖ, the PS, and the LN. None has ever held their country's highest office. This is partly because other parties tend to view forming coalitions with FRPs with apprehension, or maintain official policies of non-cooperation (Mudde, 2016, p. 30).

It is similarly difficult to establish a common internal character of these parties, in terms of their leadership or structure. Many are characterized by strong, charismatic leaders that build a cult of personality, especially during their periods of success, as such a leader plays an important role in their populist character, by acting as a unifying symbol of resistance against the corrupt elite (Taggart, 2017, pp. 165-167). Jörg Haider's leadership of the FPÖ throughout the 1990s, Nigel Farage's leadership of the United Kingdom Independence Party (UKIP) in 2015, and Marine Le Pen's leadership of the FN (recently rebranded to National Rally) from 2011 through today are prime examples. Many parties are also highly centralized; for instance, Geert Wilders is the only registered member of the PVV, giving him sole control of the party's platform (Camus & Lebourg, 2017, p.199). There are notable exceptions, though. The AfD is a highly factionalized party, marked by disputes between its more moderate, economically-minded Eurosceptic members and those that emphasize a harsher stance on immigration and identity issues. Its leadership has gone through turbulent changes, with no one person emerging as a clear, unifying force for the party since its conception (Eddy, 2017). Many other parties show signs of varying degrees of instability, with recent histories of key members, including elected members of government, leaving the party to join another or form their own, or being ousted by the party's leadership or factional pressures.

Trends in the support bases for these parties with regard to demographics can also be difficult to characterize in an overarching way. There is no quintessential FRP voter by population cleavage, no demographic that clearly defines them, except perhaps that they do not appeal to non-European immigrants and Muslims (Rooduijn, 2018,

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p. 353). Support for FRP parties does tend to correlate inversely with education, and, to a lesser degree, lower economic classes tend to show greater support for them (Rooduijn, 2018, pp. 354-355). The strength of these trends varies from party to party, however, and for some, the trend is not significant (Rooduijn, 2018, p. 363). Some of the parties feature a noticeable gender gap, with more male support than female, although this trend is not universal. Some parties perform significantly better in certain regions: the LN unsurprisingly enjoys more support in Northern Italy, a richer region of the country, while the AfD enjoys more support in Eastern Germany, a poorer region of the country (Edwards, 2018; Steffen, 2017). Some of the parties seem to do better with middle age groups, while others do better with older populations, but it is unclear if either of these trends are significant (Rooduijn, 2018, p. 363). Ultimately, it is difficult to draw conclusions about the support for FRP parties among different demographics, as trends outside of national contexts appear fairly rough.[2] There is one unifying trend among the voters of nearly every FRP party: they overwhelmingly list immigration as their top issue (Lochocki, 2018, p. 24). This single metric is the largest determinant of whether or not someone supports a FRP party, suggesting that the parties might be considered as single-issue parties, although most do present a more comprehensive platform than just an immigration stance, complete with justifications that appear somewhat ideological.

The What: Policy Proposals of Far-Right Populist Parties

There is significant coherence between FRP parties in the realm of policy, which is to be expected, given that they are defined as a group by their ideological stances. Still, there are some nuances and differences in their positions. They are largely in agreement when it comes to policies that they emphasize in their platforms, regarding values, immigration, law and order, and structural reform, although some take stronger stances than others and outliers exist. When it comes to policy areas that they emphasize less, however, such as foreign policy positions—including stances on the European Union—and economic strategies, there is greater divergence between them.

Note that my following analysis is qualitative in nature, based primarily on a study of the manifestos and basic programs of seven parties: the Alternative for Germany (AfD), the Finns Party (PS), the National Front (France, FN), the United Kingdom Independence Party (UKIP), the Party for Freedom (Netherlands, PVV), the Danish People's Party (DF), and the Freedom Party of Austria (FPÖ).[3] I also considered the

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2: I will note that, in the course of my research, I found the pre-existing literature on this subject—especially regarding broader analyses of support for multiple parties—to be rather limited or based on data that might be outdated, as they preceded important developments correlated with the rise of FRPs, like the refugee crisis. I was unable to conduct a quantitative analysis myself due to time constraints and my unfamiliarity with the dataset, but the European Social Survey might be a decent resource for those looking to conduct future research into the subject of demographic support.

3: All of these manifestos/programs were chosen because they were the most recent editions provided in English or French on each party's website, with the exception of UKIP and PS. For PS, there were three English-language documents available: a basic program, an expanded program, and a manifesto for the European Parliamentary election, all of which were used as they were all rather limited

official website of the Sweden Democrats (SD), and some journalistic resources on the Northern League (LN).[4]

There are some limitations presented by these manifestos. They were chosen for reasons of accessibility and were adopted by the parties at different times. It is possible that some of their original meaning was lost in translation.[5] It is also possible that the parties have deviated from their basic programs, especially in cases where the manifestos are older and precede leadership changes. Some of the manifestos are more detailed than others. Shorter manifestos help to reveal which policy areas the parties consider to be of greater importance—based on how much space they dedicate to each issue—but they also create room for error. I cannot account for a party's position on an issue that they are silent on, and so the parties may be in greater agreement or disagreement on some policies than I reflect here. Parties might also be disingenuous in their basic programs, misrepresenting or omitting mentions of unpopular policies that they support, raising questions as to whether or not such manifestos are the best means of analyzing party positions. Still, alternative methods, like focusing on speeches by party leaders, may present their own problems. Note too that I have not given consideration to how these parties actually act when in government.

Regarding Islam

In order to talk about modern FRP policies, it is important to understand their relationship with Islam. Muslims are usually the group construed by the modern far right to be the antithetical other to Western culture, the out-group that must be kept at a

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in terms of their content. I chose to analyze UKIP's 2017 manifesto instead of their 2019 manifesto because UKIP failed to be relevant in the 2019 election, having been essentially replaced by Farage's unsuccessful Brexit Party. They also had a weak showing in 2017, but this could be attributed to the UK's electoral system—polling for UKIP remained around 10% until the election was called for in April. Immediately afterwards, their poll numbers dropped significantly, hovering around 5% until election day, where they won only 1.8% of the vote. This suggests to me that the UK's single-round SMDP system—not shared by other countries involved in this study—enticed voters that would have preferred UKIP to make the strategic decision to support another party. Considering this situation, there is good reason to believe that the sentiments expressed by UKIP during this election, via their manifesto, were still fairly popular. I decided against using their 2015 manifesto, from when they actually earned 12.6% of the vote (although only one seat on account of the electoral system), because their status as a FRP party for this election is more controversial, as they did not take as strong xenophobic and authoritarian positions as they did in 2017.

4: The SD maintain an English version of their main webpage, which outlines their primary policies, though they do not provide their manifesto in English. Journalistic sources were chosen for the LN in order to have some representation of a party from southern Europe; they do not appear to maintain any English resources themselves. These sources are limited to reporting on official LN positions and speeches by Matteo Salvini, as speeches by other members of the party are more likely to deviate from official positions, given the party's historical internal divisions and Salvini's character as a strongman within the party.

5: It would be possible to conduct a quantitative analysis of these manifestos using datasets like the Manifesto Project Database, which bases its data on the original language versions of manifestos, but some of the scholars whose works I read were critical of such datasets, either because of how they quantified the data or because such quantification risks losing nuances in positions.

distance (Zúquete, 2017, p. 103). Whereas Jews once occupied this position for the far and extreme right for being thought of as a stateless, conspiratorial, elitist people, Muslims find themselves here on the basis of fundamentalist interpretations of their religion and recent Islamic terrorism (Zúquete, 2017, p. 109). Also unlike Jews, who have resided in areas across Europe for centuries, large Muslim populations are a recent addition to many central and western European countries. Muslims from Turkey and North Africa were invited as guest-workers to western Europe, particularly West Germany, to compensate for postwar labor shortages. France's Muslim population increased dramatically in the 1970s as a result of citizenship policies that allowed them to settle permanently, despite tensions that began to appear during the oil crisis (Zúquete, 2017, p. 106). Muslims thereafter rose in prominence as a particular enemy of the far right, a position that was solidified in the early 2000s after numerous terrorist attacks, including the July 7, 2005, London bombings, as well as assassinations in the Netherlands (Zaslove, 2008, p. 181). The rise of the Islamic State and terrorism connected to it in Europe during the mid-2010s further contributed to the view of Muslims as the natural enemies of Europeans. FRPs have since told a revisionist history of a Europe continually at war with Islam, featuring conflicts dating as far back as the Battle of Tours in 732 (Zúquete, 2017, p. 110).

FRPs criticize many fundamentalist Islamic beliefs on the basis of their incompatibility with Western values. They take issue with its opposition to secularism in the form of Sharia Law. They accuse the veil and the burqa of being oppressive toward women, restricting their freedom of expression, and also position themselves as the defenders of women over passages that sanction concubinage and wife-beating (Zúquete, 2017, p. 112). FRPs even come to the defense of Jews and homosexuals, pointing to how they are oppressed and murdered in Islamic countries (Zúquete, 2017, p. 109). Islam is considered to be not just a faith, but a political project with the goal of conquering the world and demanding its subservience. Muslims in Europe are made out to be a fifth column, a people who will act to bring about this end once given the chance (Betz & Johnson, 2017, pp. 74-75). Islam thereby threatens Europe's security and its ability to practice its own culture, as do the politically correct mainstream elites, who refuse to confront this uncomfortable truth.

Some of the parties include explicit condemnations of Islam within their manifestos. The FN, for example, has a line that translates to, "Defend the rights of women: fight against Islam that restricts their fundamental liberties" (Rassemblement National, 2017). UKIP calls for the burqa and niqab to be banned from public places, calling them barriers to integration and a security risk, presumably because they obscure one's identity (UKIP, 2017). The SD state on their website, "We will never give space to Islamism or any other extremism, this is a land of democracy and equality" (Sweden, 2020). The PVV takes the most radical stance against Islam. Nearly half of its one-page manifesto pledges to "De-Islamize the Netherlands," by calling for all mosques to be closed, public Islamic expressions to be prohibited, and the Quran to be banned (Wilders, 2017). Other parties avoid referencing Islam directly in their principle plat-

form, but their animosity toward the faith is still apparent, and none include language that condemns anti-Islamic sentiments.

Immigration Policies

All of the party manifestos oppose what they see as unfettered mass immigration into their countries. They are primarily opposed to immigration from the Islamic world, with Eastern Europeans often also being considered undesirables, albeit to a lesser degree—they are not mentioned specifically in any of the manifestos. The parties give a variety of interrelated justifications for opposing immigrants. Some of these arguments directly relate to culture, presenting them as a threat to national cohesion. They risk transforming traditionally homogeneous nation-states into multicultural societies, marred by unintegrated, hostile ghettos. For instance, the PS claims that immigration is responsible for "eroding important societal values, such as the respect for equality" (Finns Party, 2019). The DF says in its manifesto, "Denmark is not an immigrant-country and never has been. Thus we will not accept transformation to a multiethnic society" (Danish People's, 2002).

As a result of their incompatible values, immigrants are also said to be a security threat. Immigrants are more likely to be radicalized or spread extremism themselves, thereby causing terrorism. Additionally, they cause crime, especially crimes against women as a result of their backward cultures. The AfD claims that "in the wake of uncontrolled mass immigration there is a rise in crime figures" (Alternative, 2016). They might also be said to be disproportionately responsible for crime because they are poor, having come to the country as economic migrants with few productive skills. Other economic arguments against migrants claim that they are responsible for crumbling social welfare systems, like unemployment benefits and public healthcare, as they abuse these systems in large numbers. They are also said to lower wages via labor market competition, especially for blue collar work, and to raise the unemployment rate for native peoples, as they are willing to work for less and thereby steal jobs. The PS, for example, says, "Those costs [of mass immigration] have been—and are presently—huge.… This immigration is not bringing new taxpayers to Finland—or providing resources to face future challenges. These high costs fall on the taxpayer—regardless of whether the immigrant comes to Finland as an asylum-seeker or as a provider of cheap labour" (Finns Party, 2019).

Demographic concerns are also cited as a reason to resist mass migration. Native European birth rates have fallen below the replacement rate in recent decades, with the birth rates of immigrants in Europe typically being higher. These shifting demographics, with the native European population declining and the Muslim population increasing relative to it, present an existential threat to FRP national identity. There is a tangible fear among FRPs that immigration will be a means to Europe's Islamization, which would deprive Europeans, whether of this generation or the next, of their own cultures in their own homelands. These parties thus seek policies that promote the growth of traditional families as a solution to demographic problems, as an alternative

to immigration. The FPÖ's program states, "Austria is not a country of immigration. This is why we pursue a family policy centered around births" (Freedom Party, 2011).

Still, there are different nuances in each party's position on immigration. While all call for its overall reduction, some do support limited immigration via a reformed system. These parties generally call for immigration to be limited to those with certain technical skills and educated professionals. UKIP, for example, supports an Australian-style points-based immigration system, with questions related to a potential immigrant's values affecting their rating, rather than the outright cessation of immigration (UKIP, 2017, p. 33). The AfD similarly calls for legal immigration for skilled workers, referencing the Canadian model as an ideal immigration policy, although immigrants still have a responsibility to learn German and integrate into the local culture (Alternative, 2016). The FN is even more demanding, calling for immigrants to not only integrate, but assimilate into French culture (Rassemblement, 2017). Many, including the LN, want to make it more difficult for immigrants to obtain citizenship (Edwards, 2018). The PVV, meanwhile, calls for the immediate closure of their country's borders and an end to all immigration from Islamic countries (Wilders, 2017).

When it comes to refugees, most of the parties claim to support the humanitarian need to help legitimate refugees—a category that does not include economic migrants, who should be deported—thereby practicing some traditional liberal human rights values. The PVV is an exception, calling for the immediate closure of asylum centers and the withdrawal of asylum residence permits (Wilders, 2017). According to the FPÖ, "Humanity dictates that political asylum should be granted in our country for those persecuted for racist, religious, or political reasons, provided there is a need for such protection" (Freedom Party, 2011). However, FRPs also emphasize how help for refugees cannot compromise the security or prosperity of the nation, and therefore call for a reduction in the number of refugees settled in their country. The FPÖ, immediately after this humanitarian claim, seems to reference the Dublin Regulation rule that asylum seekers apply in the first EU country that they enter, stating that "those entering Austria from a safe third country should apply for asylum there" (Freedom Party, 2011). The AfD promotes the sponsorship of asylum shelters in foreign countries, like Turkey, by the EU and UN (Alternative, 2016). Some, like the SD, propose foreign policy solutions, albeit vague ones, calling to fix the problem of refugees at its source by working to end conflict and give developmental aid to countries like Syria (Sweden, 2020). This is so that refugees can be returned sooner; all of the parties expect refugees to return to their home countries as soon as the situation stabilizes.

Endorsement of Traditional and Liberal Values

As part of their aim of creating a stronger national identity, many parties feature policies that promote a more traditional approach to cultural and social issues. Education policies are one particular realm for this expression. They stress the importance of teaching the national language in education, as well as other traditional cultural

symbols and concepts, like national history. The FN is one example, calling for the promotion of the French language and history in schooling, including at the university level, and an end to the teaching of languages and cultures of origin for immigrant children (Rassemblement, 2017, pp. 15-16). They also call for the state to increase its sponsorship of the arts and local cultural organizations, including sports clubs (Rassemblement, 2017, p. 4). The FPÖ similarly supports a cultural education, saying that, "To enable people to evolve and develop fully in society we require spiritual education, the best possible training and further education, a guarantee of freedom in teaching and learning and equal social opportunities. To this end, scientific research and teaching, the development and opening up of the arts as well as teaching of the arts must be free" (Freedom Party, 2011). UKIP is more critical of the expansion of higher education, calling for the state to cease its support for programs that do not earn their students relevant, graduate-level careers, which it says are "politically motivated" and have "deceived and blighted a generation" (UKIP, 2017). The AfD also appears suspicious of modern education, supporting a prohibition on "political and ideological indoctrination in schools" and an end to the promotion of gender research, in order to restore academic freedoms (Alternative, 2016, pp. 51-53). Additionally, the AfD wants to alter how topics of German history are approached: "The current narrowing of the German culture of remembrance to the time of National Socialism should be opened in favor of a broader understanding of history, which also encompasses the positive, identity-establishing aspects of German history" (Alternative, 2016, p. 47).

Many parties find themselves attracted to Christianity. Such positions could be adopted in earnest, but they seem to be more opportunist, as a way to better contrast Islam on the front of religious identity (Zúquete, 2017. p. 106). Few include substantive policies meant to encourage religious participation; most of their pro-Christian expression consists in identifying Christianity as a source for many individualistic Western values. The FPÖ, for instance, describes their values as being rooted in "cultural Christianity," which, unlike a theocratic conception of Christianity, embraces the separation of church and state and religious freedoms for individuals (Freedom, 2011). The DF takes a stronger religious stance, as it declares that "the Danish Evangelical Lutheran Church is the church of the Danish people," and therefore wants to increase state financial support for the church, although it also says it maintains support for "ordinary religious freedom" (Danish People's, 2002). The FN, by contrast, emphasizes an unqualified dedication to secularism, wanting the words, "The Republic recognizes no community" to be enshrined in the constitution, and for religious expressions to be banned from public spaces (Rassemblement, 2017, p. 15). These differences could be attributed to the different popular and historical cultural attitudes toward religion in each country. At any rate, both secularism and Christianity are used as grounds for limiting Islamic teachings, practices, and expressions.

Most of the parties endorse policies intended to support the growth of families that could be construed as emerging from a fundamentalist conception of Christianity. However, considering how most of them are actually justified, it seems more likely

that these policies are motivated by a reaction to the demographics crisis, as a means of growing the nation, rather than by a conception of religious doctrine; although their relation to traditional right-wing positions is probably not insignificant. The AfD seeks to restrict access to abortion, in order to protect unborn life (Alternative, 2016, p. 43). The FN wants to replace homosexual marriage with a civil partnership and maintain a ban on surrogacy (Rassemblement, 2017, p. 13). The FPÖ wants do away with state recognition of homosexual partnerships entirely, idealizing the heterosexual nuclear family by saying, "The family, as a partnership between a man and a woman with common children, is the natural nucleus that holds a functioning society together" (Rassemblement, 2017, p. 13). By contrast, UKIP supports "true equality" for LGBT people, although this support is given alongside a condemnation of an implicitly pro-Islamic political correctness that allows "misogynistic and homophobic attitudes [to be] tolerated in the name of 'respecting cultural differences'" (UKIP, 2017, p. 13). Most parties also support economic incentives for families to produce children, including tax benefits and childcare resources.

When it comes to women's rights, FRPs often position themselves as the truest defenders of women, as the mainstream fails to protect them against violent immigrants and their repressive ideologies due to their elitist interests in multiculturalism and the supporting norms of political correctness. The linkage of immigration to crime and the erosion of societal values, like respect for equality, by the PS is accompanied by the statement that "children and women must be safe in Finland" (Finns Party, 2019, p. 5). Some parties are more consistent in their support for women's equality than others. UKIP, for example, is critical of "lad culture" that tends to treat women as sex objects, as well as Islam (UKIP, 2017, p. 22). The FN endorses a plan for equal pay, job security, and social security for men and women, though it also stands against affirmative action in the name of meritocracy (Rassemblement, 2017, p. 15). The FPÖ also supports ensuring equal opportunities and pay for men and women, but not to the extent of enforcing any sort of sex-based affirmative action, as they say that "statistical inequalities caused by a variety of factors cannot be evened out by wronging individual people" (Freedom, 2011). Both the FPÖ and the AfD also support compensating individuals for time spent rearing children or caring for elderly or disabled relatives via social security and pension systems, a traditionally progressive policy (Alternative, 2016, pp. 35-36).

The parties often seek to support traditional values by offering support to traditional and culturally significant industries, too. The FN stresses the importance of the traditional family farm in French culture, and wants to create economic incentives for young people to take up farming (Rassemblement, 2017, p. 21). UKIP idealizes small fishing and coastal communities and calls for their revitalization, particularly through deregulation by leaving the Common Fisheries Policy (UKIP, 2019, p. 9). Multiple parties, including the DF, venerate manual labor and blue-collar work—though not typically to the derision of entrepreneurship or innovative white-collar work—and support the expansion of trade schools and apprenticeships (Danish People's, 2002). The parties are also supportive of small and medium-sized businesses, seeking to sup-

port them economically, while generally being somewhat more suspicious of larger businesses, especially multinational corporations.

The parties appear to support civil liberties for their cultural nation, per their importance in Western tradition, tracing their roots to the Enlightenment and the Revolutions of 1848. Free speech and democratic decision-making in particular are emphasized. The PS says that "the freedom of speech is an important principle and value of a democratic society.… Political solutions must not distort the truth or force silence" (Finns Party, 2018). FRPs also call for increased academic freedom, for guaranteed freedom of thought and freedom from an ideologically paternalistic education, probably seeking to combat an idea of a leftist-dominated academia. The FPÖ describes their conception of freedom as "rooted in an idealistic belief where people are not tied down by their material needs," whereby the freedom of the individual is only limited by the freedom of other citizens and the laws necessary to maintain order (Freedom, 2011).

Herein lies the illiberal element of FRP liberalism. FRPs often phrase their stances in liberal terms, appealing to the ideal of freedom, but this freedom comes with caveats that substantially undermine it. Continuing the FPÖ's example, they mention how a freedom to practice religion presupposes a freedom to not be exposed to religious doctrines (Freedom, 2011, p. 5). But to what extent does this entail? If a freedom from religious doctrine means freedom from being coerced to follow a religion, then this would be an undeniably liberal conception. If a freedom from religion entails the inability of others to adhere to practices mandated by their religion that only directly affect them, such as wearing a burqa in public, then this conception would be fairly illiberal, especially if the principle is applied unequally to different religious groups. Indeed, the FPÖ has called for a ban on the burqa, a call that the governing coalition acceded to in 2017 in an effort to stem the FPÖ's rising popular support (Oltermann, 2017). In a similar vein, the FN claims to support parental rights to choose a private education for their children, but also wants to ensure that private schooling aligns more with the values of the Republic, which in practice suggests the banning Islamic private schools (Rassemblement, 2017, p. 4). The AfD's simultaneous sponsorship of academic freedoms and wish to cease promoting certain viewpoints in schooling, namely critical gender studies which they say "do not meet the claim of reputable research," also suggests a more limited view of freedom (Alternative, 2016, pp. 35-35).

A similar tension can be seen in FRP's calls for direct democracy referenda. Multiple FRPs propose that citizens have the ability to demand controversial legislation, including treaties, be put to a referendum, and for citizens to be able to start their own legislative initiatives via a similar system. While such direct democracy reforms may be desirable in some contexts, their unrestrained use risks creating rule by a tyranny of the majority. Direct democracy could be used as a way to justify and legitimize abridging the rights of ethnic or religious minorities, or to prevent the state from acting to protect these minorities.

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Liberties are also weighed against other practical and cultural considerations. Within the nation, one may be free to do as they choose, but that does not abrogate their responsibility to choose to support the nation. While liberties might be said to be fundamental, it is also said that they cannot exist without the rule of law, imposing another limit. The SD's website reads, "We feel that rights should be connected to duties, that first you do your duty and then you demand your right" (Sweden, 2020). The FPÖ similarly says, "Our country is a community of citizens that have particular rights and obligations. The rights of our citizens include the right to vote, the right to proper education and the right to help from the community when in need. The obligations include solidarity with fellow citizens, the payment of contributions to preserve public functions, and personal commitments to maintain internal and external security and the fabric of society" (Freedom, 2011. p.7).

Freedom for FRPs does not seem to be about expanding the typical conception of freedom, in an effort to seek broader, more absolute freedoms for individuals. Rather, it is about shifting the window of acceptable views, enabling the expression of certain beliefs that have been condemned by the mainstream, such as critiques of Islam and immigration, while making the expression of other views deemed tolerable by the mainstream, like Islamic reverence, unacceptable on the grounds of their incompatibility with a free and safe Western society. It is unclear how narrow the window of acceptable views desired by FRPs actually is. They might only seek to limit supposedly expressions that they believe present a serious risk to the nation, but this idea may or may not in fact extend to enforcing a strict adherence to a single political ideology among the nation, rather than allowing for a true diversity of views and pluralistic democracy.

Law, Order, Defense, and Anti-Corruption Reforms

The FRP parties of Europe are closely aligned on issues of the rule of law. They call for pre-existing laws to be enforced more strictly and carry harsher penalties. UKIP, for instance, calls for the rigorous enforcement of legislation regarding drugs (UKIP, 2017, p. 22). The DF calls for rapid conviction and punishment for crimes (Danish People's, 2002). The AfD wants tighter laws, harsher punishments, and fewer procedural protections for accused criminals (Alternative, 2016, p. 25). The FN even wants to take away social benefits for parents of recidivist minors (Rassemblement, 2017, p. 5). Some appear a bit more liberal: the FPÖ stresses how there must be considerable distinctions between violent and property crimes, and states that they categorically reject the death penalty (Freedom, 2011, p. 13). When criminals are foreign nationals, they typically call for their deportation, and when their own citizens commit treasonous acts, namely becoming jihadists and declaring their allegiance to some foreign terror organization, many of them call for these people to be stripped of their citizenship (Rassemblement, 2017, p. 6). They also call for the illegalization of independent arbitration based on Sharia Law, when legal in their countries (UKIP, 2017, p. 35).

Many seem to want to make order and deference to authority more of a cultural emphasis, reflected in their education policies. The Sweden Democrats want schooling "that prioritizes knowledge and order" (Sweden, 2020). The AfD wants to increase the ability of schools to discipline students, in order to combat truancy and bullying. The FN wants mandated school uniforms, and to restore the authority of and respect for teachers in school (Rassemblement, 2017, p. 16).

FRPs call for significant expansions of the police forces, intelligence services, and prison systems. They want to reduce or remove procedural safeguards that are meant to protect against abuse by these organizations as a means of making them more efficient. UKIP, for instance, wants to reinstate stop and search powers for the police, and reduce their paperwork burden (UKIP, 2017. p. 40). They also want to specifically expand anti-terrorism and anti-radicalization resources, though they often only care about Islamic extremism. Matteo Salvini, for example, was quoted after the Christchurch shooting that, "The only extremism that merits attention [in Italy] is the Islamic kind" (Salvini, 2019). Geert Wilders in his manifesto even calls for the "preventive detention of radical Muslims," alongside "a lot of extra money for defense and police" (Wilders, 2017).

FRPs also typically want to expand and increase spending on the military. Where conscription is a policy, they usually support it, as in the case of the PS (Finns Party, 2019). The same can be said for FPÖ, who also notes that they oppose expanding conscription to include women (Freedom, 2011, p. 13). The FN wants to gradually reestablish military service in France with a mandatory minimum of three months, and they want to increase spending to 3% of GDP (Rassemblement, 2017, p. 19). The AfD wants to reinstate compulsory service and strengthen the Bundeswehr, too (Alternative, 2016, pp. 30-31). The DF says that Denmark "should make the necessary contributions" to NATO (Danish People's, 2002).

The parties promote a number of reforms that are phrased as a means of mending the corrupt or incompetent activities of the mainstream elites. This entails streamlining the bureaucracy, cutting wasteful programs, and eliminating vanity projects. UKIP identifies a high-speed rail project as the wasteful pursuit of prior governments (UKIP, 2017, p. 10). They also want to eliminate the House of Lords, seeing it as a useless body of government whose only purpose is to fund elite activities with taxpayer money (UKIP, 2017, p. 58). The PS says that the education, training, guidance, and social integration programs for migrants pursued by the other parties are ineffective and wasteful, and that "the throwing away of money and resources must stop" (Finns Party, 2019, p.5). In order to reduce administrative costs, the FN wants to reduce the size of the French Parliament by over 400 members between both houses, and to reduce the number of levels of government from six to three: communes, departements, and états (Rassemblement, 2017, p. 3). The AfD also calls for a smaller government, arguing, "Government should serve its citizens, and not vice versa. Therefore, only lean government is good government. Government should merely provide a framework within which its citizens can thrive" (Alternative, 2016, p. 8). FRPs seem to

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endorse the view that, outside of a large police force, military, and intelligence program, smaller government is better, as larger governments are necessarily wasteful and corrupt. Some parties also identify large corporations, especially multinationals, as a source of corruption. The FN wants to increase sanctions against corporate executives that commit fraud to the detriment of consumers, and to fight tax evasion by taxing the operations of multinational corporations in France more dutifully (Rassemblement, 2017, pp. 9-12).

European and Foreign Policies

All of the parties maintain at least a soft Eurosceptic position in regard to the European Union. Many call for a popular referendum on EU membership, with some directly calling for their country's withdrawal, unless they are able to achieve certain reforms. The AfD, for example, "are in favour of returning the European Union to an economic union based on shared interests, and consisting of sovereign, but loosely connected nation states," and promote withdrawal if this change is not realized (Alternative, 2016, p.15). Wilders' manifesto includes the line, "The Netherlands independent again. Leave the EU" (Wilders, 2017). The FPÖ wants any treaty that would fundamentally alter the constitution, including EU law, to be subjected to a binding referendum, and rejects "any artificial synchronisation of the diverse European languages and cultures by means of forced multiculturalism, globalisation and mass immigration" (Freedom, 2011, p. 17).

There are a few reasons for this Euroscepticism. First, the EU in its current form is a supranational organization that violates national sovereignty, an ideal stressed by FRPs on the grounds that the only legitimate rulership of a nation comes from within the nation itself. Furthermore, the people subjected to the EU's rule are only given limited decision-making power over its policies via the European Parliament, whose powers are meager compared to the elitist, technocratic, unelected Commission. In many ways, the EU in its current form is an FRP nightmare: it is a multinational conglomerate led by an expansive bureaucracy. The EU presents a particular challenge to FRP ambitions insofar as it denies sovereignty to states in the area most salient to FRPs: borders. The common labor market denies nations the ability to control who may or may not coexist with them. Some parties also argue that the EU is not in their country's economic interests. UKIP says that leaving the EU would allow it to independently pursue beneficial trade agreements with other entities and supra-national bodies (UKIP, 2017, p. 7). The FN wishes to support French enterprises via their own subsidies and selective protectionist measures, which would require leaving the EU (Rassemblement, 2017, pp. 7-21). Meanwhile, the LN wishes to leave the eurozone to regain sovereignty over monetary policy (Edwards, 2018).

However, this does not mean that the parties reject a common European identity. All of them do in fact embrace a loose conception of a common European identity, based on cultural, religious, and historical bonds among European nation-states—except perhaps for UKIP, who might favor more of an Atlanticist identity, though

they would still accept a broader common Western tradition with Europeans (Vasilo-poulou, 2017, p. 127). All of these parties, per this identity, thereby agree that some cooperation is in their mutual interest (Vasilopoulou, 2017, p. 130). There is disagree-ment, however, on the route to a more ideal form of cooperation, and the form that this cooperation should take. Sofia Vasilopoulou identifies three general patterns in the Eurosceptic positions of FRPs. The rejecting position is a principled opposition to integration. Mutual trade and military alliances may be desirable, but common in-stitutions to facilitate these relationships represent an undesirable loss of sovereignty. The conditional position accepts that some integration is necessary, but seeks to with-draw from the current system of the EU, as it goes too far. The compromising posi-tion, meanwhile, also accepts some integration, and additionally thinks that reform of the EU is possible, by working within it (Vasilopoulou, 2017, pp. 128-129).

An ideal EU for most FRPs would probably look like some sort of loose confederal system (Zaslove, 2008, p. 186). Political integration would be limited. There would be no European Court of Justice to tell states which laws they may or may not cre-ate for themselves, nor would there be any decision-making body that promulgated international legislation without the unanimous consent of the member-states; and if this sort of legislation did exist, it would probably have to pass via referendum in each state. They would probably trade with each other, but some might break from the ideal of free trade to support their own industries. At a minimum, non-tariff barriers, especially borders, would be maintained. The primary purpose of a FRP EU would probably be to stand in cultural solidarity against larger, existential threats to Euro-pean culture, like Islam. If a substantial threat emerged, they would likely coordinate a response out of a need for security, but afterwards, they would probably return to their more particular interests.

Outside of Europe, FRP foreign policies diverge significantly, seemingly as a result of desires to defend particular national interests. Many are skeptical of the United States' hegemonic leadership of the world due to its conduct during the Kosovo War and the Iraq War, its support for neoliberal supranationalism, and its melting-pot culture (Zúquete, 2017, p. 106). UKIP says it values the special relationship between the US and UK, but stresses that it opposed the Iraq War and wants a stronger, more independent foreign policy that promotes closer ties with the countries of the British Commonwealth and reaffirms British dominion over the Falklands and Gibraltar. (UKIP, 2017, pp. 42-43). The FN similarly wishes to strengthen ties between France and francophone Africa, via co-development programs in the realm of education, ag-riculture, defense, and security (Rassemblement, 2017, p. 19). It also wants France to withdraw its forces from NATO's integrated command structure, as it does not want the country to be drawn into foreign wars that are not their own (Rassemblement, 2017, p. 19).

Some of these states seek a closer relationship with Russia. UKIP sees Russia as an important ally in the struggle against Islamic terror, although they do not see a way to work with Russia until it respects the territorial sovereignty of other countries (UKIP,

2017, p. 43). By contrast, the PS takes a particularly anti-Russian stance; it sees the security against Russia provided by the EU as the primary justification for Finland's place in the EU (Finns Party, 2019). It feels that Finland is fairly isolated from the rest of Europe, and that France and Germany hold all of the influence in the EU, mitigating their say in the system. They would prefer a closer relationship with the Nordic countries, on the basis of their closer cultural similarities (Finns Party, 2019).

The AfD wants Germany to take a more active role in world affairs, calling for reforms to the structure of NATO and the UN that would give Germany more of a leading role (Alternative, 2016, pp. 28-29). Meanwhile, the FPÖ seeks to maintain Austrian neutrality, especially in regard to alliances dominated by non-European states, seeing neutrality as the best way to avoid conflict and keep its nation secure (Freedom, 2011, p. 3). It does also, however, seek to diplomatically support the interests of German minorities in the former Habsburg Empire, and denounces their expulsion from Czechia and Yugoslavia after World War II (Freedom, 2011, p. 3).

Economic Programs

The parties also take fairly diverse stances on economic issues, although they seem to agree that the economy should primarily serve the nation, and thereby support policies that encourage the hiring of nationals, discourage the outsourcing of jobs, and restrict access to social benefits to members of the nation, a concept known as welfare chauvinism. Some of the parties, like the AfD, UKIP, and FPÖ, embrace neoliberal economics, deregulation, and free trade, either because they see these systems as the best way to produce wealth for the nation, or because they consider them to be the freest economic system for the nation. The AfD says that "free market competition produces the best economic results," and therefore promotes "key principles [of] ownership, personal responsibility, and free pricing" in the economy (Alternative, 2016, p. 66). UKIP supports free trade so long as agreements are transparent and do not come with "unreasonable demands," as, "Post-Brexit, UKIP's aim is to establish the UK on the world market as a low tax, low regulation economy" (UKIP, 2017, p. 49). The FN, meanwhile, supports a far more interventionist economic program. It calls for the state to maintain control of state companies, support national champions and emerging industries through cooperation, subsidy, and selective procurement, and engage in "intelligent protectionism" to help shield vulnerable French businesses from competition (Rassemblement, 2017, pp. 7-21).

Regardless of overarching economic programs, however, all of the FRPs seek to maintain and protect popular social welfare programs, although the PS is the only one that has consistently promoted use of the welfare system to substantially impact wealth inequality within the nation (Arter, 2010, pp. 500-501). UKIP, for instance, criticizes efforts by the other parties to secretly privatize the NHS using PFI contracts, and even relaxes its anti-immigration language, guaranteeing the right of EU nationals to work in health and social care due to labor shortages in these sectors (UKIP, 2017, pp. 16-20). Simultaneously, these parties generally want to cut taxes. Some seek a more

progressive taxation system, with cuts going towards lower- or middle-income groups and small to medium sized businesses, while others, like the LN, seek a flat tax (Edwards, 2018). The parties thus seem to reflect a belief that the national budget, social benefits, and healthcare systems are only overwhelmed because they are mismanaged, abused by elites, and drained by foreigners. Once this rot is removed from the system, they suggest that it will function flawlessly, as they are more fiscally capable and responsible by virtue of their legitimate interest in serving the people, not themselves.

What They Truly Want and Why: Some Ideological Commonalities

Considering the policies forwarded by Western European FRPs, the degree to which they are detailed and emphasized, and the language used to justify them, it is possible to sketch out a rough ideology shared by them, one that is more detailed than their definitional parameters. Herein lies the theoretical basis for FRP policies: the ends that they seek and the means to these ends, the reasons why, according to the parties, their policies will better the country.

Above all else, national cohesion is essential. National cohesion in this context, different from a kind of essentialist racial purity, is the degree to which members of a delineated nation agree on similar or compatible cultural norms and values, which thereby enable mutual understanding and cooperation. National cohesion is construed to lie at the base of all other societal issues considered to be important, whether it's the efficiency of systems, crime and safety, or issues of wealth. Cohesion might be an end in and of itself, but more importantly, it is a nearly universal means to all desirable ends. When national cohesion is high, people feel a sense of responsibility toward each other, and seek to support each other out of a feeling of solidarity. Employment will go up, the people will work harder, the government will be more efficient, the rich will be more charitable of their own volition, crime will go down, people will take care of the environment around them, it will be easier for people to raise children and pursue their passions, and people will be happy, living in harmony. The inverse happens when national cohesion is low: people fail to trust and feel responsible toward each other and thus seek individual ends to each other's detriment, thereby degenerating society on all fronts.

A few parties seem to express this idea explicitly. The FPÖ stresses the need for a "genuine community of solidarity" as an obligation of citizens and a prerequisite for substantial freedom (Freedom, 2011, p. 7). In the beginning of the FN manifesto, Marine Le Pen says that, above all else, she wants to protect the French national identity, independence, unity of the French, social justice, and prosperity for all, while her globalist competitors seek less cohesion among the French. The PS says that it prioritizes help to Finns that are in need out of a principle of "domestic solidarity," and that "The party's 'world view' is to value individuality that enhances a person's contribution as a member of a family and a community, and the community that enhances the

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worth of the individual" (Rassemblement, 2017, p. 2). The SD "want a Sweden where we together rejoice in our success and together help out in adversity" (Sweden, 2020).

National delineations are necessary to ensure national cohesion. The nation exists only so long as it is exclusionary, so long as there are people that exist outside of the nation. A nation need not be based entirely in blood or ethnicity—some ethnic diversity might even be embraced as a source of cultural enrichment—but it needs to have clear, coherent boundaries, otherwise it ceases to be a meaningful identity (Zaslove, 2008, p. 179). FRPs define the nation on cultural grounds, establishing which beliefs, attitudes, and symbols are definitive or permissible on the basis of some historical continuity and the compatibility of their content. Still, the cultural nation can be something of an ambiguous notion, something better felt and experienced than described. The PS, for instance, observes that, "History does not repeat itself, but a Finn will nevertheless know what it does mean to be Finnish—and what it does not. To be 'Finnish' is to recognize 'something' in the spirit…. No single tradition, attitude, opinion, or style is the core of Finnish culture—but it is the combination of language, history, customs, values, and symbols. Finns feel Finland in their heart and soul" (Finns Party, 2018). The nation is therefore the only legitimate basis for sovereignty: only a member of the nation can lead the nation, as only they understand the nation and have its interests at heart. FRP parties therefore value and endorse policies insofar as they will strengthen the national culture per their conception of it, or will protect the national culture from threats. They tend to construe non-integrated immigrants, Muslims, and the corrupt political elite as out-groups, differentiated from the nation of the common folk.

FRPs reject the idea of a universal, human nation as meaningless. For one, there needs to be a common culture among the nation, common symbols whose meanings are agreed upon (Zaslove, 2008, p. 179). If a country features multiple cultural nations, the nations are bound to self-segregate and diverge, undermining that country's cohesion and the capacity for consistent government decision-making. Additionally, there are some beliefs that are fundamentally incompatible. The Quran's passages that endorse the veiling and beating of women, for instance, are incompatible with Western conceptions of women's rights. Such incompatible beliefs cannot be tolerated within the nation's borders, as tolerance is merely the weakening of the nation's own convictions, a vulnerability to cohesion that can serve as the basis for its destruction. Perhaps a global culture could emerge, but FRPs appear hostile to this idea, either because it could only come about via some foreign cultural imposition, not organically, or because they genuinely value cultural diversity on an international scale. They do sometimes criticize multiculturalism and globalization by arguing that blending cultures destroys them and their admirable differences, making segregation a necessity for their survival—though this argument might just be clever positioning to defend against accusations of xenophobia (Betz & Johnson, 2017, p. 72).

Although they might have a preference for relative cultural stability over dynamism, this does not mean that they are entirely resistant to change, or that they are com-

mitted to maintaining the cultural status quo if it includes ideas that it considers self-defeating. Some cultures might be naturally superior to others. A xenophilic culture that is enamored with other cultures, such that it invites the members of another culture to live with it and displays a preference for them over its own members, is liable to destroy itself and is therefore inferior. FRPs thus might seek cultural change themselves, but within bounds and as necessary. As for norms that do not present a threat to the culture's existence, FRPs might accept or even embrace some diversity, but only as long as this diversity genuinely enriches the culture and does not introduce serious contradictions that threaten a culture's coherence. The FPÖ, for example, recognizes that "The indigenous ethnic groups of the Burgenland Croats, Slovenians, Hungarians, Czechs, Slovaks and the Roma are historical minorities in our country and as such both enrich and are an integral part of Austria and our nation" (Freedom, 2011, p. 5). Cultural change should also come from within the culture, as change due to foreign influences is unnatural and risks reducing distinctions between cultures, making them less exclusionary and meaningful.

Security assumes another place of importance, seemingly as an end in and of itself. Security is naturally important to protecting the lives and wellbeing of a people and their culture. There seem to be four tiers to security. The first has to do with the state's international security, the ability of the state to ensure that other states do not present a threat, which FRPs support via their defense policies. The second has to do with protecting the nation from clear outsiders that came to and reside within the country, namely non-integrated immigrants, who feel no solidarity with the nation and might seek to destroy it, and are therefore responsible for terrorism and crime. Restrictive FRP immigration policies contribute to this kind of security. The third has to do with protecting the nation from people that were once members of it, but have essentially abandoned it through some corruption or degeneration by failing to uphold their duties to other members, and thus pose a threat to it. This group might include mainstream elites and delinquents, like drug users. It may or may not include those that commit crimes in the name of a vigilante quest to defend the nation, by harassing or terrorizing resident out-groups. FRPs support this tier via their strict law and order policies, their anti-corruption reforms, their support for traditional values, which seek to strengthen the nation against degeneration, and their populist rhetoric, which outs the mainstream elites as the corrupt traitors that they are thought to be. The fourth tier has to do with existential threats to the nation, nonhuman threats that would ensure its destruction in the long-term, making its members and their children vulnerable to losing their nation. Support for the growth of families counters one such threat, namely the demographics crisis.

Security is intimately intertwined with national cohesion. A form of government that was authoritarian toward but accepted by its own people may increase the security of both, but in the West, such a government might struggle to find acceptance due to its incompatibility with longstanding Western values, and would thereby disrupt cohesion, making authoritarianism insecure. This could be why FRPs remain some distance from the extreme right: attempting totalitarianism would currently be coun-

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terproductive. If FRPs genuinely seek security above other ends, they might try to gradually build up a cultural acceptance of authoritarianism, but security concerns might also legitimately compete with other ends, or be merely a means to other ends itself. For instance, cultural cohesion could face challenges in an insecure environment. If a nation cannot physically protect itself from outsiders, who could corrupt a portion of the nation's members with their own ideas or present barriers to interaction between the nation's members, it would be difficult for it to maintain high cohesion in the long term. Security and cohesion are thus necessary—though not sufficient—for each other.

The actual practice of the contents of culture occupies a third place of importance, and could also constitute an end in and of itself. FRPs seek to execute policies that support traditional cultural norms, as long as the practice of these norms does not substantially threaten security or cohesion. Across Western Europe, this means protecting—or at least being perceived to protect—liberal freedoms, like free speech. It also means maintaining democracy and the popular will as the legitimate basis for governance. Other cultural elements particular to certain countries, like religious traditions, inform policy too. However, only members of the nation may enjoy these freedoms in full. People may be free to practice whichever religion they choose, so long as that religion is not incompatible with the national culture or a threat to national cohesion. Anyone may say hateful things about resident out-groups or foreign cultures, but if a member of a resident out-group says something hateful about the nation or national culture, they are likely to encounter restriction or retribution.

Just as with security, however, it is difficult to discern whether the practice of culture is an end in and of itself, or a means to other ends. The practice of culture is also intertwined with cohesion: an unpracticed or unshared culture would not be a culture, and active practice strengthens boundaries necessary for definition, and thereby cohesion. The practice of culture thus contributes to security, as it makes it easier to identify outsiders and strengthens internal solidarity. It would be almost impossible for an individual to coexist with others without some common culture, as there would be an inability to communicate and mutual mistrust per the Hobbesian state of nature. But security is also necessary to the practice of culture—if some threat suppressed cultural practices, the culture would likely die out over time. FRPs could view their cultural practices, or particular practices, as intrinsically good and have a wish to embrace them to the greatest extent possible, but recognize a need to safeguard them from corruptive influences and threats to livelihood—much like how extremist parties in post-World War II Germany were banned, placing limits on popular participation in order to ensure the survival of democracy. FRPs could conceive of a need to limit freedoms in order to be able to enjoy their cultures at all in the long term, making illiberal measures a security-based means to enjoy an otherwise liberal culture.

Determining the true motivations and potential trajectories of FRPs if given long-term power requires consideration regarding which of these ideals are actually held as ends. Unfortunately, any of these three ideals could be ends in and of themselves. Co-

hesion might be intrinsically good because it has a positive epistemic effect: a shared culture allows individuals to have knowledge of each other, and knowledge might be intrinsically good. Security could be intrinsically good if self-preservation is considered to be intrinsically good, whether at the collective or individual level. Cultural practices could be intrinsically good via the logic of a supporting code of morality. It does not seem that the pursuit of cohesion is realistically mutually exclusive with the pursuit of either culture or security at the level of societal organization, as the pursuit of either without cohesion would entail a rejection of society in favor of an individual way of living. Therefore, whether or not it is an end is a fairly irrelevant question for the purpose of discerning motivation and predicting trajectory. The pursuit of culture and the pursuit of security, however, might conflict. Total security might require the cessation of certain cultural practices, while a total commitment to cultural practice might entail self-destruction. The question of ends thus essentially reduces to a question of whether one's life is considered to be worth living intrinsically, without regard to cultural contents; worth living only so long as particular cultural practices persist, even if they cannot be presently practiced; or worth living intrinsically, but with particular cultural contents enhancing it significantly.

In the first case, culture is meaningless except as a means of protecting the individual, and perhaps their legacy. If they gained power, FRPs would be more likely to shift government in an authoritarian direction once they convince society that this change is worthwhile, assuming that they consider this type of government and illiberal norms to be inherently more secure. They would be neo-fascist authoritarians at heart, prompted by fascism's unpopularity to adopt their current opportunistic positions.

In the second case, security is only tolerated as a necessary restriction on the practice of a national culture in order to ensure its survival. They would not move society in much more of an authoritarian direction than they are currently proposing, as the further abrogation of certain practices in the name of mitigating risk would be abhorrent. If FRPs achieved a satisfactory degree of national cohesion and were guaranteed the security of their society from international threats, they might even lower some of the restrictions on freedoms that they are currently proposing and reduce the state's role in society. They would essentially be insecure culturalist soft-libertarians or traditionalists, driven by xenophobic fears that their way of life is under siege to enact authoritarian measures for its preservation.

If both security and cultural practices are equal intrinsic ends, however, then it is more difficult to judge where the parties might move or compromise. Their actual policies in the long term would probably remain close to their current proposals. They would increase governmental power somewhat and exclude outsiders in order to protect the core nation, but they would not seek to fundamentally alter the culture more than it needs to be altered in order to protect itself, making their current character an earnest and relatively longstanding one.

Considering the diverse backgrounds of these parties, it is difficult to say where they truly lie as a group without involving some bias. Individual parties and members likely vary. Their current proposals could be interpreted to support either culture or security as an end due to their mutual entanglement, as both are stressed significantly. The fact that immigration seems to be their primary issue does not resolve this problem. Maintaining a somewhat ambiguous position on their true goals is probably to their advantage, as it allows them to attract a larger, more diverse group of voters, all of whom think that the parties are really fighting for their interests.

It is also possible that the parties consider other ends to be important. Some do advance a comprehensive economic program, though others only offer more paltry economic solutions. The same can be said for their designs for social welfare programs. If issues of economic efficiency and wealth inequality are considered to be worthwhile ends, then it appears to be assumed that national cohesion will naturally lead to them, as the proposed policies for these goals typically involve ousting corrupt elites and immigrants. Economics could be intertwined with security as a means or end—a strong industry is a prerequisite for a strong military, and an economy is inefficient without law and order to protect the accumulation of wealth—and thereby could be intertwined with cultural practice. However, it seems that, in some cases, FRPs clearly prefer supporting cultural tradition over economic efficiency, as in the case of their support for traditional but uneconomic industries. This does not imply that security must be less important than culture, as culture could simply be perceived as a more vital means to security than economics. Wealth inequality could also be a means or an end, as FRPs do support transfer payments. Wealth inequality might be intertwined with social cohesion, as people would be more likely to hold similar interests and concerns if they possessed similar levels of wealth, and people would be more likely to voluntarily help those that are worse off if they felt a sense of solidarity with them. It seems unlikely that wealth inequality is the ultimate end of FRP policy, though, as FRPs consider inequality to be a natural fact of life (Mudde, 2017, p. 5). If either of these are ends, they therefore appear to be of secondary importance.

Why They Are Here and Where They Will Go: Reasons for Support and Future Prospects

There are multiple theories that have been offered to explain why FRP parties have enjoyed the success that they have. Some theories seek to explain how a particular party rose within its national context, aided by certain cultural norms that gave credence to the far right or populism, but such explanations are unsatisfactory. They fail to explain why the phenomenon of FRPs is as widespread as it is.

One popular explanation tends to be that FRP party supporters are the so-called losers of globalization. The traditional work of these people has been made obsolete by technological development, made uncompetitive by free trade, or outsourced overseas, where labor is cheaper, causing resentment toward the mainstream system, free trade, and white-collar elites, who profit at their expense (Margalit, 2019, p. 152). Addition-

ally, they perceive immigrants to be a source of economic distress, as immigrants are thought to be taking their jobs, or jobs that they could have taken, for significantly lower wages. While they have suffered under these changes, the political mainstream has ignored their plight, having refused to enact policies that would redistribute the overall societal benefits of free trade and immigration to ensure the wellbeing of these people. Together, these animosities, insecurities, and resentments produce feelings of xenophobia and anti-establishmentarianism, fueling support for far-right ideology, and thus the successful parties. They were further inflamed by the financial crises of the late 2000s, as the credibility of mainstream economic policymakers was damaged and austerity policies provided another basis for economic anxiety (Margalit, 2019, p. 152).

Recent academic scrutiny, however, has revealed that these theories only posses modest explanatory power (Margalit, 2019, p. 153). If the parties succeeded among the losers of globalization, then there should be a stronger pattern of support among lower class and unemployed populations—but these trends are fairly weak. Furthermore, no FRP party emerged in Ireland, Spain, or Portugal in the wake of the financial crises of the late 2000s, even though these countries were some of the hardest hit; instead, a leftist populist party, Podemos, emerged in Spain, while in Greece, Syriza, another populist left party, gained power in government (Lochocki, 2018, p. 22). More detailed analyses of voter attitudes and preferences have revealed that, while macroeconomic factors like jobs lost to trade do play a role, they fail to explain the vast majority of the FRP vote (Margalit, 2019, pp. 156-157). One study analyzing survey data from 24 countries between 2002 and 2014 found that economic insecurities and their indirect effects on political trust and immigration attitudes were only associated with 4.3 - 7.4% of the overall FRP vote (Margalit, 2019, p. 158). Another suggested that people are more likely to oppose immigration when it is framed in the context of shifting population demographics, rather than more purely economic contexts (Margalit, 2019, p. 163). There appears to be increasing evidence that FRP voters oppose immigration for primarily cultural reasons, such as the loss of social status by less-educated natives due to growing ethnic diversity, urbanization, and access to higher education, which have contributed to the displacement of traditional values by a greater acceptance of more diverse lifestyles, religions, and cultures, while evidence pointing to economic motivations has been challenged by significant scrutiny (Margalit, 2019, p. 165).

Another stronger explanation deals with the supply side of political parties. Timo Lochocki explains how, across multiple national contexts, the movements of mainstream parties created room in the electorate for FRPs to emerge, due to how they framed national discourse. Essentially, FRPs are the unintended result of mainstream parties attempting to tip the balance of the manageable diversity within their movements in their favor (Margalit, 2019, p. 154). After suffering from some crisis that decreases its support, a center-right party begins to politicize right-wing identity politics—xenophobia—to mobilize conservative voters. This makes issues of immigration salient. Due to movements on the center-left that make the social democrats successful, the center-right drops its right-wing messaging to join a liberal discourse on identity poli-

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tics. The right-wing identity issues, however, remain salient among voters. Dissatisfied that the center-right is no longer appealing to their interests—interests that they had once mobilized—they turn to FRPs, who provide the best political messaging that appeals to these interests (Margalit, 2019, pp. 155-158). These political movements are still only necessary conditions, however.

There are also some modern developments that might be considered permissive or contributing factors. De-industrialization and declining religious observance in the West dating back to the 1960s likely weakened the traditional bases of support for both the center-left and center-right, creating room for alternative politics, especially as a centrist consensus developed around a cosmopolitan, business-friendly vision of Europe (Mudde, 2016, pp. 26-27). The emergence of the internet has caused mainstream media to lose its traditional role as a gatekeeper of information (Mudde, 2016, p. 27). Declining subscriptions and ad-revenue-based income models have forced mainstream media to produce sensationalized stories, which could contribute to distrust of the mainstream. Alternative media, which could be more likely to support FRPs than the mainstream, might have simultaneously found greater success in reaching audiences in recent years due to the popularization of the internet (Mudde, 2016, p. 27).

International currents could also have an effect. The ways in which FRPs frame conflict with Islam, as some longstanding conflict between Europe and the Near East, appear reminiscent of Samuel Huntington's "Clash of Civilizations" thesis, which argued that distinctions based on historical, cultural and religious identities would become more important in shaping international relations after the Cold War, as political ideological divisions had been rendered less meaningful by the fall of communism (Huntington, 2017, pp. 34-35). Perhaps citizens of European countries are looking for new answers to questions about identity since this collapse of left-right distinctions as a basis for difference, and have discovered the cultural issues promoted by FRPs to be compelling (Betz & Johnson, 2017, p. 72). Still, an FRP movement framing conflict and identity in this way is not necessarily indicative of an entire state moving in that direction. There may be more compelling evidence, though, in the form of Eurobarometer polling, which has consistently seen EU citizens place immigration as their largest concern in recent years, although it is beginning to lose ground to climate change (European Commission, 2019).

There is considerable debate surrounding the future prospects of FRP parties. When they originally emerged as a considerable political force, many thought they would be a flash in the pan, a radical movement that had nowhere to go and would quickly die (Betz & Johnson, 2017, p. 68). For some parties, such a collapse in the near future might still be probable. The AfD, for example, could be torn apart by internal divisions. The PVV also appears to be vulnerable, facing new challenges within the far right from the Forum for Democracy party.

Overall, however, many of these parties seem to have significant staying power. Some have characterized them as single-issue parties focused on immigration, but perhaps the Greens are a more apt compassion. Both FRPs and Green parties appear to place the bulk of their focus on narrow popular issues—immigration and environmental policies, respectively—while also offering broader, somewhat ideological programs. At the present, though, the wider program offered by FRPs has seemingly failed to catch on with voters, and their ideology remains rather diffuse without stronger, more coherent ideals or texts to rally around. Nevertheless, a future proper analysis of this comparison could yield some insights.

As FRPs continue to gain in some countries, it will become more difficult for the mainstream parties to keep them at a distance. Shunning and condemning them has failed to stem their rising support, and the creation of anti-FRP coalition governments is likely to inflame the conditions in which they thrive (Mudde, 2016, p. 30). If FRPs do enter government, they might face a considerable problem: having succeeded in supplanting the mainstream elite at the head of the state, their populist rhetoric might lose its potency—they are now the elite, and they are now accountable for the state's failures (Mudde, 2016, p. 30). No party has found itself at the head of a coalition yet, though, so whether or not this theory will hold is uncertain. The supply side of political parties suggests another problem that these parties might face. If the mainstream center-right readopts right-wing identity politics positions, namely anti-immigration stances, they might be able to regain support from wayward voters. The multitude of factors that could affect FRP support, combined with uncertainties about how well they would actually govern, makes their future uncertain.

Concluding Remarks

Ultimately, FRP parties are a fairly diverse set. They have different backgrounds in terms of their ideological development and electoral success, and their internal characteristics are varied, although centralized parties with strong leaders are fairly common among successful parties—though they may also face significant instability. They seem to have had moderate success in attracting voters from different demographic cleavages, but they are still defined by a popular perception of them as anti-immigrant parties. Their policies and guiding ideologies are more united and fairly complex, albeit somewhat rough and unclear. Their most important policy issue is immigration, followed by policies regarding traditional values and law and order, as informed by their ideological emphasis on national cohesion based on a cultural identity, security, and cultural practice. They tend to agree on these policy areas, but particular national contexts are still grounds for some difference. When it comes to foreign and economic policies, the parties appear to diverge more, which could challenge their ability to cooperate with each other. There is still an ongoing academic debate as to why these parties have been successful, although cultural arguments appear to be winning out over purely economic ones.

The future of these parties is still uncertain, but the same might not be true about the policies that they support or the societal attitudes behind them. Already, there is evidence of FRP parties moving the mainstream to the right; even before the refugee crisis, mainstream conservatives like Angela Merkel, Nicolas Sarkozy, and David Cameron had publicly discussed problems with immigration, a topic that was the exclusive domain of the far right for a time (Mudde, 2017, p. 609). Even without formal power, FRPs could have a significant effect on the political course of a country: one might consider the effect that UKIP had in pressuring Cameron to issue the Brexit referendum. The greatest prospects for FRPs may lie in their ability to shift the mainstream, a diffuse body that is generally open to compromise once a view gains enough popularity out of a desire to form the largest coalition. When studying far-right trends, the success of the actual parties might be a poor indicator of the actual success of far-right sentiments within a society: instead, the attitudes of voters and the actual policies enacted by governments might provide a better basis.

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An Interview with Nicole Callahan

Jaime DeVita

Nicole Callahan ('21) was a student editor for *Proceedings of GREAT Day* 2018 and 2019.

How long did you work for the *Proceedings*, and how did you find out about the opportunity?

I worked for the *Proceedings* for two years and I found out through my boss who I was working for at the time in the Open Education Resources department, Allison Brown, who helps out a lot with the *Proceedings*, and she recommended to me that I apply. I applied because it sounded like something I would enjoy.

What has working with the *Proceedings of GREAT Day* taught you about being a student editor? What about GREAT Day?

So about GREAT Day, I think it just taught me more about the variety of things that people do on GREAT Day, because I am an English and Spanish double major, and I did not have a lot of understanding of the non-humanities side of GREAT Day. I didn't know much beyond the humanities as well, like dance performance and the music section of GREAT Day, and all the different ways that students get involved. So editing papers that varied from a range of math papers, scientific papers, psychology studies, cultural analyses, literature analysis, and dance analysis. I believe it taught me more about what was going on even if I couldn't attend those peoples' presentations. In terms of student editing, it helps to have more. I've done a lot of different student editing and I think it helps me have an example of academic editing, like papers for a formal sort of thing, like the *Proceedings*. So editing in that way is different from editing fiction or editing just a variety of different things. Mainly I have experienced editing fiction poetry and stuff like that, where the *Proceedings* taught me APA citation format, where English papers are typically MLA format. I learned how to arrange interviews with people, how to conduct professional interviews, in a way how we're doing right now, it taught me a lot about Adobe InDesign, stuff I would never had pushed myself to learn, but I need to know it. I learned a lot of different things that I wouldn't have learned doing anything else.

Have you had any personal experience with presenting a GREAT Day work that does not correspond with the *Proceedings*?

Not really, no. I'm working on one this year and I had another one that sort of fell through, but I definitely have experienced GREAT Day personally more so with the *Proceedings* and going to GREAT Day and sort of observing. This GREAT Day I am working on my capstone since I'm an honors student here at Geneseo. The work is sort of about student editing, I am seeking to re-establish FUSE here at Geneseo, which is the

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Forum for Undergraduate Student Editors. Basically, it would be a place for students from all the different publications such as *Mint*, *Gandy Dancer*, *The Lamron*, and stuff. They would come together and share their ideas and talk about editing in general. FUSE is like a national conference that people go to every October and right now the class run by Rachel Hall about producing *Gandy Dancer* called Editing and Production teaches about FUSE, where I think it is very helpful that students will have FUSE as a separate organization that people can go to and learn from one another. So, my presentation is kind of going to be about that: my work for FUSE national and also establishing FUSE at Geneseo.

What do you think GREAT Day provides the Geneseo community?

I think it provides a lot of things. It's definitely interesting to have had two live GREAT Day and now, since I'm a senior, two vitual GREAT Days. It's sort of a different vibe, and I know it is different this year, I believe it will be similar to last year's, I mean obviously they're not having an in-person one. I think even the digital one, it sort of just a place to have your academic interests or even non-academic necessarily, just something that interests you, to show it to the rest of the campus and share it with students from all different majors and all different fields at this school because there is a lot of interesting stuff going on. There's a lot of academic curiosity here on campus and I think students do a lot of interesting work that I enjoy learning about. I also like that the keynote speaker comes and has that moment of clarity. I remember when the speaker I interviewed for one of the *Proceedings* was interested in political engagement and getting people involved in voting, and I remember going to that one and then talking to her. She taught me an interesting lesson, she was a very engaging speaker and also just a nice person when I talked to her. So, I think GREAT Day does a lot to unite us for one day, in terms of the thing we actually are primarily at Geneseo, which is students. It unites us as people who pursue knowledge and being people who are learning.

Is there a certain work that stood out to you, that potentially opened you up to a different academic realm present here on campus?

I learned a lot about dancing. There were several dance papers submitted to the *Proceedings*, in which I knew nothing about dance, but now I do. There were always a lot of interesting English papers, but I'm already interested in literary analysis and new things about how people write an English paper, so it was nice to read certain English papers and see what those people have learned about things like Medieval literature. I liked reading all the English papers, and I liked reading history papers because they tend to be similar in that way. I think it was interesting to read papers about stuff that I don't understand or know anything about. I really thought it was interesting learning about dance, especially, and the psychology papers as well. There were things I just did not know, terminology-wise, so I would ask my psychology friend what these terms

meant, because it would assume these words that I did not recognize were typos. It helped round me out. There was one paper that was specifically about someone who composed a performance, who was a composer and they had directed a performance, a whole musical group, and she wrote a whole paper about it, which I thought was intense since I know nothing about music, where I thought it was interesting to hear her personal experience about that. I think there were a lot of papers where I didn't know anything about the field and learning about those things was really interesting.

As your Geneseo undergraduate career is approaching its end, what are your plans after graduation, and how was the *Proceedings* internship prepared you for that?

I don't know! [Laughs] I think that I definitely want to keep editing in whatever way that I can—I am going to find a way to keep editing. I don't have any really solid plans, because I am not, I guess ending college I kind of thought I would know. I feel like up until now there was a life plan that I was following, which was getting to college and then finishing college, that I think a lot of people right now replace immediately with graduate school. I am kind of weary to do that, so I am going to continue editing in whatever way I can and hopefully get some sort of professional development in editing because that is what I do. I mean who knows, life is crazy, and it changes all the time and especially now. I enjoy uncertainty, and I am going to continue to enjoy it.