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The Weapons Effect

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Abstract

This review examines the current state of research on the weapons effect, a phenomenon in which the mere presence of weapons is presumed to cause people to behave more aggressively. The General Aggression Model (GAM) is often used to explain how and why the weapons effect occurs. Hence research on the extent to which weapons prime cognitive and appraisal processes is considered, based on findings from recent meta-analytic research. Findings from classic and contemporary studies offer mixed support for the weapons effect. Implications for theory and future research will be discussed.

Introduction

Berkowitz and LePage (1967) coined the term "the weapons effect" in their classic article that first demonstrated that the mere presence of weapons could increase aggressive behavior. In that experiment, male college students were paired with a partner (actually a confederate) in what was ostensibly an essay rating task. Participants were led to believe that the "ratings" were the number of electric shocks given to their partner, with more electric shocks equating a more negative evaluation. First, the partner evaluated the participants' essays with either one electric shock (low provocation condition) or seven electric shocks (high provocation condition). When it was the participants' turn to evaluate their partner, they were led into a control room that contained either rifles or badminton racquets that were presumably left behind by mistake from a previous experiment. There was also a true control condition in which no objects were present in the control room. Berkowitz and LePage (1967) found that highly provoked participants who were also exposed to weapons gave the most electric shocks, showing more aggression than participants in any of the other conditions.

Aggressive Behavior

Since that initial experiment, numerous attempts to replicate the weapons effect have been reported with participants of various ages, including samples of adults (e.g., Caprara, Renzi, Amolini, D'Imperio, & Travaglio, 1984; Leyens & Parke, 1975), adolescents (Frodi, 1975), and children (Turner & Goldsmith, 1976). Although Berkowitz and LePage used electric shock to measure aggressive behavior, other laboratory experiments have found similar results using other aggression measures, such as blasts of unpleasant noise delivered through headphones (Lindsay & Anderson, 2000), and the amount of spicy hot sauce delivered to a victim who hated spicy foods Klinesmith, Kasser, & McAndrews, 2006).

There was some initial skepticism regarding the weapons effect, largely based on the hypothesis that the positive results obtained by Berkowitz and LePage (1967) were due to participants' suspicion or evaluation apprehension (Page & Scheidt, 1971). However, a series of experiments appeared to debunk that particular explanation, showing that the weapons effect occurred when participants were naïve and lacking evaluation apprehension and did not occur when they were suspicious or apprehensive (Simons & Turner, 1976; Turner & Simons, 1974). In other words, the mere presence of weapons appeared to influence aggressive behavior as long as participants were unaware of the hypothesis or believed that they were being watched and judged by others. That said, there have been a number of noteworthy failures to replicate the weapons effect in the lab (e.g., Buss, Booker, & Buss, 1972; Fraczek & MacAuley, 1971) and in the field (Halderman & Jackson, 1979; Turner, Simons, & Layton, 1975, Exp. 3). Turner et al.

(1975, Exp. 3) is especially noteworthy for showing evidence of mere exposure to a weapon suppressing aggression.

In spite of these mixed findings, a meta-analysis of the available published research (Carlson, Marcus-Newhall, & Miller, 1990) appeared to support the reliability of the weapons effect under highly provoking conditions, but not under neutral conditions, in line with the findings initially published by Berkowitz & LePage (1967). After Carlson et al. (1990) published their meta-analysis, research on the influence of weapons on aggressive behavioral outcomes largely ceased, with exceptions duly noted (e.g., Bushman, Kerwin, Whitlock, & Weisenberger, 2017; Guo, Egan, & Zhang, 2016; Klinesmith et al., 2006; and Lindsay & Anderson, 2000). A more recent meta-analysis including all known available published and unpublished research on the weapons effect suggests that the influence of weapons on aggressive behavior is inconclusive for now (Benjamin, Kepes, & Bushman, 2018). Although the weapons effect appears to be statistically reliable on the surface, once publication bias and outlier effects are taken into consideration, it is not entirely clear what the "true" mean effect size for the influence of weapons on aggressive behavior actually is. The mean effect size may be small but reliable if a random effects trim-and-fill analysis is used to estimate publication bias, but other techniques to estimate publication bias show an average effect size close to zero. As a result, Benjamin et al. (2018) suggest caution in interpreting research on the influence of weapons on aggressive behavioral outcomes.

Aggressive Cognition

Assuming there is sufficient evidence for a weapons effect, why might it occur? According to the General Aggression Model (GAM; Anderson & Bushman, 2002), weapons have the potential to prime aggressive thoughts, which in turn influence hostile primary and secondary appraisal processes. Depending on the outcome of these appraisal processes, an aggressive behavioral response may result.

Although some research showing a link between the mere exposure to weapons and an increase in aggression-related thoughts was conducted as early as the 1970s (e.g., Frodi, 1975; Mendoza, 1972), research on what would be called the weapons priming effect did not begin in earnest until the 1990s. An initial article established the weapons priming effect from the results of two experiments (Anderson, Benjamin, & Bartholow, 1998). In the first experiment, participants viewed stimulus words (either weapons or animals) paired with target words containing aggressive or nonaggressive content. After viewing each stimulus word, participants read each target word aloud into a microphone, which is called a pronunciation task. Anderson et al. (1998) found that reaction times for aggressive target words were significantly faster when they were paired with weapon-related words than when they were paired with animal-related words. A second experiment, in which participants viewed pictures of weapons or neutral objects paired with the same aggressive and nonaggressive target words used in the first experiment successfully replicated the results of the first experiment. These findings were subsequently replicated by Lindsay and Anderson (2000) and Bartholow, Anderson, Carnagey, & Benjamin (2005).

More recent experiments examining cognitive priming effects of weapons use a lexical decision task procedure in which participants have to decide as quickly as possible whether or not a string of letters is a real word (Bartholow & Heinz, 2006; Subra, Muller, Bègue, Bushman, & Delmas, 2010). As with the pronunciation task, faster reaction times to aggressive words indicate greater accessibility of aggressive thoughts in memory. The findings of these experiments indicate that individuals tend to respond more quickly to aggressive words when primed with weapons than when primed with neutral objects. At least one other published set of experiments replicated the weapons priming effect by using a word completion task, in which participants were instructed to complete word fragments to form words (Bushman, 2017). For example, the fragment KI__ can be completed to form an aggressive word (e.g., KILL, KICK) or a non-aggressive word (e.g., KISS, KIND). Participants exposed to weapons tended to complete more aggressive words.

A recent meta-analysis suggests that weapons reliably prime aggressive thoughts (Benjamin et al., 2018). The initial mean effect size was small-to-moderate. A battery of sensitivity analyses was run to test for publication bias and outlier effects. These analyses found no evidence of outlier effects. Furthermore, although analyses from the battery of sensitivity analyses showed publication bias reduced the magnitude

of the average effect somewhat, the effect was still reliable (with mean d estimates between .21 and .25 reported).

Aggressive Appraisal

As noted earlier, the GAM predicts that how we interpret a given situation determines whether or not we will respond aggressively in that situation. Although most research on appraisal outcomes is relatively recent, some published research was conducted as early as the 1980s (da Gloria, Duda, Pahlavan, & Bonnet, 1989), and unpublished research exists as far back as the 1970s (e.g., Klosterman, 1973). Early research examined primary appraisal based on how rapidly participants clenched their fists when exposed to weapons versus neutral objects (da Goria et al., 1989). Clenching one's fists is a potential fight response to a perceived threat. More recent research on primary appraisal examines how rapidly individuals respond to perceived threats. In particular, this line of research examines if individuals respond to weapons such as guns and knives similarly to stimuli we are biologically prepared to recognize as threats such as spiders and snakes. This research consistently shows that adults respond more rapidly to both types of threatening items compared to non-threatening items (e.g., Blanchette, 2006; De Oca & Black, 2013; Fox, Griggs, & Mouchlianitis, 2007; Sulikowski & Burke, 2014). There may be gender differences in primary appraisal to weapons (Sulikowski & Burke, 2014), with males responding with more hostile appraisals than females to threatening items. Finally, recent research examining secondary appraisal shows that similar effects are obtained with objects that are typically not weapons, but could be used as weapons, such as garden shears (Holbrook, Galperin, Fessler, Johnson, Bryant, & Haselton, 2014).

When examining the influence of weapons on aggressive appraisals, Benjamin et al. (2018) found that the average effect size was approximately moderate. Once primed, individuals appear biased to make initial appraisals of threat and secondary appraisals of hostility. Sensitivity analyses examining potential publication bias and outlier effects showed that publication bias was indeed a serious concern, and that the initial effect size estimate was moderately inflated. That said, even taking into consideration publication bias, the magnitude of the average effect remained statistically reliable. (Benjamin et al., 2018).

Limitations and Concerns

Although we know much more about the weapons effect, there are numerous questions that remain to be answered. In addition, it is apparent that there are some limitations to the weapons effect. Let us begin with what we know about the limitations. First, it appears that context plays a potentially important role in whether or not the mere presence of a weapon primes aggressive behavior. For example, Ellis and Weinir (1971) provided evidence that the weapons effect did not occur when participants were led to believe that the weapon in the control room was associated with a police officer. The authors suggested that participants weighed the potential for an aggressive response to be punished, and hence inhibited the level of aggression in their response to a provocation. In addition, although Turner et al. (1975, Exp. 2) showed that participants appeared to be more prone to honk their horns at a vehicle with a gun on a gun rack present than a vehicle with no weapon present, that specific experiment was never successfully replicated (e.g., Halderman & Jackson, 1979; Turner et al., 1975, Exp. 3). A closer examination of Turner et al. (1975, Exp. 2) suggests the apparent successful replication was based on a subsample – a point that seems apparent when examining the pattern of results in that paper's subsequent experiment (Turner et al., 1975, Exp. 3). It more plausible to conclude that the presence of a gun in that particular context is sufficient to inhibit aggressive behavioral responses, such as horn honking, in everyday life. In addition, Carlson et al., (1990) showed in their meta-analysis that the weapons effect appears to only reliably occur under conditions of high provocation. Finally, how a weapon itself is interpreted, based in part on life experience, may play a role in whether or not a weapon facilitates aggression. For example, Bartholow and colleagues (2005) showed that for hunters, the weapons effect was only present when they were exposed to assault-type firearms, but not to hunting firearms. Furthermore, Bushman (2018) showed that when the weapon is interpreted as one not intended to harm humans, that specific weapon does not prime aggressive thoughts.

In terms of theory, for any cognitive priming theory such as GAM (Anderson & Bushman, 2002) to be useful for explaining the weapons effect, not only does there need to be evidence that the mere presence of weapons increases accessibility of aggressive cognitions and hostile primary appraisals, but there must be solid evidence that merely seeing a weapon increases aggressive behavioral outcomes as well. That appears not to be the case at this time (Benjamin et al., 2018). An alternative to GAM, the Situated Inference Model, was used by Englehardt and Bartholow (2013) to suggest that a number of failures to replicate the weapons effect were due to participants attributing their increased physiological arousal to the weapon itself, rather than to the person provoking them. Although Englehardt and Bartholow's (2013) speculation is reasonable enough, as of yet there is no evidence to support their suggestions – in large part because almost no available research has examined the extent to which weapons increase physiological arousal (Benjamin et al., 2018). For now, it appears that the sort of social cognition approach to the weapons effect that has been in vogue since the 1990s may not be viable.

The current conversation about the weapons effect is embedded within a context in which Psychology (among other sciences) is embroiled in a replication crisis (see, e.g., Open Science Collaboration, 2015). In order to improve replicability, practices such as preregistration of research protocols using properly powered research designs and public archiving of data are increasingly advocated (e.g., Open Science Collaboration, 2015). The weapons effect is one phenomenon that would be ideal for such an approach, given the novelty of the original finding, the relative low effect sizes reported in the literature, and the low power of the vast majority of the experiments measuring the influence of weapons on aggressive behavioral outcomes. For example, a registered replication report (RRR) approach has been used to further explore other phenomena such as hostile priming effects (e.g., McCarthy et al., 2018), in the process shedding light on whether or not the effects reported in classic research articles are reliable. An equivalent approach, in which the original Berkowitz and LePage (1967) experiment were subjected to a RRR utilizing multiple labs and a large overall sample, would enable us in the social sciences to either debunk the phenomenon or to offer some solid support for the phenomenon. Until such an approach is utilized to examine the weapons effect, it is prudent to be skeptical about this particular line of research.

Summary

Recent developments in research on the weapons effect continue to further our understanding of the processes by which the mere presence of weapons can influence aggressive thoughts, hostile appraisals, and aggressive behavior. Although much of that research appears promising, especially regarding cognitive and appraisal processes, research on aggressive behavioral outcomes suggests we as social scientists interpret the available evidence regarding weapons as potential primes of aggressive behavior with considerable caution and skepticism (Benjamin et al., 2018), and that we need to rethink the theoretical models used to interpret the available pattern of findings. Berkowitz (1968) once said, "Guns not only permit violence, they can stimulate it as well. The finger pulls the trigger, but the trigger may also be pulling the finger." Although the remarks regarding violence appear doubtful at best, there is some tentative evidence that the mere presence of weapons does influence aggressive thoughts and appraisals. The findings based on experiments measuring behavioral outcomes is considerably more complicated and requires more exploration, especially given the relatively small sample sizes of many of the early behavioral experiments as well as the potential lack of consideration to the psychometric properties of those aggressive behavioral measures (Benjamin et al., 2018). Although skepticism is understandable and quite necessary given the inconclusiveness of the research examining the priming effects of weapons on aggressive behavioral outcomes, this is an area of inquiry worth examining in more depth and with greater rigor.

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Come One, Come All: Door to Door Campaign Material Distribution and Early Voting Turnout Among Age Groups

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Abstract

This paper provides an experimental design model that measures the value of campaign material distribution to increases in early voter turnout among separate age groups. Voter turnout records are used to see the effectiveness of the distribution. The results reveal that turn out the vote campaign solicitation provided through door to door materials has limited or no effectiveness for voters under the age of 65. However, card distribution showed a significant increase in turnout for those registered voters who were 65 or older. The analysis also revealed that the cards soliciting Republican turnout were significantly effective for senior Republican voters. Turnout levels of senior Democrats and swing voters who received the same cards were positive and significant, but less conclusive. The results indicate that campaigns should direct turnout materials only to voters who are most likely to respond to the solicitation, and that literature with a partisan message should go only to supporting voters.

Keywords: *Voter Turnout, Targeted Campaign Solicitation*

Introduction

Politicians, advocates, and party leaders have long sought to find ways to increase voter turnout among their supporters. There have been many examples of election results being determined by a small number of voters at the state and local level. In each case defeated candidates ponder over scenarios of "voters missed," potential supporters who could have voted but did not because of time constraints, missing information, or lack of knowledge. The importance of voter contact in close elections can be extreme. However, while it is true that voter contact has an impact on results, in the vast majority of cases individual voters are not swayed by such contact. Therefore, it is not just important to do voter outreach, it is important that the voter outreach be targeted so that resources will be used efficiently. This research will focus on the efficient use of voter outreach by looking at how different age groups and partisan groups respond to political solicitation. This will be done by implementing an experimental design and looking at the impact of outreach contact on early voting participation.

Previous Research

Theories on voter participation have been the subject of quantitative study for decades. Classical studies on the subject have covered perspectives from all disciplines in the social sciences. Economic theories of voter participation claim that voters calculate costs and benefits in making a decision to participate (Downs 1957). These costs do not limit themselves to dollars and cents. For instance, guilt may enter the cost calculation when deciding to vote (Ferejohn and Fiorina 1974; Niemi 1976), and social interaction may be a benefit in the calculation (Uhlander 1989).

Sociological hypotheses on voter turnout concentrate on demographics to predict behavior. These classic research theories look at variables in social status and predict voting behavior from

these variables. While many studies preceded it Wolfinger and Rosenstone's definitive book *Who Votes?* (1980) created complex models to predict turnout and clarify the independent effect of each variable. Other similar studies followed to clarify findings and look for new possibilities. The largest predictor of turnout among these variables is education with those holding higher levels of education voting significantly more often (Verba and Nie 1972; Brody 1978; Wolfinger and Rosenstone 1980). Age, with older people being more likely to vote (Schaffer, 1981), and being married also increase participation (Texiera, 1987, Stoker and Jennings, 1995). Environmental factors have also been shown to contribute to the decision to participate. For instance, growing up in a family of voters indicates a better likelihood of voting (Beck and Jennings, 1982). Additionally, social status is a good predictor of turnout. Being a member of a social club (Baumgartner and Walker, 1988), or simply having awareness that you are a member of a group, significantly increases the likelihood of voting (Verba and Nie, 1972).

The psychological mindset of citizens has also been shown to predict turnout. For instance, having political efficacy increases the chances of a person voting. This can be external efficacy where the voters feel that the system responds to them (Abramson and Aldrich, 1982) or internal efficacy, the belief that a single voter can make a difference (Miller and Miller, 1976). The institutional system in the United States also has an impact on turnout. Crewe (1981) found that the United States federal system featuring multiple levels of government creates so many elections that people simply get tired of keeping up with the candidates and voting. In addition, registration laws often make things difficult for voters (Piven and Cloward, 1988; Brians and Groffman 2001). Making registration easier, like registering voters when they renew their driver's license, has resulted in more voters going to the polls (Mitchell and Wlezien, 1995; Braconnier et al 2017). The same is true for moving registration deadlines closer to Election Day or having them on the same day as the election (Knack 2001; Vonnahme 2012).

The goal of getting out the vote by providing information is of high importance to political parties and candidates. Once a possible supporter has been identified the act of increasing the voter's information can help them make the decision to participate. This surge in political sophistication which includes learning the system, having knowledge about the candidates, and knowing the procedures leads to higher registration levels and higher voting turnout (Erikson, 1981). As a result campaigns have gone to great lengths to provide potential supporters with information.

Recent research found that such voter outreach efforts can successfully increase political participation, even when they do not specifically target the community's primary issues (Pons and Liegey 2016). Most efforts to provide information directly to voters comes by contacting them with phone conversations, mail, or door to door solicitation. While the magnitude of these types of contact is not massive the impact is significant. Research has shown that all three methods increase participation and have proven to be cost effective (Nickerson et al. 2006). The door-to-door distribution of information, which is the focus of this research, has been found to increase voters participation enough to change the outcome of close elections. Green, Gerber, and Nickerson's (2003) study indicated that face-to-face voter mobilization was especially effective in stimulating voter turnout in local elections with each encounter increasing a registered voter's probability of voting by approximately 7 percentage points. While other research has found a smaller impact in magnitude when conducting door-to-door distribution the effects have been significant and could be a deciding factor in very close elections (Nickerson et al. 2006).

Methods

This research focuses on three separate hypotheses. The first hypothesis tested is the contention that outreach efforts, specifically the door to door distribution of election information, will increase voter turnout. Previous research reviewed has shown that such efforts produce significant if not extensive differences. The second hypothesis is that this intervention will have different levels of effectiveness for different age groups. Specifically, voters who are of retirement age will respond more positively to a call to vote than younger voters with more life and family obligations. Lastly, the hypothesis that voters will respond to a call to turnout, even if they are not the partisan target of the information, is also examined. This reviews the actions of voters who receive a card that does not appeal to their partisan leanings and posits that they will be more likely to react with action by being motivated to vote.

To do the analyses data were collected prior to the 2016 election on a suburban voting precinct north of Houston, Texas. The data were provided by the Harris County Republican Party. These data were comprised of all registered voters in the precinct for the 2016 general election. The data included the name, age, gender, party affiliation, and street address for each registered voter. Party affiliation was coded in the data and determined by each voter's participation in previous primaries. Texas voters are required to declare partisan affiliation before they vote in each primary. After early voting in the 2016 election turnout records were also collected for each registered voter in the precinct to determine early voting participation.

The research design for the project was an experimental design with matching. The procedure involved selecting 60 streets in the precinct. Each street selected had only upper middle class houses. Streets with apartments, which are located in a different part of the precinct, were not among the streets used for the project. Matching was done primarily to insure that the two groups, the control group and the experimental group, were fairly equal in size and composition. To do this each of the 60 streets were ranked from smallest to largest in the number of registered voters. The streets were then paired with the street closest to it in the number of registered voters to form 30 pairs. The streets in each pair were then randomly assigned to the control group (Group 1) and experimental group (Group 2). The results can be seen in Table 1.

[See Table 1]

Group 1 had a total of 777 registered voters and Group 2 had 781 registered voters. A group membership variable was then created in the data for the analysis. Once the groups were selected campaign materials were distributed to the front door of each of the 781 houses in Group 2. No campaign materials were distributed to voters in Group 1. A picture of both sides of the card distributed can be seen in Figure 1. The front side of the card shows Texas Republican Dan Huberty, the House of Representatives member for the precinct, soliciting voters to vote straight ticket Republican. It also gives election dates in bold letters. From the card it is clear that early voting will take place from October 24 to November 4. The back side of the card features Harris County Judge Ed Emmett (the chief executive in the county) quoted as saying "Harris County government is government working as it should." In addition, the backside of the card once again encourages voters to vote straight ticket Republican.

[See Figure 1]

The cards were distributed to the Group 2 homes on October 24th and 25th, the first two days of early voting. Data were then obtained through Harris County following early voting to record whether or not each registered voter participated in early voting during the October 24 to November 4 time period. With the categorical dependent variable in place a probit analysis was done to determine statistical significance of the hypotheses results.

Results

To test the hypotheses a bivariate comparison of group status and early voting participation status was done for each hypothesis. The categorical nature of the dependent variable violates ordinary least squares assumptions, therefore, probit analyses were conducted to adjust for the variable's non-continuous nature (Finley 1952). The results are displayed in Table 2.

[See Table 2]

The results of the first hypothesis, that receiving a card will have a positive impact on early voting participation, are presented in the first model. The results in Table 2 show a positive coefficient for the test indicating that receiving the cards did have a positive effect on the early voting participation of Group 2 members. However, the intervention failed to achieve statistical significance. The three models that follow in Table 1 show the same test for differences by age group. These results show that in cases where registered voters under 65 received the cards there was no effect. In fact, the coefficient for both groups under 65, those under 40 and those 40-64, have negative coefficients of almost exactly zero indicating that receiving a card had no effect on early voting turnout among these voters. Conversely, analysis of the 335 registered voters 65 and older show an increase in turnout among those receiving the cards in comparison to those who did not. This increase is statistically significant at the .05 level for the one tailed test.

A further test looks at the impact of receiving the cards among those 65 and older by partisanship. This hypothesis contends that both non-Republicans and Republicans will be more likely to participate in early voting if they receive a card, even when the card solicits Republican votes. In other words simply getting the prompt to vote should increase the likelihood of voting regardless of whether the message comes from someone the voter supports, or not. This hypothesis is tested by splitting the registered voters 65 and older by partisan status. The results are in Table 3.

[See Table 3]

The analysis indicates that the coefficient for each group is positive and reaches statistical significance, although the coefficient for non-Republicans is only significant at the .10 level for the one tailed test. The Republicans over 65 receiving the cards were much more likely to vote early than those who did not. However, the 168 non-Republicans 65 and older were also more likely to vote early than those who did not receive the cards. The evidence indicates that receiving political solicitation will increase the likelihood that senior citizens will react even if the solicitation is not in line with the recipient's political ideology.

Conclusion

This research focuses on the impact of door to door solicitation, in the form of get out the vote cards, on early voting turnout. The hypotheses presented in this paper ask if receiving a card at a residence will increase the chances that the registered voter will vote early in the upcoming election, and if the partisan message on the card will affect the likelihood of early voting turnout. The results here show that only a select group, those age 65 and older, will be more likely to participate in early voting when they receive door to door solicitation to do so. The results also show that the partisan message in the solicitation may not have to be in line with the voter's political leanings to cause a reaction. Senior voters who received a card with a favorable partisan message were significantly more likely to early vote than those who did not. However, those senior voters who received a card with a partisan message not targeted toward them were also more likely to vote early than those not receiving cards.

This study, in line with other research, indicates that door to door campaign solicitation can have a small but positive effect on voter turnout. The findings here also show that the impact is not the same for everyone. When distributing the cards to the entire registered voter sample 31

cards were needed to garner one extra early vote. However, when the cards were distributed to those over 65 one extra vote was recorded for every 6.4 cards distributed. Targeting favorable partisans may be just as important in distributing literature. While the cards urged voters to vote Republican those voters over 65 who were not Republicans were 15% more likely to vote early. Such results indicate that ignoring non-partisans may be just as important as targeting partisans in attaining positive election outcomes.

These results must also be scrutinized due to the sample being studied. External validity is always an issue in experimental design. Here the sample looks at upper middle class home owners. Whether or not these results carry over to different populations deserves further study.

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Figure 1. Campaign flyer (with picture of front and back) distributed in solicitation of early vote in experimental design.

Table 1. Experimental design street assignments. Streets were matched to pair the number of registered voters and then the pairs were randomly assigned. Group 1 was the control group and Group 2 was the experimental group.

Registered Voters	Group 1 Streets		Registered Voters	Group 2 Streets
3	SNEAD		3	BATON
5	SPINNER COURT		6	DEER CROSSING
6	SEBASTIAN		6	SAND TRAP
9	MASTERWOOD		8	OLYMPIC
10	ARCARO GLEN		10	DOCKSIDE HILL
12	SAILFISH COVE		12	DECATHALON
13	SHADY COVE		12	NYAD
14	CADDY		13	CHESTNUT CREST
15	ANCHOR BAY		14	RIGBY
15	CEDAR JUMP		15	CAMPERS CREST
15	PINEWOOD CANYON		16	TEAL CREEK
17	PINE ECHO		17	DEERWOOD LAKE
20	BRONZE TRAIL		20	JOGGERS
20	RUNNERS		21	PINEWOOD CREST
23	CAMP LILLIE		22	HICKORY ASHE
23	AUTUMN CREEK		23	LEISURE PLACE
24	LIGHTHOUSE LAKE		24	PALMER PLACE
24	ROLLING RAPIDS		24	SHADY ACE
26	GAMBLE OAK		25	PLAYER PARK
26	TIMBER VIEW		26	VAULTED PINE
27	LIMBER BOUGH		28	HUNTERS VILLAGE
28	NEHOC		28	PAR FIVE
28	SUNCOVE		29	PUTTING GREEN
29	SHOREVIEW		30	AEROBIC
30	MATCH PLAY		31	AGILE PINES
36	TUMBLING		37	ARBOR PINES
51	SUMMIT PINES		51	PINEWOOD BLUFF
57	SILVER LURE		63	AQUADIC
69	PINE SHORES		64	MILE RUN
102	PINES PLACE		103	CROSS COUNTRY
777			781	

Table 2. Experimental design probit models of early voting participation.

Variable	*Full Sample* *Coef. (S. E.)*	*Age Under 40* *Coef. (S. E.)*	*Age 40-64* *Coef (S. E.)*	*Age Over 64* *Coef. (S. E.)*
Received Solicitation	.08 (.06)	-0.00 (.13)	-0.01 (.09)	0.39 (.16)**

Constant	.15 (.05)**	.21 (.09)**	.16 (.06)**	.06 (.10)
N=	1558	415	818	335

**p<.05, one tailed test
*p<.10, one tailed test

Table 3. Experimental design probit model of early voting participation.

Variable	*Coef. (S. E.)*
Over 65, Received Solicitation and Republican	.48 (.16)**
Over 65, Received Solicitation and Not Republican	.28 (.18)*
Constant	.06 (.10)

N=335
**p<.05, one tailed test
*p<.10, one tailed test

Carpenter v. US:
Are Cellphones an Investigator's New Best Friend?

Sue Burum
MSU, Mankato

In 1944, in *Northwest Airlines, Inc. v. Minnesota* (*Northwest v. Minnesota*, 1944), Justice Frankfurter wrote, "The court makes a persuasive case for the general applicability of the rule it announces. The court is nonetheless wise to leave open the possibility of exceptions, to ensure that we not 'embarrass the future." In *Carpenter v. United States*, (*Carpenter v. United States*, 2018), the Supreme Court (Court) grappled with the wisdom of Justice Frankfurter while trying to apply the Fourth Amendment law and prior judicial interpretation to cellphone towers and location data. In the absence of Congress updating its laws in this area, the Court needed to update and apply older law and cases to new innovations, clarify the use of cell tower location data, and decide whether a warrant, based on probable cause, is needed to search this stored location data. The Court hopes to not embarrass individual justices or the institution of the Court in the future with a decision today that may create new problems because of being overly broad. Attempting to anticipate and cover potential future problems is full of peril. The Court and individual justices hope to not be in the embarrassing situation of having to reverse a case in the future because of situations the Court did not consider when making today's case. This paper will analyze the decision of *Carpenter*. An understanding of the case will be important to anyone who teaches government, law enforcement, or civil liberties courses. This paper will also consider if the Court will succeed in this attempt to reinterpret and apply older precedent to new and rapidly changing technology.

Case Facts

Between December 2010 and March 2011, several people conspired to steal cellphones. They carried out nine robberies at RadioShack and T-Mobile stores in Michigan and Ohio. Four of the robbers were captured. One confessed and turned over his cellphone. He identified 15 accomplices and gave the FBI some of their cellphone numbers. The FBI reviewed the calls from that phone around the time of the robberies. A magistrate judge, using the Stored Communications Act, which with paper will refer to as 'Act' (Stored Communications Act, 1986), granted the FBI's request to obtain "transactional records" from various carriers for 16 different phone numbers as well as location data on the phones.

The numbers on the phone would not be enough to establish probable cause to get a criminal warrant. Anyone who called the caught robber would be red flagged as a fellow robber, even if the person dialed the wrong number and did not even know any of the robbers. United States law enforcement is not built on catching every criminal as swiftly as possible. The law also requires the added duty to protect peoples' civil liberties. Cellphone data can be acquired with probable cause. To establish probable cause, law enforcement must first have articulable, trustworthy evidence that establishes that a crime has been or is being committed, second, a specific person or item is connected to the criminal activity, and third, in this case, evidence that establishes the cellphone contains evidence of that criminal activity. There would have to be evidence beyond the mere belief that the phone numbers the defendant gave them belonged to co-conspirators (Kerr, 2017). The belief, even if based on an officer's experience and training, is not enough. Nor is the belief that cellphones are necessary for social interactions and thus must contain evidence of a crime. Law enforcement would have to do some additional investigation to gather specific evidence tying the potential co-conspirators to the criminal activity. Then investigators could get a warrant to get the cellphone location data that could provide incriminating evidence and establish whether a person was in the area and time of those robberies.

Under the Act, the officers had enough information to get a subpoena for the cellphone providers' records, but not enough evidence for a warrant based on probable cause. The officers had enough evidence to provide articulable facts showing a reasonable belief that the records sought would be relevant in an ongoing investigation. The first order sought 152 days of location records from MetroPCS, and the second order sought 7 days of location records from Sprint (*Carpenter v. United States*, 2018).

Timothy Carpenter was one of the people who was arrested, after the records were acquired, for several counts of aiding and abetting robberies. The government received 127 days of cellphone tower records from MetroPCS that traced the whereabouts of Carpenter's phone, and 7 days of records from Sprint. He was convicted and sentenced to 116 years in prison. Carpenter was charged with 6 counts of robbery and 6 counts of carrying a firearm while committing the burglaries. At his trial, prosecutors introduced Carpenter's cellphone records, which confirmed that his cellphone was connected to cellphone towers in the vicinity of the robberies. Prosecutors made extensive use of the cellphone records to gain a conviction (*Carpenter v. United States*, 2018). Carpenter's attorney argued that prosecutors should not be allowed to use the cellphone records against him without a warrant. The lower court disagreed. The US Court of Appeals for the Sixth Circuit heard the appeal and agreed with the trial court that no warrant was required (*Carpenter v. United States*, 2018).

The Arguments During Oral Argument

On Nov 29, 2017, the Supreme Court heard oral argument on the case. The issue in the case was whether prosecutors can use data from cellphone towers, without a warrant, to track a person's location.

On behalf of the government, Deputy Solicitor General Michael R. Dreeben argued that, while the technology in the case may be new, the legal principles that should govern the case are not new (Howe, 2017a). He made two arguments why acquiring the location data was legal. First, he used two older cases that establish the third-party doctrine, which says the Fourth Amendment does not protect records or information that is voluntarily shared with someone else. He argued that these decisions should apply to this case despite being old.

The first case he used is *United States v. Miller* (*United States v. Miller*, 1976). Miller was charged with carrying alcohol distilling equipment and whiskey without paying a liquor tax. The Bureau of Alcohol, Tobacco, and Firearms issued subpoenas to two of Millers banks requesting the records of Miller's accounts. The banks complied, and the evidence was used at trial to convict Miller. Miller's attorney argued on appeal that Miller's Fourth Amendment rights were violated. The US Court of Appeals for the Fifth Circuit ruled in his favor, and the case went to the Supreme Court. In a 6-3 decision, Justice Lewis F. Powell, writing for the majority, concluded that bank records were part of the bank's business records, not Miller's private papers. Miller's rights were not violated when the records were transmitted to the government. There was no legitimate expectation of privacy in checks and deposit slips. The information was voluntarily conveyed to the banks and exposed to the bank's employees in the ordinary course of business. The Fourth Amendment does not prohibit the obtaining of information voluntarily revealed to a third party and conveyed by the third party to the government (*United States v. Miller*, 1976). A search warrant was not necessary for the government to acquire the information because of the third-party doctrine.

The second case Dreeben used was *Smith v. Maryland* (*Smith v. Maryland*, 1979). A pen register was installed at Smith's telephone company's central office. It recorded every number dialed from that phone. The Supreme Court, in an opinion written by Justice Blackman, held that the installation and use of a pen register was not a search within the meaning of the Fourth Amendment, and no warrant was required to use it. The installation and use of the pen register did not violate a legitimate expectation of privacy since the numbers would be available to and recorded by the phone company anyway. In choosing to use a phone, Smith voluntarily conveyed this information to the phone company so that they could connect his call. Subscribers realize that phone companies keep these records because they get a phone bill that shows the long distance calls they make. Maintaining these records is important to the phone company for checking billing operations, detecting fraud, and preventing violations of the law (*Smith v. Maryland*, 1976). In *Smith*, the Court did not distinguish between disclosing a number to a live operator versus automatic equipment (Sachs, 2017).

From these two cases, Dreeben argued that cellphone location data records are business records. They are created and held by the cellphone company. They are solely used by the cellphone company to seamlessly provide service to cellphones as people move in and out of the range of cellphone towers with their phone. If companies did not do this, service would be lost when a phone moves from one cellphone tower until another tower picks up the phone. The location data is also used for billing when a person moves outside of their service area (Howe, 2017b). Dreeben argued that, if people wanted business records to have privacy protection, Congress would have to enact a law giving business records privacy protection (Howe, 2017b). Cellphone providers create and maintain the location records for their own purposes. They give the records to the government under the requirements of the Act. Carpenter did not create or own the location records. The location date from Carpenter's phone is like a person's bank records and the recording of numbers dialed from a person's phone. The right to privacy does not protect location data.

The second argument Dreeban used for the ability to acquire location data and use it to convict Carpenter is the Stored Communications Act of 1986. The Act was passed by Congress and addresses voluntary and compelled disclosure of stored wire and electronic communications and transactional records. Dreeban argued that the Fourth Amendment protects the people's right "to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures" (Howe, 2017a). It has been interpreted to protect people, not places. But when it is applied to information stored online, the protections are potentially weaker. Society has not reached a clear consensus on reasonable expectations of privacy in current, and developing, forms of recorded and/or transmitted information. A search warrant and probable cause is needed to search a home. Under the third-party doctrine, only a subpoena and prior notice are needed to get an Internet Service Provider (ISP) to disclose files stored on a server (Liptak, 2017a).

Section 2701 provides criminal penalties for anyone who "intentionally accesses without authorization a facility through which an electronic communication service is provided for…intentionally exceeds an authorization to access a facility: and thereby obtains, alters, or prevents authorized access to a wire or electronic communication while it is in electronic storage…"

Section 2702 says that ISP's are allowed to share "non-content" information with anyone other than a government entity. ISP's can disclose the contents of a subscriber's communications if authorized by that subscriber.

Section 2703 describes the conditions under which the government is able to compel an ISP to disclose customer or subscriber content and non-content information. For example, a communication that has been stored for 180 days or less, the government must obtain a search warrant. If a communication has been stored for more than 180 days, then the government must obtain a search warrant based on probable cause or a subpoena or a "specific and articulable facts" court order based on reasonable suspicion (Stored Communications Act, 1986).

The government relied on this Act to argue that no warrant is required in *Carpenter*. First, the government was not obtaining content, such as the content of cellphone conversations or the content of emails. The government was only acquiring location information. Even if this location data is somehow interpreted to contain content information, the government only asked for 152 days of location data, which is less than 180 days in Section 2703 (Stored Communications Act, 1986).

Nathan Freed Wessler, staff attorney with the ACLU Speech, Privacy, and Technology Project, argued on behalf of Carpenter. He relied on *Riley v. California* (*Riley v. California*, 2014). Pew Research Center, in 2013, conducted a survey and found that 90% of Americans owned a cellphone. Information like this caused the Supreme Court in *Riley* to unanimously hold that the warrantless search and seizure of cellphone contents during an arrest is unconstitutional (*Riley v. California*, 2014).

The leading case on search incident to a lawful arrest is *Chimel v. California* (*Chimel v. California*, 1969). In *Chimel*, the Supreme Court limited a prior precedent that said officers could search the entire house on a search incident to a lawful arrest when a person was arrested from a home. In *Chimel*, the Court limited the search to the area around the person and interpreted this to mean the room the person was in. The rationale for allowing the search is to prevent the arrested person from acquiring a weapon or

destroying evidence should the person break free from the arresting officer. The rational would not apply to the entire house because it is unlikely the person would get past the room they were in if they broke free from the arresting officer (*Chimel v. California*, 1969).

In *Riley*, officers could search the area around the arrested person, but they had to get a warrant to go through the contents of a cellphone. It did not matter if the cellphone was on or around the suspect. This is a change from *Chimel*. A cellphone did not pose a danger to the life of an officer because it is unlikely to become a weapon. Also, it is unlikely the content on the cellphone could be destroyed as the phone would take time to open if an escaping person tried to delete material on the phone (*Riley v. California*, 2014). Remote wiping of the data on the phone by an associate might be possible, but the phone's security features usually prevent an associate or officer from getting into the phone once it locks. Searching a cellphone is comparable to searching the private papers and drawers in someone's house. More of a person's life is contained on a phone from the books and magazines a person reads, to the music one listens to, to emails and text messages, to banking records, to contacts, etc. "The fact that technology now allows an individual to carry such information in his hand does not make the information any less worthy of the protection for which the Founders fought" (*Riley v. California*, 2014).

Justice Samuel Alito wrote in a concurring opinion in *Riley* stating that precedent from the pre-digital era should not be mechanically applied to cellphones. A phone can hold more personal data than a person ever could have carried with them in the past. However, now papers inside a wallet can be searched on a lawful arrest, but not the papers inside the cellphone (*Riley v. California*, 2014). He was concerned whether a rational line was drawn. He suggested that Congress and state legislatures should consider drawing better lines, as this should not be the job of courts.

The prosecutor's interpretation of the Stored Communications Act also should not apply. The routing data contains much more than the "information necessary to get communications from point A to point B" (*Carpenter v. United States*, 2018). Cellphones are intertwined into the lives of the users. Cellphones contain vast data that essentially contains the sum of a user's life. They are carried everywhere a person goes. Location data shows much about a person's life such as when the phone goes to another person's house and the time of these visits. It could show if the person has a lover, goes to a political rally, goes to a particular church, or visits a doctor. Locations can disclose more than an abstract location. It can divulge private and personal information about a person's life that is not relevant to the case (*Carpenter v. United States*, 2018).

The Justices' Responses During Oral Argument

Chief Justice John Roberts was not convinced that old rules, like the third-party doctrine, easily apply to this case. He pointed out to Dreeban that the cellphone provider did not generate the location records entirely on his own. He said it was more like a "joint venture" with the phone's owner. This could limit the application of the doctrine to the case (Howe, 2017a).

Justice Elena Kagan asked the prosecutor how this case was different from *United States v. Jones* (*United States v. Jones*, 2012). In *Jones*, the Court held that installing a GPS tracking device on a vehicle and using it to monitor the vehicle's movements was a search under the Fourth Amendment. In 2004, Jones was suspected of drug trafficking. Police got a warrant to attach a GPS device to his car. However, the tracking exceeded the warrant's scope in both geography and length of time. The device tracked the vehicle for four days and this tracking went on 24 hours a day. The Court unanimously considered the police's actions to be unconstitutional. However, they split 5-4 on the reasons for the conclusion. Justice Scalia wrote the opinion for the majority. He concluded the installation of the device was a trespass and a search. The majority did not decide if there was any reasonable exception that would allow the search because the government did not argue this in lower courts (*United States v. Jones*, 2012). The case did not address the privacy implications of a warrantless use of GPS data had there not been a physical intrusion, like factory-installed tracking or wireless service providers that track the vehicle.

The dissenters used the *Katz* approach as to whether a reasonable expectation of privacy was violated. They concluded tracking every movement for 28 days violated a reasonable expectation of privacy and thus constituted a search (*United States v. Jones*, 2012). The location data in *Carpenter* is similar to the GPS tracking. It can continue for extensive periods of time with little to no effort on an officer's part. It

should require a warrant under *Katz v. United States* analysis (*Katz v. United States*, 1967). The average person would think that their car's movements over such a long period of time were private. The minority in *Jones* relied on *United States v. Knotts,* (*United States v. Knotts*, 1983), where the Court allowed an officer to attach a beeper to a vehicle, without a warrant, for a short period of time. Beepers send out short distance signals. The officers had to follow the car to receive the signal. The vehicle was tracked for a single trip for less than a day. The Court in that case held that a person traveling on public roads has no expectation of privacy in its movements because anyone on the road can see them (*United States v. Knotts*, 1983). Kagan would not rely on *Knotts* to resolve *Carpenter*. Unlike the use of a beeper, no officer had to follow Carpenter or his phone all those days like what happens with the use of a beeper. The location data was automatically recorded by the phone company (Howe, 2017a).

Dreeben, in response to Roberts, believed old cases could govern new technology (Howe, 2017a). To Kagan, he responded by saying *Jones* involved direct surveillance by the government. Carpenter's case involved business records from a cellphone provider (Howe, 2017a). Kagan responded that the cases were similar because there was reliance on new technology that allowed for 24/7 surveillance (Howe, 2017a). Dreeben responded that, in *Carpenter*, the government was not watching anyone. People decided to use a cellphone and signup for cellular service. The use of this service requires that a phone communicates with a tower and a business record is generated. If people want privacy in those records, they must go to Congress (Howe, 2017a).

Justice Roberts raised a concern that people do not voluntarily agree to have the phone company store location data. He suggested that this argument was inconsistent with the decision in *Riley* (Howe, 2017a). The *Riley* case suggested that people do not have a choice about whether to have a cellphone anymore. Justice Anthony Kennedy asked Wessler whether most people actually even realize cellphone providers have their data (Howe, 2017a). Wessler responded by saying that most people know their purchases are revealed to others, but not that their long-term movements could be revealed (Howe, 2017a). These two justices questioned the voluntariness of data disclosure. The third-party doctrine rests on the notion people agree to share information in third-party disclosure situations. People know using a land line phone results in the phone company keeping a log of the calls made from that phone and using a bank means the bank creates account records. People volunteer this information to phone companies and banks, or they do not use a landline phone or bank. Some cellphone users may not even know that data beyond phone numbers dialed, like location data, is stored. For those users who do know towers keep track of phones, the argument is that location data is different. People agree to the storing of location data so the use of the device is not compromised as they move in and out of different tower coverage areas. It is hard to consent when the only option is not to use a cellphone. A cellphone is needed in society beyond being used for making phone calls. It is not reasonable to assume that a person can function as well in society without a cellphone (Howe, 2017a).

Wessler, while trying to resolve the case, suggested that movements over 24 hours may be reasonable to track, but periods of 127 days were excessive (Howe, 2017a). Justice Ruth Bader Ginsburg did not see how this made sense. She commented that looking at cell-site data for one robbery would be reasonable, but not being able to look at data for the other seven would be unreasonable (Howe, 2017a). Justice Kennedy suggested that a longer period of time could actually demonstrate a person's innocence. The person might go to the location for a reason other than to commit a crime (Howe, 2017a). Justice Breyer simply asked how the Court could draw a line. Dreeben responded that he did not know how (Howe, 2017a)! Arbitrary line drawing is more suited to legislating than interpreting the Constitution (Howe, 2017a). Congress is the one that draws arbitrary lines. Congress is more equipped to do so since it can hold hearings and possibly see more of the ramifications for drawing lines at different points. For courts, line drawing can be like throwing darts at a moving dart board.

Justice Sonia Sotomayor commented that this case is not just about current technology. She stressed how fast technology was developing. She was concerned that a provider could someday actually turn on a cellphone and listen to conversations. She seemed to prefer that the Court carve out an exception to the third-party doctrine in resolving the *Carpenter* case. She reminded everyone that the Court created an exception for the release of medical records without a patient's consent. She thought the time period of

127 days was excessive and a person would have an expectation of privacy due to the length of time (Howe, 2017a). Basically, she felt the Court needs to update Fourth Amendment rules to maintain the balance of government investigative power with or without action by Congress.

The Decision

The opinion of the case was written by Chief Justice John Roberts. Justices Ruth Bader Ginsburg, Stephen Breyer, Sonia Sotomayor, and Elena Kagan joined in the opinion. Roberts wrote that the case involved two potentially competing lines of precedent (Howe, 2018). The first concerns whether Carpenter can expect to have his movements kept private. *Katz v. United States* is the key case that analyzed expectations of privacy and overturned *Olmstead v. United States* (*Olmstead v. United States*,1928). *Olmstead* was a bootlegging case where criminals were caught through the wiretapping of their phone calls. The wiretap, without a warrant, was upheld because there was no trespassing while conducting the wiretaps. The equipment used to tap the calls was attached to phone lines that were in the streets near houses. The Court concluded that a warrant was not needed because none of the defendants owned the land or phone lines where the equipment was placed. There was no trespassing, such as going into the house and attaching equipment to Olmstead's home telephone (*Olmstead v. United States*, 1928).

Olmstead was overturned in *Katz v. United States* (*Katz v. United States*, 1967). In *Katz*, a wiretap was placed on the outside of a phone booth. The Court created a two-part test to decide if something is private and needs a warrant to be tapped. First, the Court analyzed whether the defendant would think his phone calls were private in a public phone booth. The Court concluded in the affirmative. There was a subjective expectation of privacy. Second, using *Katz*, the Court considered whether society was willing to recognize this expectation of privacy. The Court again concluded in the affirmative by concluding that the expectation of privacy would be reasonable to the rest of society. Since both parts of the test were satisfied, officers had to get a warrant to tap a phone conversation from a phone booth (*Katz v. United States*, 1967). This case overturned *Olmstead* by saying a reasonable expectation of privacy determines whether a warrant is needed, not who owns the phone booth or phone lines. The property approach in *Olmstead* has not been completely abandoned, but has been analyzed through the second part of *Katz*.

Cases working with the *Katz* two-part test considered whether a person's movements on a public road could be considered private. In *Knotts*, the Court decided society would not recognize the person's movements as private. Thus, a warrant was not necessary to track a person as they moved on public roads (*United States v. Knotts*, 1983). However, Roberts concluded that the times have changed in the digital age. Society would not expect police to be able to track a person's movement over a long period of time without a warrant. Roberts suggested people carry cellphones everywhere with them. They not only make phone calls, but they are used for keeping appointments, text messages, email, the use of banking apps and credit cards, purchasing goods, and many other activities of daily life (*Carpenter v. United States*, 2018). Cellphone location data is recorded anytime the phone is turned on. People do not consent to the storing of location data. However, the tracking of a cellphone's movements is necessary so service is not lost as people move around. Roberts compared this to a person wearing an ankle monitor as it provides near perfect surveillance of a person's movements (Walsh, 2018). The cell towers also preserve the movements of phones for five years (Walsh, 2018).

The second line of precedent is the third-party doctrine. Cellphone users voluntarily entrust the security of online information to internet service providers, a third-party. Prior cases have concluded that users relinquish expectations of privacy when information is voluntarily divulged to a third party. However, asking for cellphone location data is not the same as asking for someone's bank records. Location records do not just cover one person, but combine data from everyone using the tower (*Carpenter v. United States*, 2018). The tower records also cover long periods of time (*Carpenter v. United States*, 2018). *Carpenter* applies to historical cellphone records. Another consideration is that people do not voluntarily give up this location data. That would require an actual choice. There is no choice here. It is all or nothing. One either consents to cellphone location data being collected, or they must give up the use of the cellphone. It is not just the ability to make phone calls, being connected to towers is needed for many other functions of the phone such as text messages, emails, and apps. The

phone constantly connects to towers even when the phone is on but not being used (*Carpenter v. United States*, 2018).

Roberts did emphasize that the ruling in the case is a narrow one that only applies to historical cell tower location data. The Court was not ruling on the gathering of real time location data (McCubbin, 2018). Law enforcement may still be able to get information without a warrant if the information were needed in an emergency situation like bomb threats, child abductions, or active shooting situations (*Carpenter v. United States*, 2018). The Court was not even making a ruling on gathering location data for periods of time less than seven days (*Carpenter v. United States*, 2018). The Court in this case is simply deciding that law enforcement officers do not have unlimited access to providers' location data for extensive periods of time. He does not want far-reaching new means of invading privacy to erode Fourth Amendment protections.

Justice Anthony Kennedy dissented from the majority's opinion. He was joined in his opinion by justices Samuel Alito, and Clarence Thomas. Kennedy recognized that the digital age has great potential to change current laws and court precedents. However, he sees the third-party doctrine as applying to this case. It is still a choice to own and use a cellphone (*Carpenter v. United States*, 2018). It is common knowledge that information from phones is gathered. The cellphone tower location data is simply a business record. Carpenter has no expectation of privacy that society should recognize because he does not own or control the records (*Carpenter v. United States*, 2018). Land line telephone records always recorded the telephone numbers dialed from a phone. That was necessary for billing. Cellphone location records are the same thing. The company creates these to keep phones connected and provide service. He does not see workable distinctions between these two types of records and does not see why one should require a warrant while the other does not. He would not resolve this case by making new principles of law based on potential future developments. He sees the Court as having become unhinged from property concepts that have long grounded the Courts reasoning on cases.

Alito wrote dissent in which he was joined by Thomas. Alito concluded that the interpretation of the Fourth Amendment, as the writers of the amendment would have originally understood it, would not have applied to all methods of obtaining documents for law enforcement purposes. The Court overreached in its attempt to deal with new technology. He believes that this decision will eventually apply broadly to all documents that contain personal information or else the Court will carve out extensive qualifications, exceptions, and limitations. This will create an overcomplicated maze to navigate and apply the Communications Act. The Court should have deferred to Congress when it decided that warrants were not needed for information acquired under the Communications Act (*Carpenter v. United States*, 2018). While warrants require probable cause, reasonable suspicion is all that is required to get transactional records (Stern, 2018). But, both warrants and subpoenas are reviewed by the courts before they issue either (Liptak, 2017b; Stern, 2018). Alito was concerned that the majority made the work of police harder.

Thomas also wrote alone in a separate dissent. He suggested that the Court reconsider its use of 'reasonable expectation of privacy.' He is concerned that that concept may have no basis in the text or history of the Fourth Amendment. He concluded that the Court has been moving away from the doctrine because the Court is losing an originalist perspective and approach. He believes the case should be decided based on whose property was searched, more like what the Court did in *Olmstead*, not whether a search occurred. The data was clearly the company's property, so warrants should not come into play (*Carpenter v. United States*, 2018).

Finally, Neil Gorsuch wrote separately in dissent. He indicated that he would abandon both the reasonable expectation of privacy test and the third-party doctrine. Instead he would focus on the more traditional Fourth Amendment approach of whether a person has a property interest in the records (Liptak, 2017a). The Fourth Amendment may grant broader protections to everything one has a legal claim to, which may include cell-site data. He did not go further with this idea as Carpenter did not brief this approach in the lower courts (Howe, 2018).

What about Carpenter? The case was reversed and remanded back to the lower court. However, this case may do little for him because of the good faith exception (Matbakis, 2018). In *United States v. Leon,* (*United States v. Leon*, 1984), the Court created the "good faith' exception to the exclusionary rule. If law

enforcement obtains evidence believing that they are acting according to the law, evidence they gather is still admissible in court, even if the law changes (*United States v. Leon*, 1984). This case changed the law, but the officers in the case did nothing wrong. They followed the law as it was when they investigated. The application of this case is for use in future investigations.

Conclusion

The Court was wise to decide the case narrowly and leave open the possibility of exceptions. The Court is trying to ensure that the decision does not embarrass them in the future. The majority does not see this case as a full broadly reaching manifesto for digital privacy, but they do see that a new discussion is needed on what the right to privacy entails and how the right applies to digital data. The Court tried to define some constitutional terms and a framework for that discussion. Roberts said case does not call into question conventional surveillance tools such as security cameras. It is not questioning other business records that might incidentally reveal location data. It does not apply to foreign affairs or national security collection techniques (*Carpenter v. United States*, 2018). However, the Courts ruling, while narrow, may have implications for all sorts of information held by third parties, such as browsing data, text messages, emails, and may even require a revisiting of bank records (Stern, 2018). The Court did not attempt to draw time lines as feared during oral argument. Line drawing can be done by Congress or, if needed, in some future case when the consequences of different time periods may be better understood. This case will cause a new series of cases on privacy data held by cellphone service providers, social media companies, and app makers. It will result in many cases for the Court to decide, but the Court seems content to apply old principles and develop new principles slowly, where needed, on a case by case basis.

One of the strengths of this case is that the justices recognize its complexity (Sorkin, 2018). Who owns information about another person? What privacy should people expect when they take location based phones everywhere they go and share everything through social media? Current devices can reveal not only movements, but also family, political, professional, religious, and social associations. The facts in *Carpenter* took place eight years ago. Cellphones have increased in abilities and storage capacity since the burglaries in *Carpenter*. Who knows what future devices will be able to do and how much stored information the law enforcement of the future will actually need? It will take the Supreme Court many years and many cases to get more clarified instructions to law enforcement personnel in cellphone cases. The best approach is probably for Congress to revisit the Communications Act, but Congress did need the Supreme Court to interpret the Fourth Amendment principles for new technology. This case helps with that task. The courts cannot do everything. Congress is the one who can have hearings and develop broader conversations. If both branches of government will do their part, reasonable solutions will appear. This writer thinks this conversation can now begin. Are cellphones an investigator's new friend? This question will be answered slowly through many Court deliberations and cases. Justice Frankfurter would be pleased.

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CRISPR and Patent Law: Molecular Biology Is Not the Only Thing That Is Confusing!

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Mark Twain, in *A Connecticut Yankee in King Arthur's Court*, wrote "a country without a patent office and good patent laws was just a crab and couldn't travel anyway but sideways or backwards" (Ladas & Perry, 2014). The battle over patents for scientific techniques, such as Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) appears to be moving like Twain's proverbial crab, more sideways than forward, meaning that this country's approach may not be in keeping with good patent laws. Former Chief Judge Paul Michel of the Court of Appeals for the Federal Circuit called *Regents of the University of California et al v. The Broad Institute Inc. et al* "the US patent case to watch in 2018" (Lloyd, 2018). This case will have a profound effect on patent law, scientific research, and business' ability to commercially use scientific research. This paper will explain CRISPR and review patent law in an effort to broaden the discussion to people in social sciences, biology, and law. People from broad, diverse backgrounds are needed to collaborate on ways to handle CRISPR type issues in the future. This topic and the resolution of the dispute is important not only in an academic sense for those in social sciences, biology, and law, but also is expected to have a dramatic impact on business profitability. Understanding the complexities of biology, along with patent law, can help provide clarity as to how the law might have to be modified and how the law should be applied to genomic discoveries and techniques, and what qualifies as an invention worthy of patenting. The ultimate goal is to avoid stifling scientific innovation or using excessive amounts of taxpayer money to defend academic institution patents.

Introduction to Molecular Biology

Before CRISPR can be defined, it's important that general biological terms and main principles of molecular biology are understood. All life on earth, from archeabacteria and eubacteria (prokaryotes) to animals and plants (eukaryotes) consist of one or more cells. Within these cells are double stranded helix shaped molecules that carry a genetic code that allows the organism to develop, grow, and reproduce. This code, or information, is called deoxyribonucleic acids or DNA for short.

DNA consists of three parts: a phosphate group, a sugar molecule, and one of four nitrogenous bases [(adenine, thymine, guanine, or cysteine). These three parts together are referred to as nucleotides. An organism's entire sequence of nucleotides, in their specific order, are referred to as the organism's genome. All cells within an organism contain the same genome. Within our genome are certain sections of DNA called genes that code for proteins. Proteins are important in that they are molecules that perform certain biological functions within our cells so that the organism can stay alive and reproduce.

By increasing or decreasing the expression of certain genes, and therefore the amount of proteins within that cell, we can create cells that look different and have different functions despite having the same DNA. To do that, the cell makes a single stranded copy from the double stranded DNA, called a messenger RNA, through a process called transcription. Messenger RNA can then be read and converted into a protein through a process called translation. This entire process of creating messenger RNA from DNA and proteins from messenger RNA is referred to as the "central dogma" of molecular biology.

The final biological term that should be addressed is allele. An allele is an alternative form of a gene. As an example, let's examine human eye color. Eye color is impacted by multiple human genes but for simplicity we will focus on one of the main genes, *OCA2*. *OCA2* has different alleles that impact their expression. If an individual has inherited alleles that result in low expression of the gene, and therefore

low levels of a protein involved in producing and storing melanin, the individual will have blue eyes. If the individual has inherited alleles that result in high levels of gene expression, and therefore a lot of that particular protein, they will have brown eyes. In this particular example, individuals can have slight differences in the DNA sequence that impacts eye color but has no negative impact on eye vision.

Some alleles for genes can negatively impact the structure and function of a protein. For example, within red blood cells, people have a protein called hemoglobin that binds oxygen in the lungs and then delivers it to different cells in the body. While most humans carry two copies of the normal allele that creates perfectly functioning hemoglobin, some individuals within the population have inherited two copies of the gene with a single nucleotide difference (i.e., a different allele) that results in sickle shaped blood cells under low oxygen environments. This results in sickle cell disease.

As illustrated in the previous example, a change or difference in the gene resulting in a slightly different protein can have negative consequences on health. The ability to change a gene, by editing the genome, so that the organism has better alleles and therefore better proteins is a game-changer for scientists and can lead to tremendous improvements for society in a number of different fields besides health. CRISPR happens to currently be the best technique on the market for editing genomes.

What is CRISPR?

CRISPR's roots can be traced back to the last 1980s. In 1987, Yoshizumi Ishino, Hideo Shinagawa, Kozo Makino, Mitsuko Amemura, and Atsuo Nakata, all from Osaka University, Japan (Ishino et al.,1987) were analyzing the DNA sequence from *Escherichia coli* (*E. coli*) when they identified a series of small segments of repeating DNA interspaced by non-repetitive DNA (spacer sequences). The scientists concluded at the time that the sequence was not similar to other publicly available DNA sequences in prokaryotes and they were unable to determine its function (Ishino et al., 1987). However, during the 1990s, DNA sequencing technologies improved to the point that more prokaryote genomes were able to be sequenced and this same pattern of DNA was routinely discovered in other prokaryote species. In 2002, Ruud Jansen, Jan D. A. van Embden, Wim Gaastra, and Leo M. Schouls, all from Utrecht University, Netherlands, were the first to define the pattern of CRISPR which consisted of short repeating DNA segments separated by unique DNA sequences. In addition, they also found a gene near the CRISPR location which was eventually called "CRISPR-associated proteins," or cas for short, (Jansen et al., 2002). Between 2005 and 2011, different laboratories determined that the CRISPR spacer sequences were actually foreign viral DNA spliced into the bacterial genome. Between several laboratory groups, they determined that the CRISPR region and the cas proteins, as part of a CRISPR-cas system, was an immune mechanism to defend bacteria against viruses (Barrangou et al., 2007; Bolotin, Quinsquis, Sorokin, & Ehrlich, 2005; Deltcheva et al., 2011; Garneau et al., 2010; Hale, Kleppe, Terns, & Terns, 2008; Makarova, Grishin, Shabalina, Wolf, & Koonin, 2006). In short, when a virus attacks a bacterium, the bacterium finds and cuts the attacking virus's DNA using a cas protein and then stores that segment of cut DNA within the bacterium's own genome. When attacked by that same virus later on, they can use the previously cut segment to help identify the virus genome to cut and kill the virus. The CRISPR sequence (the foreign viral DNA fragment) acts as a map to find the specific part of the viral genome, called a crRNA. The crRNA is also connected with another DNA sequence called a tracrRNA and together form a guide RNA. The guide RNA serves as a "homing beacon" for the cas protein. The guide RNA directs the cas protein to the correct site on the viral genome, activated by the tracrRNA segment of the guide RNA, and then, like a scissor, cuts both strands of the DNA.

In 2012, Jennifer Doudna, from the University of California, Berkeley, and Emmanuelle Charpentier, then from the University of Vienna (Berkley group) were the first team to figure out how the bacterial defense system could be modified and used as a "cut and paste" tool for editing genomes (Jinek et al., 2012). In the natural CRISPR-cas system, the tracrRNA have to come together as the "homing beacon" to cut the virus. In their modified system, the tracrRNA and crRNA are already together as one unit and the crRNA is a short sequence of DNA designed to cut a specific part of an organism's genome (Jinek et al., 2012). Using a specific type of cas gene called Cas9, they demonstrated that the technique could be used to cut specific DNA at any particular point in an organism's genome (Jinek et al., 2012). This could be exploited to make edits to the DNA. Since its discovery, scientists have quickly adapted the technology

for different types of cells and for a variety of purposes including the first group led by Feng Zhange, from Broad Institute of MIT and Harvard, to edit mice and human cells (Cong et al., 2013). These adaptations also sparked the debate about who should own patents using CRISPR technology.

The Importance of CRISPR

While CRISPR is not the first genome editing tool created, to date it is currently the most cost effective and most efficient method to use (Ricroch, Clairand, & Harwood, 2017), and CRISPR has been quickly adapted for editing gene sequences within mice, humans, and plants (Cong et al., 2013; Li et al., 2013; Nekrasov, Staskawicz, Weigel, Jones, & Kamoun, 2013). CRISPR has many potential applications but, perhaps, the most lucrative application could come from its use to cure human genetic diseases by editing dysfunctional alleles. As mentioned earlier, sickle cell disease is the result of a single nucleotide difference between the disease allele and a normal allele for the hemoglobin protein. Perhaps embryos that have the sickle cell allele can be edited to create normal hemoglobin proteins so, when the babies are born, they never have sickle cell disease. Humans have already been injected with CRISPR to cure disease (Kaiser, 2017). Human trials using CRISPR technology have already been approved, thus, at the time of the current paper's publication, human trials will have either started or will start soon (LePage, 2017; Reardon, 2016).

CRISPR could be used to improve crops by editing plants to have the best possible alleles for various traits such as crop yield or disease resistance (Ricroch et al., 2017). No longer would scientists have to resort to long breeding trials to understand which genes beneficially impact those traits. This would save agriculture breeders both time and money. The USDA has already stated that, as long as crops do not contain foreign DNA and the alleles can be naturally found within that species of plant, they will not regulate their use like traditional genetically modified organisms (GMOs) (Kwon, 2018; Waltz, 2016). This means these agriculture companies can develop these crops and not suffer the stigma and regulations associated with GMOs.

More controversially, but not outside the realm of possibility, CRISPR could be used for other applications such as de-extinction and designer babies. For example, CRISPR can be used to edit the genome of currently existing white rhino subpopulations to match the genome of extinct northern white rhino samples. In other words, CRISPR could be used to bring back extinct species or subpopulations. Scientists could possibly even edit elephant genomic DNA to recreate and reintroduce the wooly mammoth into the environment (i.e., an Ice Age version of the movie Jurassic Park) (Wray, 2017). CRISPR could also be used to create designer children (i.e., children genetically engineered *in vitro*) by editing the genome for reasons other than to cure disease to give the offspring "desirable traits". Certainly, de-extinction and designer babies are ethically controversial, but the CRISPR technology could potentially make this a reality. In short, CRISPR has the potential to be a game-changer and enormously lucrative. Therefore, it is understandable that scientists, who have created the CRISPR-Cas system for different types of cells and applications, wish to claim intellectual credit and potential royalties from licensing agreements.

Applicable Law

Statutory Development of Patent Law

The history of patent law goes back to medieval times when rulers, for a fee, would grant an exclusive right to use inventions. The granting of a monopoly/patent to exclusively use an invention was done on a case-by-case basis at the whim of a ruler. It was a convenient way to raise money (Ladas & Perry, 2014). Because of abuses, the Statute of Monopolies was passed to limit the power of the sovereign to grant monopolies (English Statute, 1624). The statute said that inventions had to be new to be granted a monopoly to its use. The granting of a patent could not be harmful to the state, for the sole purpose of raising prices on commodities. Also, the exclusive use would only be for a term of 14 years. This period of time equaled two training periods for craft apprentices.

In Colonial America, there were no laws that provided for patents. Inventors had to appeal to colonial governments for a grant to exclusively use their invention. The earliest grant was from the state of Massachusetts in 1641 (Cambridge, 1942). The passage of state-specific patent laws did not happen until 1784 in South Carolina. Until this point, both in the colonies of early America and under the Articles of

Confederation, the granting of patents had to be done on an individual, case-by-case basis. Early patent laws followed the Statute of Monopolies by allowing exclusive use of inventions for 14 years. American patents were also supposed to be for the advantage of society as a whole, rather than the main emphasis being on the property rights of the inventor.

In 1787, Article I, Section 8, of the Constitution gave Congress the power to make laws pertaining to patents. The Constitution was drafted in the U.S. during an industrial revolution in England and a pro-patent climate in both countries (Ladas & Perry, 2014). The first federal regulation of patents occurred in the Patent Act of 1790 (Patent Act, 1790). The Act gave the power to grant patents to the Secretary of State, the Secretary of War, and the Attorney General. A patent was granted for 14 years and required two of the three government officials to agree to issue the patent. To get a patent, something had to be important and useful. The first patent was issued on July 31, 1790, to Samuel Hopkins for a new apparatus and process for the making of Pot and Pearl Ashes (USPTO, 2001). George Washington signed the patent. The act was repealed and replaced in 1793. Besides being important and useful, the 1793 change said the subject of a patent also had to be new. The 1793 replacement was amended in 1832 and allowed resident aliens, who declared an intention to become a citizen, to obtain a patent. A major review was undertaken in 1836 in response to complaints about the granting of patents for things that were not novel (Ladas & Parry, 2014). In the application for a patent, the inventor had to distinguish his invention from prior inventions. There was also a procedure to resolve conflicts between competing applications. The Act also allowed for the extension of a patent for 7 years after the original 14-year period. The act established an official patent office, which was chaired by a Commissioner for Patents, rather than the Secretary of State. This allowed for more efficient granting of patents and freed the original three government officials from the duties of granting patents.

Patents were viewed unfavorably during periods of depressions, such as the 1890 and 1932 depressions, and again in the depressed economic conditions of the 1970s. During these periods, patents fell out of favor (Ladas & Perry, 2014). The Sherman Antitrust Act in 1890 was passed due to a concern over the power of big business (Sherman, 1890). The Act tried to prohibit agreements in the restraint of trade, such as through monopolies and product control. Patents, during challenging economic conditions, were viewed as a way to promote monopolies. Courts during these periods tended to invalidate patents. In 1980, Congress passed the Patent and Trademark Law Amendment Act, also known as the Bayh-Dole Act (Bayh-Dole Act, 1980). This act grew out of the recession of the 1970s. Before the Act, intellectual property that was created or discovered using federal funds belonged to the federal government. The Act allowed universities, small businesses, or non-profit institutions to acquire ownership of inventions from the inventor. Before the Act, the government had acquired 28,000 patents. This allowed patents to be put to use and developed into industries in the private sector.

In 1952, during a period when patents were valued and better protected, Congress passed the Patent Act of 1952 (Patent Act, 1952). In the Act, an inventor had to show that the invention was not only new and useful, but also non-obvious to get a patent. Congress created the US Patent and Trademark Office (USPTO) in 1975 to delegate power to the USPTO to enact laws relating to patents. Now patents could be issued for 20 years. In the early 1980s, with the election of President Ronald Reagan, and the country's return to a pro-business focus, emphasis against anti-trust enforcement again went out of favor. In 1982, the Court of Appeals for the Federal Circuit took the place of the Court of Customs and Patent Appeals. The court was pro-patent and provided more protections to the holders of patents. In 2011, the Leahy-Smith American Invents Act changed the patent system from granting patents to those who first invented something to granting patents to the first inventor to file for a patent (Leahy-Smith, 2011). The Act went into effect March 16, 2013.

Court Development of Biological Patent Law

Patent law, in Title 35, Section 101, says that anyone who "invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent" (Inventions Patentable, 2018). The US Supreme Court has mostly interpreted this statute broadly to encourage innovation. However, courts have set limits on biological discoveries of "laws of nature, natural phenomena, and abstract ideas" (Ku, 2017). Laws of nature also include products

of nature, although the courts have had difficulty defining what is considered a "product of nature". The Supreme Court has tied "natural" to a scientific concept rather than creating a legal term and articulating factors to help courts decide if something is natural. Using scientific concepts has not resolved the tension concerning what is natural. Some claim the concept can be too restrictive because the phenomena of nature are the basic tools of scientific research and technological work. By interpreting a scientific definition of "natural" too literally, nothing would be able to be patented in the biological sciences. Similarly, interpreting the concept too broadly, everything could be patented (Ku, 2017).

In *Funk Bros. Steel Co. v. Kalo Inoculant Co*, 1948, the US Supreme Court had to decide where to draw the line between what was patentable and what was a law of nature deemed not patentable (Funk v. Kalo, 1948). The facts in this case involved the discovery of a process to better help plants take nitrogen from the atmosphere. In the natural environment, some plants are not able to take nitrogen easily from the atmosphere. For example, legumes, like beans, are a type of plant that do not take up nitrogen easily, and have bacteria in the roots that help do this for the plant. Different types of bacteria were needed since no one type of bacteria worked with all plant species. Some bacteria were even incompatible with other types of plants. Scientists discovered a group of bacteria that could work together and be used for different types plants. *Kalo* was the first to package and sell this mixture. Later on, Funk used *Kalo's* idea and made and sold the same mixture of bacteria. *Kalo* sued for patent infringement. Justice Douglas, writing for the majority, concluded that the bacteria were "the work of nature" and could not be patented (Funk v. Kalo, 1948). The US Supreme Court held that "a facially trivial implementation of a natural principle or phenomenon of nature is not eligible for a patent" (Funk v. Kalo, 1948). In other words, it was ruled that selecting appropriate bacteria and packaging them together was not enough to be patentable.

The Supreme Court revisited this case in *Diamond v. Chakrabarty* (Diamond, 1980). This case considered whether GMOs could be patented. Ananda Chakrabarty genetically modified a bacterium to break down oil and wanted to patent that organism. Historically, no living organism had been patented. Under the Patent Act of 1952, the newly created bacterium was considered to be manufactured and did not exist in nature. Thus, the Supreme Court said it could receive a patient. The USPTO interpreted this case broadly, and this encouraged research in the medical and biotech industries. Without this ruling, the CRISPR-Cas9 research would not be patentable.

In the 2012 *Mayo v. Prometheus*, the Supreme Court unanimously held that a patent request for a personalized method to administer a drug to a patient could not receive a patent (Mayo, 2012). The correlation between naturally-produced metabolite levels in the body and the dosing range for the drug was considered a law of nature.

In 2013, the Supreme Court further clarified what living things could be patented. In *Ass'n of Molecular Pathology v. Myriad Genetics, Inc.,* the Supreme Court affirmed a lower court's decision that a company, searching for a gene for breast cancer, could not patent an isolated DNA sequence because DNA sequences exist "naturally" in nature (Association, 2013). However, scientists that take single stranded RNA and remake it into double stranded DNA might be able to get a patent because double stranded RNA does not exist in nature. Justice Thomas, in writing the majority opinion of the Court, stated, "If the company had created an innovative method for manipulating genes…it could possibly have sought a method patent" (Association, 2013). The process used by *Myraid* was well understood and widely used. Any scientist looking for a breast cancer gene would have used the same approach.

In *In Re Roslin Inst*., the US Court of Appeals for the Federal Circuit, held that "Dolly the Sheep" could not receive a patent (In Re Roslin, 2014). The sheep was the first mammal cloned from an adult somatic cell. The method for doing this was patented, and was not an issue in the case. Dolly could not be patented because, using the *Myrid* decision, no genetic information of the clone was created or altered.

In the case *Alice Corp. v. CLS Bank Int.,* concerning a computer-implemented electronic escrow service, the Supreme Court created a two-part test for what can be patented as an exception if the subject of the patent does not technically fit what is allowed under current patent laws (Alice Corp., 2014). The United States Code says that anyone who "invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent subject to the conditions and requirements of this title. (Alice Corp, 2014). Thus, only inventions that fall

within the categories of process, machine, manufacture, or composition of matter are eligible for patents. Laws of nature, natural phenomena, and abstract ideas are not patent eligible. They are "manifestations of nature which are free to all men and reserved to none" (Alice Corp, 2014).

The Supreme Court, in *Alice*, articulated a two-part test for distinguishing patent-ineligible concept claims from those that are still patent-ineligible, but now judicially- created exceptions. Inventions that are derived from a product of nature are not patentable, whereas those that are derived from human intervention can fall within a judicial exception. Under *Alice*, the first part of the test is to decide if something is patentable under the requirements of the Patent Act. To get a Patent under the Patent Act, something has to be an invention or discovery of a new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement. In *Alice*, a software implementation of an escrow arrangement on a computer, was not one of the listed items in the Patent Act. Escrow is not a patentable invention. The court considered it an abstract idea. An escrow is an account that is set up to pay for future expenses. In the past, it was done on a physical ledger. Its implementation on a computer to manage future payments, does not raise it to a patentable level. It was like the personalized drug method in *Mayo*. It was still a patent-ineligible abstract idea despite being done through a computer. CRISPR, on the other hand, would pass the first part of the test in *Alice*. Nature-inspired products like CRISPR must possess different characteristics from those found in nature. Different characteristics could include things like different biological functions or characteristics, different chemical or physical properties, different phenotype, or different structure and form. If the nature based product has different characteristics, it is patent eligible. The CRISPR-Cas technique is patentable because it not only modified the system to have the tracrRNA and crRNA together, but is also able to target non-viral DNA to cut and edit an organisms genomic sequence (Ku, 2017). It is a "new and useful process" inspired but not copied from nature and therefore, it comes under the Patent Act and is not an abstract idea.

If a patent request does not meet the first part of the Alice test, then it may still be able to receive a judicial exception if it passes step two of the *Alice* test (Ku, 2017). The second step determines if there is any "additional element" that transforms the claim into something that is a potentially patent-eligible implementation of the idea. There needs to be an inventive concept. In *Alice*, there was no inventive concept like there is with the gene manipulating concept of CRISPR-Cas. It was the ordinary and customary use of the computer requiring "generic computer implementation." In the case of CRISPR-Cas, there is no reason to go to the second part of the Alice test since it would be patentable under part one. CRISPR-Cas is patentable under the second step of *Alice* because the additional element is the transformation of a bacterial immune system to destroy viruses into a genome editing tool for multiple species. CRISPR-Cas was no longer just an abstract idea but a new method to edit genomes that does not exist in nature.

In 2011, in *Stanford University v. Roche Molecular Systems, Inc.,* the Supreme Court settled the issue of who owns the rights to inventions after the Bayh-Dole Act of 1980 (Stanford University, 2011). The university thought they had the rights to an employee's invention/research under their employment agreement. The employee assigned rights to the invention/research to the Roach Company as part of their employment. The Supreme Court concluded that the Bayh-Dole Act did not change the old rule that the title to inventions/research belonged to the inventor, even if the person worked at a federally funded lab. Stanford did not negotiate a good agreement with the researcher to have patents pass to the university (Stanford University, 2011). Now institutions have created better contracts with their employees to avoid this situation. Under employment contracts, an inventor's research usually belongs to the employers' school since they are using the institutions research facilities.

The Problem

In 2014, two groups of inventors filed applications for patents. Jennifer Doudna, and Emmanuelle Charpentier (Berkley group) were the first team to discover the biology that underlies CRISPR. In May 2014, they filed for a patent that described the use of CRISPR-Cas9 gene editing only in terms of prokaryotes. However, their patent request was broader. They asked for a patent "in any setting, including eukaryotic cells and other cell types." They did not demonstrate editing in eukaryotic cells (Tuttle, 2016). In December 2014, Feng Zhang, of the Broad Institute of Harvard and the Massachusetts Institute of

Technology (Broad group), filed for patents for the use of CRISPR in eukaryotic cells. These are cells found in organisms such as plants and animals. These patents are potentially the most lucrative application of the gene editing technique because it covers applications of the technique to treat human genetic disease and agriculture. Although the Berkeley group filed first, the Broad group opted for an expedited review and got its patents approved first (Zang, 2016).

Berkeley then initiated an interference proceeding before the patent office's Patent Trial and Appeal Board (PTAB). They argued that Broad's patents overlapped with their still pending CRISPR patent. Once the Berkeley technique was demonstrated in 2012, they argued that it was obvious the technique could be applied to human and plant cells. The Berkeley group argued that if you can cut and edit bacteria DNA, being no difference between prokaryotic and eukaryotic DNA base-pairs, it should work in both systems. They stated that their patent covered all uses of CRISPR, including its use for humans. Since the technique's application to eukaryotic cells was "obvious," Broad could not patent that application (Pollack, 2017). The Broad group argued that if it was obvious, why then didn't the Berkeley group demonstrate its use in eukaryotic cells. In February, 2017, the PTAB concluded that the granting of the Broad's patents were separate, did not overlap, and did not interfere with Berkeley's still pending patent. They also concluded that the Berkeley patent did not specifically cover eukaryotic cells (Pollack, 2017). Berkeley, while inventing CRISPR, only got the technique to work in bacteria or free-floating DNA. The Broad group argued that Berkeley's work did not automatically mean that the technique would work in more complex environments. Berkeley countered that they were the first to engineer CRISPR-Cas9 for use in all environments, non-cellular as well as plants and animals. The Broad group argued that it was not intuitive and there was "no reasonable expectation of success" that CRISPR would extend beyond bacteria and it took extensive work to apply the technique to eukaryotic cells (Akst, 2016). The PTAB did offer Berkeley some hope on their patent. In their opinion, the judges wrote, an "earlier disclosure of a genus does not necessarily prevent patenting a species member of a genus" (Pollack, 2017). This means that maybe the Berkley group could get a patent for the CRISPR technique in any organism, while the Broad group can get a patent specifically for use on humans and animals.

In April 2017, Berkeley appealed PTAB's decision to the US Court of Appeals for the Federal Circuit (Appellant Brief, 2017). They are arguing that the patent board made "fundamental errors of law" that could result in the overturning of the patent board's decision. They reiterated their claim that applying CRISPR to eukaryotic cells was so obvious that six different labs did it in the same time frame as Broad. Patent examiners, before Broad's patent applications, even rejected similar patent application from Sigma-Aldrich and ToolGen because the examiners concluded the requested patents were obvious and not novel in light of Berkeley's disclosed work (Appellant Brief, 2017). The PTAB ignored this and concluded it was not relevant. This was a fundamental error. The Broad group, in their filings, argued that Berkeley failed to provide new evidence that would undermine PTAB's decision (Appellee Brief, 2017). Broad said in a statement that "the [Berkeley] brief hinges on its argument that, although [Berkeley's] work simply involved characterizing a purified enzyme in a test tube, it rendered obvious that genome editing could be made to work in living mammalian cells" (Akst, 2017).

Oral arguments were held April 30, 2018. If the Federal Circuit Court decision is going for the Broad group, the decision should come in May of 2018. If the court is deciding for the Berkeley group, it will likely be 60-90 day before the decision is handed down. Courts generally defer to the patent office, so Berkeley has an uphill battle to prevail. If Berkeley does not prevail, there is still the question of whether Berkeley will get its patent. Jennifer Doudna, in a phone interview with reporters, said "They have a patent on green tennis balls: we will have a patent on all tennis balls" (Rogers & Niiler, 2017). This follows the PTAB's opinion where Berkeley could get a patent for all cells (i.e., all tennis balls), while Broad has patents for a particular eukaryotic species (i.e., green tennis balls). If this is the case, then companies wanting to use CRISPR in areas like medicine and agriculture will need a license from both the Berkeley group, as the inventor of the technique, and the Broad group, as the ones who applied the technique to eukaryotic cells (Rogers & Niiler, 2017). The Broad group also argued to the court that, if both teams will have patents, then Berkeley is not harmed by the Broad's patents. Berkeley will still collect fees from their patents. Thus, the court does not need to invalidate Broad's patents (Appellee

Brief, 2017). If Berkeley loses, it will be in the same situation it is in now. Berkeley could try to appeal to the US Supreme Court. However, the Court may not accept the case as the issues more involves questions of fact. It does not appear to involve compelling legal doctrine that causes other cases to get accepted by the Court. More likely there will be some cross-licensing scenario or settlement by the two sides. The worst-case scenario for Berkeley would be that they only receive a patent for the use of CRISPR with bacteria. This "winner take all" scenario is unlikely as the Broad group would have to prove that they actually invented the technique.

Both sides are also fighting for patents to CRISPR around the world. Other teams from other countries are also battling for overseas patents, especially in China and European countries (Cohen, 2017). The European Patent Office follows the 2011 Leahy-Smith Americans Invents Act in the United States. They grant patents to the first inventor to file for a patent. However, they have a technical requirement that requires all inventors to be listed in applications for patents (Ledford, 2017). Broad's patent applications in the United States included Luciano Marraffini, of The Rockefeller University in New York City, as an inventor. A disagreement between Rockefeller and the Broad group over Marraffini's role in CRISPR inventions resulted in Broad leaving him off the list of inventors in nine out of ten European patent office applications. Neither Marraffini nor Rockefeller assigned their rights to the Broad group (Servick, 2018). This has already resulted in some of Broad's applications being rejected. This rejection could result in the Broad group not being the first to file overseas. Their original application could be dismissed because they failed to include an inventor. If they have to refile with all inventors listed on the application, then their filing date would be after the Berkeley group. Berkeley, or even another filer, could be the winner of patents in Europe (Life Sciences, 2017). The Chinese Intellectual Property Office granted the CRISPR patent to the Berkeley group in both cellular and non-cellular settings in prokaryotes and eukaryotes, including humans (Buhr, 2017).

Lessons

Why did Berkeley lose at the PTAB? One thing the judges cited was Doudna's own statements. Doudna admitted to reporters, "We weren't sure if CRSPR-Cas9 would work in eukaryotes—plant and animal cells" (Begley, 2017). She admitted that her team experienced "many frustrations" getting CRISPR to work on human cells (Begley, 2017). She cautioned those interested in applying the technique to human cells that genetic "techniques for making these modifications in animals and humans have been a huge bottleneck in both research and the development of human therapeutics" (Begley, 2017). This caused the patent judges to conclude with Broad that it was uncertain that the technique would work in eukaryotic cells and the ability to apply the technique was not intuitive (Brown, 2017). This sends a scary message to scientists (Begley, 2017). Scientists are taught to be honest about uncertainties in their research. If scientists now see this honesty being used against them and their research, there will be a temptation to "lawyer up" and not say anything that could be used to undermine a patent request.

Fighting all these appeals is very expensive. It was estimated, in the summer of 2016, that legal fees for both sides passed $15 million (Brown, 2017). Unfortunately, legal fees have only continued to rise since then. Schools that rely on taxpayer dollars as well as tuition to operate should not engage in these cases and appeals. Also, scientific research is often partially funded by grants. While some grants can come from private businesses, grants often come from taxpayer dollars. Are taxpayer dollars now being used to fight for patents? Patent law needs to change so that parties, especially those that do not have deep pockets of private money, are pressured to use mediation or arbitration to settle patent claims in a more cost-effective fashion. This case will ultimately result is a settlement. Most people see the solution to require cross-licensing. If both sides arrived at this conclusion earlier, both sides would have saved money that could be better used for additional research. People should not be encouraged to fight for winner-take-all solutions.

Licensing agreements should not be so expensive that only a few can purchase and use them. Scientific discoveries often have a short period of time when they are unique. Zhang, in 2015, discovered CRISPR-Cpf1, a new version of CRISPR-Cas9 as it uses a simpler and more efficient enzyme (Begley, 2017). As Cpf is a protein found in *Prevotella* and *Franciscella* bacteria as part of their CRISPR-Cas system that can cleave DNA, he was able to receive patents for this discovery (Brown, 2017). If licensing

agreements are too costly, others will just modify CRISPR or even come up with a completely different technique. Chinese researchers published a paper on a new editing system from *Natronobacterium gregoryi* Argonaute (NgAgo) that can be used to edit mammalian DNA. This could make both Berkeley's and Broad's patents much less valuable.

Patent battles can slow scientific research that makes use of a technique like CRISPR. What is the place of patents in scientific research? Does the patent process help or hurt science in the end? Legal rights can get confused with scientific credit (Yirka, 2017). Patients are supposed to encourage and recognize scientific discovery by rewarding universities and companies for their accomplishments. As inventors, they can use their discoveries for profit and they can limit others from using their discoveries without purchasing a license from them first. The profits can allow them to do even more research. This is not always the case. In 2000, in a survey of more than 1200 US geneticists, half of those scientists reported that they felt patents related to genetic testing had limited their research (Brown, 2017). Scientists have argued, instead of patents for a scientific process, a more open and collaborative system should be used to share research and encourage development of promising techniques. The old wink-and-nod custom of not enforcing patents for academic research is not enough to protect important discoveries. Medical advancements run the risk of being slowed if every case develops into legal challenges and appeals as developed in the CRISPR case (Ledford, 2016). Both parties have licensed their technology to several firms. That research is held up until the legal fights are resolved.

Conclusion

Patents should be drawn narrowly to avoid ambiguously implied claims, and leave room to reward others for advancing knowledge in areas previously left unexplored (Genomeweb, 2017). This guideline is consistent with, both, the reason we have patents in the first place, and with the revocations of patents by courts when big companies seemed to be stifling economic growth in times of recession. An example of a narrow patent in the CRISPR case would be to give researchers a patent to cover just one part of CRISPR, such as giving the Berkeley group a patent to CRISPR's use in non-eukaryotes such as bacteria. Broad group's patent should also be narrow and only cover what was actually demonstrated to work. A broad patent to the entire technique and all possible applications may not encourage development of the technique and research into newer applications. Patents need to be issued for the public benefit as well as the benefit of the inventor or organization that holds the rights to the discovery. The Bayh-Dole Act was passed as a way to encourage commercialization of federally funded research. The CRISPR patent battles have demonstrated that patent fights waste time and money as different parties try to duplicate each other's work and then spend excessive amounts of money trying to win patents and challenge other's patents. Moving from the first to invent to the first to file was an attempt to lessen CRISPR type challenges. Inventors will be able to get acclaim as the first to invent something. A patent is important for the commercial development of an invention. A person does not need a patent to be given scientific credit as the inventor. Separating these two concepts may help, but it will not eliminate battles. Battles can be expected especially when a discovery is especially likely to generate great profit. If broader patents are considered to be a better approach, then maybe some statutory changes are needed to encourage different battling sides to settle and share patent revenue. If Berkeley holds the parent "to all tennis balls" and Broad holds the patent to just green tennis balls, then mediation or arbitration would be a better approach to simply consider how each side should share profits, if any. This better serves the public, wastes less resources and time, and allows additional research and development to move forward. Regardless, *Regents of the University of California et al v. The Broad Institute Inc. et al* in 2018 will be a very important case to watch. No matter how this case is resolved, maybe further legislation should also be considered to clarify government-use rights for federally funded research and possibly extend them to grantees and contractors. Inventors and the public have needs. These needs must be balanced in order to advance discoveries. Fights like the CRISPR battle keep us moving sideways, like Twain's crab, rather than moving forward.

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Poverty Stricken Bank Account Holders Experience a Dwindling Effect on Their Personal Savings

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Abstract

Comparatively United States and Kenya banking industries impose account fees to account holders. Imposing bank account fees to account holders in regions with high poverty levels contributes to their inability to improve and sustain their living conditions. The purpose of the qualitative analysis was to explore the views and effects of the established bank account fees directives on account holders that lived in high poverty areas and lacked meaningful resources to earn income to sustain themselves. In addition, researcher wanted to capture the existence of sustainability as an economic development that allows residents to address their needs today and can save for future needs. Participants were a purposeful sample of 220 residents of the Kisii-Kenya locale with existing or closed bank accounts that had incurred monthly bank charges. Data collection was via open-ended interviews and surveys; the content was added to NVivo 10 software to generate common themes. The emerged themes confirmed that the monthly charges imposed on each account holder to maintain their account impacted participants living in poverty regions especially those with no other means to earn resources to sustain their well-being.

Keywords: agriculture, banking, education; food staple, poverty, sustainability

Introduction

Kenya lies across the equator in East-central Africa with neighboring countries Tanzania, Uganda, Ethiopia, and South Sudan (shown in Figure 1). Kenya's population is 45.6 million people (as shown in Figure 2) in 2014 with 75% of Kenyan population dependent on agriculture for income and food (GeoHive, 2015). Kenya is well known as one of the main producers of tea, a product that is handpicked by farmers and contracted employees (as shown in Figure 3). Kenya tea growers consist of small scale 260, 000 farmers and private estates of 60 to 75 contribute to the country being named as one of the leading black tea producer behind China and India (see Table 1) with 303, 308 tons in 2015 (SoftKenya, 2011; The Tea Board of Kenya, 2012). The GDP (Gross Domestic Product) in Kenya was at $60.94 billion with an approximate population of 44, 863583 in 2014 and an estimated GDP growth of 6.0% for 2015, 6.6% for 2016, and 6.5% for 2017 (GeoHive, 2015; World Bank, 2015). Kenya National Bureau Statistics confirmed a GDP growth rate of 1.27% from 2005 to 2015 (Trading Economics, 2015).

The research study focused on residents in the rural region of Kisii (shown in Figure 4) located in the Western region of Kenya. Kisii region hosts a population of 2.2 million in 245,029 households with 51% of the population living under the poverty line (GeoHive, 2015; Muthaiga, 2014). Ninety percent of the Kisii residents depend on small scale farming of food staples that include bananas; maize; beans; potatoes; dairy farming; and crops such as tea; coffee; sugarcane; and pyrethrum (Muthaiga, 2014).

The combination of the population growth and the circulation of monies in the region have contributed to the substantial increase of banks in Kisii town to a total amount of 18 active banks in 2015 as listed in Table 2 (Banks Kisii, 2015; Muthaiga, 2014). The Kisii region experiences a substantial growth of banking industries from five long existing banks that included Kenya commercial bank; Barclays bank; National bank; Post bank and Co-Operative bank (Banks Kisii, 2015; Muthaiga, 2014). The new entrants

of banks in the Kisii town region have not minimized but increased the cost of banking for local residents forcing the local government constituency to request certain banks such as Central Bank to help in the reduction in cost of money handling for the residents and attract investors (Muthaiga, 2014). The Kisii town hub deriving commerce from agriculture has also experienced a growth of other businesses that include hotels; restaurants; large chain supermarkets; and the recognized global brand Coca-Cola has a bottling plant in the region (Muthaiga, 2014).

Background

Monthly fees to maintain account holders bank accounts are not only charged to bank account holders in Kenyan banks but also in western regions such as United Stated (US); a country with a GDP of $17.42 trillion and a population of 318.9 million in 2014 (World Bank, 2015). Multiple banks in US established fees to account holders in attempt to replace lost funds that were correlated to the federal restrictions on the overdraft charges and checking or credit card interests (Evanoff, 2011; Gallagher, 2011; Hargreaves-Alle, 2011). Sharing some real-time examples, the Bank of America charged fees based on the amount of business the account holder conducts with the bank; in other aspects the account fees were omitted for some customers with substantial business; and up to 25.00 per month was charged to account holders with minimal businesses (Gallagher, 2011). Similarly, First Tennessee charged up to $3.00 per month, while SunTrust charged $5.00 per month, and Wells Fargo tested $3.00 per month fee in five states (Evanoff, 2011).

Banking industries such as SunTrust Banks; Regions Financial Corp; Wells Fargo & Co.; and J.P. Morgan & Chase & Co. also established policies of charging account fees to account holders on services that used to be free; while Citigroup Inc. and PNC Financial Services Group Inc. announced no implementation of the monthly fees to their customers (Sidel, 2011). To address the complaints from outraged consumer's sensitive to the monthly lucrative fees about the inability of saving money; ING DIRECT in Toronto Canada offered the no-fee option for their consumer's daily banking needs which in turn rewarded the bank with increase in business (Sidel, 2011; PR Newswire (2012). Similarly, in Israel Bank Hapoalim ceased their checking account fees while Bank Leumi opted to offer a new Digital Leumi Total plan that would carry no monthly fees and maintained monthly fees that ranged from (Israeli New Sheqel) NIS 10 to NIS 35 with an exchange rate of 0.26 US Dollar (Exchange Rates, 2014; Nissan, 2014).

In an effort to combat the criticism in the US, the National Capital Bank confirmed they would prefer to maintain their consumers respect and confidence and avoid raising any fees because the fees had no substantial impact on the banking industries financial goals and the bank (Business Wire. (2011). Similarly, HSA Bank, a division to Webster Bank N.A and holly-owned subsidiary of Webster Financial Corporation and credited for providing consumers and businesses with financial planning; mortgage; investment; internet and telephone banking initiated new policies of eliminating account set up and card renewal fees (PR News, 2009). HSA banks decision to eliminate the account charges came after an annual Consumer Benchmark Survey that confirmed consumer complaints about bank fees from (PR News, 2009).

Method and study procedure

This qualitative explorative case study was essential in explicitly identifying the views and effects of the established bank account fees directives on account holders that lived in Kisii Kenya a region with high poverty where participants lacked meaningful resources to earn income to sustain themselves. The participants were recruited via word of mouth at local churches, community events, at bank line up, and forwarded to other residents that wanted to participate in the case study. The target population for the study was an age bracket consisting of bank account holders of the age range of 60 years of age and above. The selection of this specific age range was in attempt to capture the residents that raised complaints about the banking fees and had a minimal understanding about the imposed account fees. The sample population also consisted of Kisii locals with minimal education and understanding of banking industries policies and procedures that include charging account fees but had the notion that they could sustain themselves with minimal interest received from the monies put aside in their saving accounts. Five questions were designed and given to all participants; face-to-face interviews were administered to

participants that couldn't read or write in English while the rest of the participants completed and returned the surveys to the authors. The results from 220 local Kisii residents that were willing to partake in the research were retrieved, cleaned up, analyzed into themes with the use of Nvivo 10 software. The selection of Nvivo software helped in the ease of organizing and analyzing the research results; the Nvivo software is validated and has been used in existing research conducted by Nelson (2016) on Methodology for examining attributes of African Americans in the department of defense senior executive service corp published in the *Journal of Economic Development, Management, I T, Finance, and Marketing; research by* Kikooma (2010) on the publication on Using qualitative data analysis software in a social constructionist study of entrepreneurship published in *Qualitative Research Journal*
and research; and research by Adetoro & Damilola, (2016) on the. Attitudes of Nigerian facilities management professionals to the benefits of benchmarking published by *Facilities.*

Research Findings

General results:

The study findings generated the following themes from poverty stricken bank account holders who shared their experiences on the dwindling effect on their personal savings that impacted their sustainability:

1. Small scale farming as source of sustainability
2. Unemployed workforce as a contributing factor to poverty
3. Bank account balance dwindling monthly
4. Monthly maintenance fees correlation to less sustainable participants
5. Educating participants on banking policies and applicable charges

Specific Results:

The study findings revealed that the participant's main source of income stemmed from small scale farming and served as the most imperative economic activity in Kisii, Kenya. Participants were involved in small scale farming with limited technology to till; plant; irrigate; harvest; and store their food. All the participants shared that "the tilling of land was cumbersome and took place on certain months depending on rainfall months; the process was done by hand using digging hoe" (shown in Figure 5). Funding by local banks and high unemployment rates contributes to participant's inability to afford the cost to purchase or rent farming equipment's. Planting of the food staples was done manually with one person digging the hole and another placing the seeds and covering the seeds (shown in Figure 6) in an area that was less than five acres of land owned or occasionally leased for the season. Participants also shared that "the harvesting of food staples was not guaranteed because the farmers were heavily dependent on rainfall for all their irrigation needs." The findings reveal that the participants were susceptible to suffer loss when there were periods of unexpected drought thus contributing to lack of enough resources to sustain their homesteads. The results confirmed that on good years when the participants experienced rainfall and sun balance, the harvesting season was done by hand (as shown in Figure 7) with the farmer's family members or contracting out the services for a fee that had to be paid after the day's harvest was done not weekly or monthly. The harvested food staples would be heaped in the home compound (as shown in Figure 8) where the harvest would be sorted out in sections of what to sell for income store for consumption, and animal feed.

Participants expressed that their region exhibited high unemployment rate and dense population in their locale contributed to their poverty and lack of sustainability because they had no other means of earning income besides the small-scale farming. Participants noted "at our old age we now depend on our children, but there are so many youths without jobs in our region." To maintain enough food supply for their family, the participants shared "because of lack of job in our region we have to think of long-term preservation therefore we keep some food staples to last us until the upcoming harvest season." The results confirmed that participants needed to attend to their basic needs that included purchase of oil for cooking, sugar for their tea or coffee, and even raising funds for their children's education forcing participants to sell majority or all of their harvest to sustain themselves and their families. The findings also revealed that those participants that planted nonfood staples such as tea, sugarcane, and pyrethrum

for sale to the local processing plants had to in-turn use their revenue to buy resources to sustain their living.

The participants' results revealed that the safe keeping of monies earned from farming was entrusted to the banks in Kisii town. Participants confirmed that the element that attracted them to opening savings accounts at the local banks was the potential to earn some interest from the banks thus can sustain their long-term needs. The results confirmed that the participants' notion of gaining interest on active saving accounts came to a screeching halt when each of the participants realized that their savings were dwindling monthly because the banks had enforced monthly banking fees to be deducted from the existing savings on monthly basis. The participants' findings revealed that the bank account holders were furious of the monthly deductions and expressed "why are the banks taking my money that I trusted them for safekeeping without even notifying me." The findings confirmed that the deduction ranged from one hundred shillings to five hundred shillings per month depending on the bank (one hundred shillings was an equivalent of one US dollar on October 25, 2015 by Wave registered to worldremit.com and a comparison of standard of living as shown in Table 3). The study findings revealed that the participants were not officially notified of the monthly maintenance fees deductions done by the local banks. The participants shared that "we checked our bank accounts and saw the difference in the amounts from our original deposits and raised our complaints about the charges to the bank." In addition, participants shared that "in my next visit to the bank when I noticed that my account balance was lower than my last transaction, I asked the agent who then told me about account fees, something I was never told before." The results revealed that formal documents were never mailed to participants advising them of the monthly charges. Participants shared that "the monthly deduction ranged from 400 hundred shillings to 1000 hundred shillings per month depending on the bank" and the findings revealed that the participants were advised individually at the time of complaint. The bank deductions from the customers' existing saving accounts came as a surprise thus contributing to poverty as confirmed by the sample participants who shared that they had no other means to gain supplemental income other than from farming. The participants also share that lack of notification that bank fees would be charged to maintain the account contributed to accounts dwindling down thus leaving them with no money in their accounts and with lack of savings they were categorized as participants' below poverty level.

Participants understanding of a savings account were of a possibility of earning interest on their savings enough to sustain themselves not deductions to maintain their account. The study results validated that banks didn't educate participants thus lacked knowledge of the monthly fees and did not understand the correlation of the deductions to their personal savings account. The participants shared that they didn't recall the bank representative advising them of monthly maintenance fees at the time of account set up and never received any written document. Participants reiterated their revulsion of the banks deducting their hard-earned money from farming by establishing monthly maintenance fees was an element that contributed to their poverty thus inability to sustain themselves.

Conclusion and Discussions

Banks throughout the world establish or opt out of charging the monthly maintenance fee to account holders. In the US the bank's decision for charging monthly fees had a connection to the banks intention of recovering the costs incurred for opening the savings account and as means of recovering lost revenues (Evanoff, 2011; Gallagher, 2011; HT Syndication, 2013). Specifically, the consumers' loss of their bank accounts had a correlation with the Federal Reserve's decision to impose fees on debit card thus contributing to the inability of the consumers to afford the additional cost charged to their accounts (Hargreaves-Alle, 2011). The US consumers that were not willing to pay the bank account fees used the option of mobile-only banking offered by Wal-Mart while others opted to use prepaid debit cards an option unavailable to Kisii, Kenya consumers (Hargreaves-Alle, 2011). On the contrary the Kisii Kenya residents that were part of the research confirmed that they were obligated to pay the established monthly maintenance fees and had no other available options of performing their banking needs other than opting to permanently close their bank accounts; an action that some participants took an effort to sustain themselves.

The purpose of the qualitative analysis was to explore the views and effects of the established bank account fees directives on account holders that lived in high poverty areas and lacked meaningful resources to earn income to sustain themselves. In this research we also looked at the aspect of sustainability as an economic development that allows people to address their needs today and have the ability to save for future generations (Kinicki & Williams, 2015). The research results confirmed that the local Kisii residents were dependent on small scale farming as their main source of income and the imposing of monthly charges by banking industries came as a surprise. Participants shared that they entrusted their savings to the local banks in Kisii for safekeeping and were enraged noting that the banks were stealing from poverty stricken participants. Existing data from Unicef noted that the literacy of levels among the youth of ages 15 to 24 in Kenya is at 83% (Unicef, 2015); while data from Worldbank (2015) confirmed that Kenya was a country that had 17.1% unemployment rate in 2011 and an increase to 17.4% among youths in 2015. The 17.4% unemployment rate was in conjunction with the study findings that confirmed the participant's inability to sustain themselves with earnings from small scale farming and the banks imposing of monthly account fees without notification was another contributing element to their inability to sustain themselves thus remaining under the poverty line.

The qualitative analysis was limited to participants who had active or who had terminated their bank accounts in rural Kisii, Kenya who voluntarily shared their views and effects of the established bank account fees directives. The authors' recommendation was for the banking institutions to educate existing account holders by sending out official notifications before enacting the policies and advising all new account holders of the banking policies at the time of account set up. The notifications would minimize the account holders who would be furious or shocked when monies are deducted monthly from their accounts. Future research can extend on the account holders views on the monthly maintenance fees by sampling participants from an urban region or doing a comparison of rural and urban participants. Researchers can also focus on determining the impact of the established monthly charges against the locales opening and closing of bank accounts and the existing correlation to the established bank maintenance fees for the Kisii bank and other regional banking locations. Future researchers can also use existing data from the sample size of 60 years of age and older and compare the results to other sample sizes from different age ranges to provide a comparison group.

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Figure 1: Kenya Map

Figure 1. Map of Kenya showing Kisii locale in Western Kenya in close promity to Lake Victoria. Adapted from Maps of World. (2014, April 19). *Map of Kenya.* [Map]. Retrieved from mapsofworld.com

Figure 2: Kenya Population

Figure 2. Kenya population Adapted from Trading Economics (2015). *Population 2006 to 2014*. Retrieved from www.tradingeconomics.com

Figure 3: Kenya Tea Picking

Figure 3. Kenya tea picking Adapted from Worldatlas (2015, April 20). *The world's top tea producing nations*. Retrieved from www.worldatlas.com

Figure 4. Map of Kisii

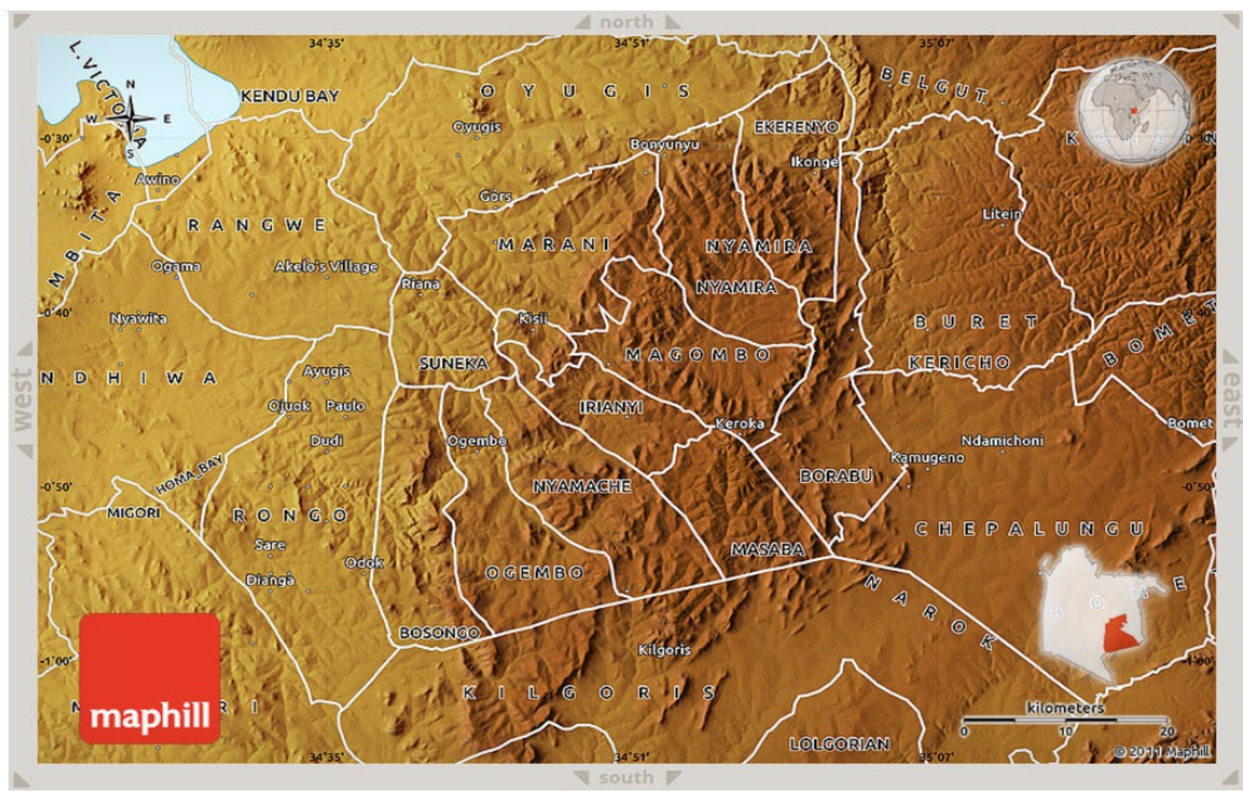

Figure 4. Flat physical map of Kisii, Nyanza Kenya tea picking Adapted from Maphill (2013). *Physical map of Kisii*. Retrieved from www.maphill.com

Figure 5: Digging Hoe

Figure 5. Digging hoe is used by Kisii residents to prepare and cultivate food and crop staples. The metal section is purchased from hardware store while the wood work is made by a local capenter. Adapted from Grub Hoes (2015) Retrieved from www.easydigging.com

Figure 6: Planting Maize in Kisii – Kenya

Figure 6. Kisii residents planting maize in a single line with help of rope. Adapted from Owino, K. (2014, August 07) One Acre Fund. [Planting maize]. Retrieved from www.oneacrefund.org

Figure 7. Harvesting Maize

Figure 7. Kisii residents manually harvesting maize. Adapted from (2014, December 07) One Acre Fund. [Planting maize]. Retrieved from www.hivisasa.com

Figure 8: Harvested Maize

Figure 8. Harvested maize is sorted out by hand and heaped in categories of what to sell, save for food, and feed animals such as cows and goats. Adapted from (2014, August 07) One Acre Fund. [Harvested maize]. Retrieved from www.oneacrefund.org

Table 1: The World's Top 10 Tea Producing nations

Nation	Tonnes (2015)
Argentina	69, 924
Islamic Republic of Iran	83, 990
Japan	88, 900
Vietnam	116, 780
Indonesia	157, 388
Turkey	174, 932
Sri Lanka	295, 830
Kenya	303, 308
India	900, 094
China	1, 000, 130

Note: The World's Top 10 Tea Producing nation. Adapted from www.worldatlas.com

Table 2: Banks in Kisii - Kenya

Barclays	Family Bank
Bank of Africa	I&M Bank
Credit Bank	Kenya Commercial Bank (KCB)
Co-operative Bank	K-Rep Bank
CFC Stanbic	Mwalimu Cooperative Savings
Chase Bank	National Bank of Kenya
Diamond Trust Bank	Standard Chartered Bank
Eco-bank	Post Bank
Equity	Kenya Women Finance Trust

Note: Banks located in Kisii – Kenya region

Table 3: Cost of Living Data 2016

Category	New York, NY	Kisii, Kenya	Difference
Meal, Inexpensive Restaurant	$ 18.00	$ 3.91	78.26%
Cappuccino (regular)	$ 4.23	$ 2.22	47.52%
Water (Bottled 0.33 Liter)	$ 1.64	$ 0.54	66.91%
Transport (Local to town - one way)	$ 2.75	$ 0.59	78.95%
Basic (Electricity, Heating, Water, Garbage) for 915 sq ft Apartment	$ 128.84	$ 44.36	95.57%
Apartment (1 bedroom) in City Centre	$ 2,990.77	$ 444.00	85.15%
Average Monthly Disposable Salary (After Tax)	$ 3,345.50	$ 297.60	91.10%
Mortgage Interest Rate in Percentages (%), Yearly	$ 3.97	$ 15.48	289.78%

Note: Cost of living comparison between New York, NY and Kisii, Kenya. Adapted from www.numbeo.com

Service Learning in a Cost Benefit Analysis Class

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This paper is divided into four parts. It begins with a brief review of the literature, followed by a discussion of the structure of the course especially the service-learning portion of the course. (This includes a "guide to" if one wants to do the service-learning in a Cost-Benefit class.) This is followed by the student's reactions to the course after they had finished the course. Finally, the last section has my reflections on the course and suggests some changes to the course based on my view of the service-learning aspects of the class.

A Brief Review of the Literature

There is an extensive literature on service-learning projects. Some are how-to guides, for example, Wodicka, Swartz and Peaslee's article "Taking the Classroom to Town Hall: Advancing Public Affairs through University-Municipal Collaborations." Other articles measure the results of service-learning such as Celio, Durlak, and Dymnicki (2011), who after completing a Meta-analysis of 62 studies, conclude that students engaged in service-learning demonstrate gains in student achievement, increase attitudes towards school and learning and increases in social skills.

Since this article is based on an economics class, I wanted to highlight a couple of articles about using service-learning in economics classes. While most economic instructors still use "chalk and talk," which today might be more commonly be PowerPoint and talk. This makes the instructor the sage on the stage and it is probably the way to cover the most material. However, one must ask how much do the students learn in that setting. However, for students of economics not only do they need to learn economic knowledge but be able but draw it out and use it to explore issues (Hansen, 1986). Saunders (1990 p. 79) notes that "if you expect students to learn concepts up to the application level, you must design presentations and exercises that go beyond recall and memory and stress transfer." Salemi (2002) writes an article where he provides a rationale for active learning in undergraduate economics courses noting that "students reach a better understanding of course concepts," (p.725), and that "active learning promotes a positive attitude toward learning," (p.728). A person who has written extensively on service-learning and economics is KimMarie McGoldrick. "Service-learning is a method of experimental learning that links the classroom with local community. It requires students to spend time in volunteer service and relate theories to the educational theories they learn in the class room. During the service-learning project, students are expected to identify economic issues, explore economic theories, and provide evidence relate to their experience to these educational theories they learn in the classroom." Thus service- learning suggests an active approach to learning economic theory, (McGoldrick, 1998, p. 365). In the same article, she points out that "service-learning is not without its drawbacks… can involve a substantial amount of the professor's time…Despite precautionary measures instances will occur--either the student or the agency fails to live up to the expectations of the assignment," (p.374). McGoldrick, Battle and Gallagher (2000) note that service-learning allows students to recognize that there are links between economic theory and their everyday lives, and that "students become experts through their own experiences… Students are encouraged to involve their whole selves, " (p. 44) in the project. While there are a number of articles and even a book (McGoldrick and Ziegert, 2002) advocating using service-learning in undergraduate economics curriculum, this is the first paper to discuss using service-learning in graduate economics programs.

The Cost Benefit Course

The Cost-Benefit Course is a requirement for the Murray State's newly developed M.S in Economic Development degree. However, it is also open to any graduate student. This was the first time the class was offered and my first time teaching it or any other course like it. Eight students were enrolled in the class: five were enrolled in the M.S. in Economic Development and the other three were enrolled in the M.S. Program in Economics. Two of the students were from other countries: China and Germany and three of the students were women.

Before the class, I met with the Mayor of Murray, and then two more times with the Mayor and his management staff and we came up with three cost-benefit projects that would help the city. One of the projects was to examine if the city should build a natural gas fuel station. Since the city leases most of it vehicles and most of these vehicles don't travel far from Murray, the city would gradually change their fleet of vehicles to natural gas. Also, the project involved contacting other possible users in the Murray area to see if they would be interested in using the station if it was constructed by the City of Murray. (It turned out that the survey was not completed successfully. No other company or government organization would give a definite answer that they would use the natural gas station.) The second project was the possible further extension of natural gas lines to areas outside the city limits. The city has served customers outside of the city and charges them more than city residents since they don't pay city taxes. The third project involved the downtown fire station. The options were to take down the old fire station and put up a new station or to renovate the existing fire station.

The cost-benefit project was worth 45% of the final grade; in addition some of the final related to the cost-benefit project. For example, one question on the final was what discount rate did your group decide to use and why? (The final was 30% of the grade.)

The class met once a week on Wednesday evening during the spring semester of 2017. In the second week of class, several people from the management team of the city came to class and explained the three projects and answered questions about the projects. On the third week, the class was divided into three groups: two students for the natural gas line extension and three for the other two projects. We divided the groups with a draft where students pick a number from one to eight that was written on folded pieces of paper and the person with the lowest number picked what project she wanted to be on and the second student picked a project until all 8 students were assigned to the projects. It was my hope that all of the students contribute in all three projects, so at the beginning of every class each group discussed what they had done on their projects and what they planned on doing the following week. The other students and I made suggestions to help the other groups. This took about a third of the class time each week. The rest of the class was devoted to my leading discussions from the text and cases that I had assigned. It was good that all of the students already knew about present value calculations, so that topic was only briefly reviewed. We also used one week to deal with forensic economics. A collogue in the department, who has published papers and performs forensics economics for attorneys, came to class one week and discussed how to statically value the loss of a life or an injury. Two other important topics were the social rate of discount and environment issues. One of the most frustrating things for the students was getting the data they needed to do the cost-benefit analysis. As an empirical economist I am also frustrated by not having the exact data I need and often have to figure out how to modify my expectations and perhaps find proxy's for some of the missing data. These were eye opening to the students. They often had trouble getting the data they needed in a timely fashion either because the city officials didn't respond to them in what they thought should be a more timely fashion, or the lack of data they needed from secondary sources. The students were confronted with real struggles that empirical researchers often confront. Eventually, they realized that they had to use what data was available. However, by the end of the semester the students had three completed and excellent reports.

The students also presented oral versions of their findings to the mayor and the management team in the city council chambers. Before the oral presentation we practiced in class. This included brainstorming about possible questions that might be asked of them when they made their formal presentations. The students did an excellent job when they made their formal presentations to the city and were very prepared for the questions asked in the presentation.

After the oral presentations, the students submitted written draft reports. I had prepared a rubric which we discussed in class and they used this rubric to submit the draft written reports. I then read the draft reports and met with each team to suggest changes. Then each group completed a final written report. All three of the written reports were all given to the mayor.

One of the benefits of using service-learning in this class was that we spent some time on both oral and written communication. I don't think this would have happened in a technical class like this class if we had not done these projects for the city. In addition, the students were more motivated because they knew that these presentations were not just for a grade but also would help the city of Murray.

Student Reactions to the Class

The student's reactions to the service-learning aspect comes from two documents. First, the course assessment form that is administered by the University for every Class and by a form that I constructed for course improvement. Both documents are anonymous. Murray State's instructional assessment form has two components; a numerical component and a written Student Comment Sheet.

All of the students liked doing their projects. I asked them to answer a question: "What are the three most important things that you learned in this course?" Some of the responses related to the project were: "the collaboration process between city officials and projects," "real world experience and feedback from people who aren't part of the course (clients)", "how to organize a project for the city," and "how to measure and account for intangibles."

Another question asked, "What did you like about the course project?" Here students wrote, "Real World Experience. Without actually doing a complete CBA I would not have learned about all of the hidden challenges we'll face in the real word….The project allowed me the freedom to put to use a good portion of the theory I've learned in the economics program into practice," "It was a very hands on approach to the subject area," and "We can discuss and talk with each other to exchange our ideas."

A third question asked, "How could the project be improved?" Some responses were: "getting more help from the city of Murray," "more reliable sources," "making sure before the project is picked that there are ample resources," "better communication from the city on projects," and "group grades must be scored individually…That's not fair to do the work of people who freeload to walk away with the same score."

On the student assessment instrument students on average did not rate me as high as I normally get rated. They also did not think that I put in a lot of effort into the course.

My Refection's and Suggested Chances

I felt very good about the class and what the students accomplished with this course. I was a little bit surprised when I received the course evaluations. Perhaps it was because the course was different than most of the courses that our students take. I think the students didn't realize how much work I did before the course to set up the projects. Also, they were not used to the collaborative nature of the course. While the low rating from the students bothered me, I think maybe it should serve as a warning to other faculty that they should make students aware of what they did to prepare for the course especially to get the collaboration with city. This is especially true for tenure track faculty. The students were clearly frustrated with obtaining the data and perhaps blamed me for not having answers. On a more positive note, the mayor wrote a letter to the Murray State University president and to my dean thanking the class and me for doing the three cost-benefit studies.

Next time I teach the class I will do several things differently. First, I would try to have four or three students in a group. The projects were a lot of work and this would ease the burden for each student. Also, I do think that there was some freeriding in the class and (Milkman, 2012) has figured out a method of assigning individual grades for projects, but you need at least three members in a group for the method to work.

I also need to make the clients (in this case the city management team) aware that the students need them to quickly respond to their questions. This would have relieved a lot of tension for the students. Also, some of the students didn't know the expectations that I had for the projects. This was partly my fault since this was the first time the course was taught. Now I will have examples of the projects to show what they should be trying to accomplish.

To conclude, I felt that the using service-learning in the class went well and when I teach it again, I will do the same thing with a few changes that I have noted above.

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Examination of a Correlational Relationship between Religiosity and Gender Role Conflict

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Abstract

The purpose of the study was to examine the relationship between Religiosity, Spirituality, and Gender Role Conflict. The experimental hypothesis for this study was an inverse relationship would be found between Religiosity, Spirituality, and the subscale constructs of Gender Role Conflict relating to homophobia, including Restrictive Emotionality (GRC-RE) and Restrictive Affectionate Behavior Between Men and Women (GRC-RABBM/W). A significant negative correlation was found between Religiosity and GRC-RE ($p < 0.01$), Spirituality and GRC-RE ($p < 0.05$), and a positive correlation between Religiosity and GRC-RABBM/W ($p < 0.01$). Religious individuals were split into high and low by moving one standard deviation from the mean. A one-way between-subjects ANOVA was conducted to compare the effect of Religiosity on GRC-RABBM/W. A significant difference was found on GRC-RABBM/W based on Religiosity. Religious individuals may be more prone to higher scores of GRC-RABBM/W than those who do not rate themselves as high as others. Possible explanations are discussed.

Introduction

Homophobia is clearly a discriminatory way of thinking that is harmful and destructive to individuals and our cultural society. Possessing homophobic thoughts and beliefs can be argued as being damaging and hurtful. Homophobia is often considered a learned belief system stemming from exposure to negative and damaging myths and stereotypes (Morin & Garfinkle, 1978). Historically, society has taught children that heterosexual relations are desirable and appropriate, while avoiding discussion of other forms of relationships. This allowed for information to be gained through opportunistic, often negative, outlets regarding alternative types of relationships. (Harbaugh & Linsey, 2015). In the United States, society is still lacking in formal, objective education regarding sexuality. Recent reports suggest that few schools provide sex education that is LGBTQ-inclusive; also, there are very few LGBT individuals who receive sex education in which their sexuality is adequately and accurately explained (Harbaugh, & Linsey, 2015). Having homophobic or antihomosexual attitudes has been associated with many intolerant beliefs including sexism (Black, Oles, & Moore, 1998), racism (Ficarrotto, 1990), and rape myth acceptance (Aosved & Long, 2006). Homophobia has also been associated with lower levels of empathy and poorer coping styles (Johnson, Brems, & Alford-Keating, 1997). Homophobia's association with other negative constructs has led some to suggest that homophobia and intolerance may exist together as a distinct form of pathology (Guindon, Green, & Hanna, 2003). Taken together, these findings suggest that more effort may be need to elucidate the origins and consequences of homophobic beliefs.

Gender Role Conflict

Homophobia has been investigated as a violation of gender role expectations, also known as gender role conflict. A gender role is the role or behavior learned by a person as appropriate to their gender, determined by the prevailing cultural norms. Gender role conflict occurs when a person adheres to inflexible gender roles, resulting in suppression, devaluing, or transgression towards their self or other

individuals (O'Neil, 1981b; O'Neil, Good, & Holmes, 1995). Gender role conflict may be thought of as "the restriction of a person's human potential or the restriction of another person's potential" (O'Neil, 2008, p. 362). Individuals who experience gender role conflict often experience problems in self-recognition regarding aspects of their selves linked to the opposite sex (O'Neil, 1981b). Gender role conflict can be directed towards the self or can be projected towards others (Thompkins & Rando, 2003). It can be identified on conscious or unconscious levels, and can be demonstrated cognitively, behaviorally, or affectively (Thompkins & Rando, 2003). Gender role conflict can be built upon a person's attempt or failure to attempt to display societal traditional gender roles (Thompkins & Rando, 2003).

Gender role conflict often contains a homophobic aspect, so homophobia is measured on the Gender Role Conflict Scale (O'Neil, 1981b). Homophobia may relate to a person's fear of displaying traits of the opposite gender, particularly males fearing the appearance of femininity (O'Neil, 1982). Males with gender role conflict are often inflexible with rigid views (O'Neil, 1982). Homophobic males often have problems developing or maintaining their relationships with male friends (O'Neil, 1982). Homophobic individuals have demonstrated personality characteristics that include rigidity in sexuality and thoughts, being status conscious, and authoritarian in their interactions with others, all which can be harmful within interpersonal relationships (Morin & Garfinkle, 1978).

While women may also experience gender role conflict, women generally are more tolerant of homosexuality than men (Barringer, Gay, & Lynxwiler, 2013; Johnson et al., 1997). In general, women have been shown to be more supportive of the rights of homosexuals in society (Whitley, 2001). It has been suggested that women employ a care and responsibility perspective when making moral judgements (Gilligan, 1982), while males are more concerned with justice (Lyons, 1983). These different approaches to morality may well lead to differences in beliefs and behaviors regarding homosexuality, as sexuality may be seen by some as a moral issue. Women may respond more fluidly in situations calling for empathy, whereas men are more likely to respond according to what they feel is morally just, which can be an inflexible stance.

Religiosity

Religious affiliation, which many associate with tolerant or accepting mindset, may be related to intolerant beliefs based on gender role expectations. In the United States, generally females have been thought to participate in more religious activities and have higher levels of spirituality, although current research is calling these assumptions into question (Simpson, Cloud, Newman, & Fuqua, 2008). Organized religions typically have formal and informal position on gender roles, homosexuality, and marriage. (Barringer et al., 2013). Research seems to consistently show a positive correlation between religiosity and homophobia (Berkman & Zinberg, 1997; Harbaugh & Lindsey, 2015; Herek, 1988; Johnson et al., 1997) as well as other forms of intolerance (Eisenstein, 2006; Doebler, 2014; Jankowski, Johnson, Holtz Damron, & Smischney, 2011). These intolerant beliefs may be related to the perceived inflexibility of moral stances within certain religions. A person with high religiosity may rely heavily on dictated morality and fail to construct their own moral judgements, leading to stress when presented with opposing views, such as that seen in those with gender role conflict. Indeed, gender role conflict does appear to alter religious adherence in some manner as well. In males with religious affiliation, having gender role conflict appears to be related to having religious beliefs that are more external in nature and elated negatively to spiritual well-being (Mahalik & Lagan, 2001), and males with a more feminine orientation appear to be more intrinsically directed in their religious activities (Thompson & Remmes, 2002).

Religiosity versus Spirituality

Research has suggested a distinction between spirituality and religiosity. (Schlehofer, Omoto, & Adelman, 2008). Religion has a base set of guidelines and structure that must be followed. Spirituality can be expressed as being independent of an organized religion. However, spirituality may be influenced by religion as well. Spirituality is how one defines their own relationship with a higher being. Spirituality can also be identified as how an individual's moral beliefs impact their everyday life. Spirituality is not

meant to be concrete, but fluid. Spirituality can be related to the devotion of your religion, but does not guarantee one is religious as they are defined as separate entities.

When considering what spirituality is "it refers to a connection with a larger reality that give one's life meaning, experienced through a religious tradition or, increasingly in secular Western culture, through meditation, nature or art." (Peteet & Balboni, 2013, p. 280). However, one can be both religious and spiritual. When it comes to spirituality, it is often hard to disassociate it from religion; nevertheless, there must be some form of basis for moral decisions without religion. For that reason, spirituality must be able to stand alone from religion. Spirituality allows for the fluid movement of ideas and beliefs of one's own morality due to the lack or rules set forth. This ability to flexibly apply morality may allow for belief systems that are more tolerant of others.

The current research seeks to explore the relationship between religiosity, spirituality, and homophobia (as measured by the Gender Role Conflict-Restrictive Affectionate Behavior Between Men/Women Subscale) in male and female college students. It is hypothesized that religiosity will be negatively correlated with this measure of homophobia.

Method

Participants were recruited and asked to answer a self-report survey that involved questionnaires to measure various types of constructs including Gender Role Conflict (GRC) and beliefs about religiosity and spirituality.

Participants

The participants in this study were 275 undergraduate students enrolled in a 2000-level psychology course (i.e. Introductory Psychology; Child Psychology; Adolescent Psychology; Developmental Psychology) at the University of Louisiana at Monroe (ULM). In terms of university classification, of the participants, 50.2% were freshmen, 32.4% were sophomores, 12% were juniors, and 5.5% were seniors. Females comprised 66.2% of the population, while 33.8% were male. Approximately, 59.6% of the participants identified themselves as Caucasian, 30.2% African American, 2.9% Asian, 2.5% Hispanic, 0.4% Native American, and 4.0% responded with "Other race or origin". Ages of the participants ranged from 18 to 32 with a mean of 19.37 and a standard deviation of 1.602.

Materials

Consent form. The consent form was provided to the participants prior to the beginning of the study procedure. The consent form contained all contact information that is required to reach the principal investigator of the research experiment. Participants were asked to sign this document and return it to the researcher.

Demographics questionnaire. The demographics questionnaire utilized in this study consists of a series of items that are designed by the researcher to gather general participant's information which includes school classification, sex, ethnicity, age, ACT or SAT score, and self-reported scores of religiosity and spirituality. Participants were instructed that these items do not require a response and all answers are confidential and will only be aggregately reported.

Religiosity survey. Religiosity was measured based on a 10-point Likert-type scale that ranged from 0 to 10 with 0 being "Not Religious" to 10 being "Very Religious". Such examples of religiosity that were given include attending church, praying, and individual forms of worship. A definition was given that stated that being religious was "the belief in a set of ideas that are related to a belief in God."

Spirituality. Spirituality was measured based on a 10-point Likert-type scale which ranged from 0 to 10 with 0 being "Not spiritual" to 10 being "Very Spiritual". Such examples of spirituality that were given include meditation, reflection, dancing, painting, celibacy, chanting, and communing with nature. A definition was given that stated that being spiritual was "the universal feeling of being a part of something bigger than oneself."

Gender Role Conflict Scale (O'Neil, Helms, Gable, David, & Wrightsman, 1986). This 37-item self-report scale was used by researchers to help assess gender role conflict. The participant was given a statement such as "Moving up the career ladder is important to me." and asked to respond to the item on a 6-point Likert-type scale, where 6 is Strongly Agree, and 1 is Strongly Disagree. The four subscales of the GRCS were determined through factor analysis. The four subscales are Success Power, and Competition,

Restrictive emotionality, Restrictive Affectionate Behavior between Men, and Conflicts between Work and Family. The subscale of Success Power and Competition (SPC) is made up of 13-items measuring the importance that a person has in regards to power above other individuals, rivalry with other individuals, and success, accomplishment, or achievement. Restrictive emotionality (RE) subscale consists of 10-items that measure disclosure of the self and difficulties when having to express individual feelings and emotions. The GRCS subscale Restrictive Affectionate Behavior between Men (RABBM) is made up of 8-items that measure the level of distress or uneasiness that is experienced when it is necessary to express emotion with a person of the same gender or sex. The final subscale, Conflicts Between Work and Family (CBWF) is comprised of 6-items that measure the distress created on an individual when the job or schoolwork intrudes upon their domestic existence.

The four factors that comprise the GRCS have been identified as explaining 36 percent of the total variance O'Neil et al. (1986). Internal consistency, as determined by using Cronbach's alpha in past research on gender role conflict, has been found to be between the range of .75 to .85 (O'Neil et al., 1986). O'Neil et al. has identified that reliability, using four-week test-retest comparison, ranges from .72 to .86 for each subscale. The GRCS has been identified as having acceptable concurrent validity, as concluded by Good and Wood (1995).

Procedure

Prior to the beginning of this study, approval was obtained from the Institutional Review Board (IRB) at the University of Louisiana at Monroe. All relevant ethical guidelines set by the American Psychological Association (APA) were followed throughout the duration of the experiment, as well as after the experiment (regarding confidentiality and anonymity). No personal information regarding participants, such as subject name or campus identification number, was included in the permanent data record. Individuals who participated in the study were provided with extra course credit in return for participation; individuals who chose not to participate in the study were provided an equivalent opportunity to earn equivalent credit by the course instructor. All information obtained from participants in this study was kept in strict confidentiality.

Administering of the survey occurred in a classroom environment that was reasonably distraction free. On arrival, the participants were handed a survey packet that included the consent form and were reminded that they could leave the experiment at any time and still receive bonus credit. The participants were also reminded that they were free to discontinue participation at any time and were reminded that they were free to skip any item on the demographic questionnaire or any other questionnaire to which they were not comfortable responding (without the loss of any due extra course credit for participation or any other repercussion). The purpose of the study was also very briefly discussed to participants, and the participants were thanked for their consideration of participating in this study. Participants were then urged to read the consent form thoroughly and complete the information at the bottom (e.g. signature, date, course professors name, section number, or regular class meeting time); follow this information regarding the consent form, the participants were asked to proceed to the demographics page and complete the remaining parts of the survey.

Results

Data Analysis

Data from this research project was taken from two separate questionnaires that assess similar constructs in each gender. Therefore, to integrate the two versions of the Gender Role Conflict scale, z-scores were used to allow the calculating of the probability that this score will occur in a normal distribution.

Correlations

Data from 275 participants was analyzed to assess the validity of several hypotheses. As shown in Table 1, significant positive correlations were found between the following variables: Religiosity and Spirituality ($r = .385$, $p < 0.01$), and Religiosity and GRC-Restrictive Affectionate Behavior Between Men/Women (GRC-RABBM/W) ($r = .263$, $p < 0.01$).

One-way ANOVA

The data was then split into high and low religiosity by taking one standard deviation above and below the mean. A One-way ANOVA (shown in Table 2) was conducted to compare the effect of Religiosity on GRC RABBM/W. An analysis of variance showed the effect of Religiosity on GRC RABBM/W was significant, $F(1, 87) = 13.58$, $p = 0.001$.

Discussion

Gender role conflict occurs when individuals display prohibitive, rigid, or sexist gender roles that conclude in suppressing, devaluating, or offense to their own selfhood or other persons (O'Neil et al., 1995). Individuals who encounter gender role conflict frequently experience difficulties in self-acknowledgement about facets of their character which they believe to be related to the opposite sex (O'Neil, 1981b). Specifically, men having gender role conflict often have difficulty acknowledging any part of their personality that might be thought of as feminine or lacking masculinity. Additionally, gender role conflict can be described as damaging consequences which occur due to the numerous social responsibilities which impact the anticipated actions of men and women in society (O'Neil, 1981a). Particularly, gender role conflict can transpire when individual or society's gender roles create destructive outcomes for people (O'Neil et al., 1986).

In the current study, it was predicted that individuals with higher levels of religiosity would score higher on the GRC-RABBM/W scale than those who did not. Individuals who were dubbed highly religious ($m = 9$ or above) scored a mean of 0.20 and standard deviation of 1.11. Individuals who were dubbed as scoring low on the religiosity scale ($m = 3$ or below) scored a mean of -.56 and had a standard deviation of .73. The One-Way ANOVA determined that there was a statistically significant difference in both of these scores, thus validating our hypothesis. Explanations for this may be related to the individual structure of the religion that the individual takes part in. Participants were given the examples of religiosity that relate to attending a church, praying, and individual forms of worship, which may all be defined as being structured around a certain belief.

Finlay and Walther (2003) analyzed anti-homosexual attitudes based on religious affiliation and attendance and relationships to known gay, lesbian, and bisexual persons. It was found that members of Conservative Protestant denominations had the highest homophobia scores. These scores were followed by Moderate Protestants and Catholics, Liberal Protestants, Non-affiliated, and Non-Christian groups. When controlling for other variables, these significant differences remain consistent. Influencing attitudes are strongly suggested when the significant individual has a relationship to known lesbian, gay, or bi-sexual others. Individuals with more relationships and contact with other gay, lesbian, or bisexual individuals tend to be less homophobic (Finlay & Walther, 2003). It was also found that men in the sample were significantly more homophobic than women and minority group members. However, there were no significant differences between gender and other variables. Therefore, it is suggested that the differences in religious affiliation, which included differences with in "Protestants" affect attitudes toward homosexuality.

Participants in this sample may fall into the category of "Conservative Protestants", thereby displaying more judgmental beliefs when it comes to the concept of homosexuality and homophobia. This may be caused by many factors, including how and where the individual was raised, as well as the cultural belief systems of that regional environment. Future studies may need to address these possibilities.

Berger, Levant, McMillan, Kelleher, & Sellers (2005) performed a study which found that adult males who scored higher on measures of gender role conflict and traditional masculinity ideology tend to have more of a negative attitude toward seeking psychological help. In the context of this study, researchers found Restrictive Affectionate Behavior Between Men to be significantly positively correlated to Rejection of Homosexuals. Increased rejection of gay men and being a younger age appear to predict more negative attitudes toward seeking professional psychological help.

The Restrictive Affectionate Behavior between Men subscale determines discomfort levels experienced by gender role conflicted men when they have to express their thoughts and/or feelings with other men (O'Neil et al., 1986). Additionally, this factor can measure how difficult it is for the gender role conflicted male to touch other men. Finally, this factor examines how the gender role conflicted male avoids displays of caring expressions towards other males (O'Neil et al., 1986). This factor was created

through the combining of the patterns of restrictive sexual and affectionate behaviors, health care problems, and homophobia.

Gender role conflict may be projected towards other individuals or may be self-directed (Thompkins & Rando, 2003). It can be detected consciously or unconsciously, and may be exhibited as cognitive, behavioral, or affective displays (Thompkins & Rando, 2003). Gender role conflict may happen when undesirable messages, perceived directly or indirectly regarding an individual's effort or failure to exhibit society's conventional gender roles (Thompkins & Rando, 2003). According to O'Neil (1981b), the utmost detrimental outcome of gender role conflict can be argued as lacking the achievement of the ideal success levels as a human being, or affecting others to be reduced in their individual levels for potential growth. It is therefore worthwhile to continue studying the correlates of homophobia as intolerant beliefs limit human potential of both those who express these beliefs and their victims.

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Table 1

Correlations between Religiosity, Spirituality, and GRC-RABBM/W

Correlations			
	Religiosity	**Spirituality**	**GRC RABBM/W**
Religiosity	**1**	**.385****	**.263****
Spirituality	**.385****	**1**	**.100**

GRC RABBM/W	**.263****	**.100**	**1**

****. Correlation is significant at the 0.01 level (2-tailed).**

Table 2

One-way ANOVA between Religiosity and GRC-RABBM/W

ANOVA					
GRC-RABBM/W					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	**12.754**	**1**	**12.754**	**13.584**	**.001**
Within Groups	**81.686**	**87**	**.939**		
Total	**94.440**	**88**			

Virginia's Role in Americanizing the Ideology of African Inferiority

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INTRODUCTION

Virginia is regarded as the archetype in America for setting into motion a system of oppression that resulted in the enslavement of Africans (Higginbotham, 1978). The record is clear about Virginia creating some of the first laws to initiate the system of American slavery. The first population of Africans brought into colonial America arrived in Virginia during the early seventeenth century as servants and before the end of the seventeenth century law defined exclusively them as slaves (Toppin, 1996; Higginbotham, 1978). Rather than discussing Virginia and slavery, the purpose of this present argument is to demonstrate Virginia's significant role in using their authority and cultural and social institutions to lay the foundation for a system of White cultural violence against Africans during the early stage of America. This study is not intended to introduce new historical data about Virginia, but to frame some of the activities conducted there into a context which highlights the social construction of a perpetual ideology against Africans in America. Johan Galtung (1999) says "cultural violence" occurs when a dominant group uses cultural and social institutions, or any aspect of a cultural domain, to spread and maintain an ideology about the inferiority of a subordinate group (pp. 39-43). This set of ideas and images became part of what Rebecca Ann Lind (2004) calls the, "dominant ideology" (p. 7), because it embodied and imposed the idea of a divine presence and inherent superiority of Europeans (whites) over the darker Native Americans, Mexicans, and Africans in the New World. The focus in this study is how the dominant ideology of African inferiority was used against Africans in Virginia. By controlling how a subordinate group is framed in a cultural and social context, dominant groups can influence attitudes and actions toward subordinate group members (Lind, 2004). The deployment of cultural elements by cultural and social leaders in Virginia permitted the entrenchment of African descendants into American culture as immoral, criminal, animal, cursed, savage, violent, and best suited for slavery.

Cultural Violence as a Mechanism of Oppression

The challenge has been how to frame the set of nefarious ideas generated and propagated about Africans as a system of oppression by Europeans beginning in the fifteenth century and spanning into America well beyond Reconstruction. The European characterization of Africans as subhuman is typically identified by scholars and writers as various forms of racism, stereotypes, prejudice, or a combination (Tatum, 1997; Drake, 1987/1998; Schwartz and Disch, 1970; Entman & Rojecki, 2000/2001; Nash, 1970; Clarke, 1996; Clarke, 1996). Race theory was not developed in Germany until the late 18th century (Stanton, 1960; Gould, 1981; Browder, 1992) and race theory did not become prominent in America until the mid-19th century when anthropologists began to use it to support the enslavement of Africans (Baker, 1998). Race theory and the application of race theory (racism or racial discrimination) in America became part of the ideology of African inferiority produced centuries earlier. Based on Gorham's (2004) definition of stereotype— "a schema for people we perceive as belonging to a social group" (p. 14) — **a** stereotype can be a result of cultural violence. Moreover, prejudice, which involves "a negative cognitive or emotional response" about individuals or a group can be individually based and may or may not be used to adversely affect a group of people (Lind, 2004). If the point is considered that the symbol of the ideology of African inferiority was initiated by enslavers and religious leaders from Spain and Portugal during the fifteenth century, (Jackson, 2001) and that Virginia grafted the enslavement techniques, ideology, and the methods of dispersing the ideology onto American soil beginning in the 17th century (Franklin & Moss, Jr., 2000), it is improper to refer to the establishment and spread of these negative ideas as a type of racism or prejudice. The propagation of this ideology, which is more than 500 years old, constitutes what may best called White cultural violence. This study is about how Virginia played a leading role to entrench a depiction of a

debased image of Africans in America. Spawning a system of White cultural violence in America required the social construction of a dominant ideology against Africans. The incubation of the tenets of this ideology championed in Virginia grew out of Europeans' quest to enslave Africans, European religious and cultural ethnocentrism against Africans, and the fabrication of a tainted representation of Africans.

The Historical Antecedents to White Cultural Violence in Virginia

The dawn of European enslavement in Africa summoned Christian reasoning for approval, which became a pillar of the dominant ideology against Africans. Phillip Dray (2000/2003) proposes that the way in which Europeans used Christianity made it "unique among the world's religions in promulgating the idea that" Africans were inferior (p. 80). Spanish and Portuguese enslavers and religious leaders initiated the tenets of the dominant ideology against African descendants in the fifteenth century. The Portuguese and Spaniards led Europeans in invoking the missionary zeal of Christianity to justify their activities on the West Coast of Africa. In 1493, Pope Alexander VI's papal bull stated heathens (Africans) and "especially their resources" were rewarded to Spain and Portugal by the "grace of an understanding god" (as cited in Karenga, 2002, p. 119). Moreover, in 1517 Catholic Bishop Bartolomeo de las Casas, unsettled by the Spanish enslavement, destruction of culture, and genocide against "Indians" in the New World, wrote a letter to the King of Spain to bring in Africans to replace the devastated populations (Las Casas, 1552/1992; Franklin and Moss, Jr., 2000; Blassingame, 1972/1979). The rationalization in Spain and Portugal, and later Virginia, for making Africans slaves was that the "heathen" (non-Christian) Africans gained exposure to Christianity (Franklin and Moss, Jr., 2000). European enslavers used "Noah's curse" as the core of the dominant ideology to rationalize enslaving Africans by teaching that Africans descended from Ham, and their enslavement was the will of God (Haynes, 2002). According to Nana Banchie Darkwah (2000/2003), Europeans used four main processes to promote their supremacy over Africans:

- Christian Europe accepted slave traders' justification of their consciences and description of Africans as inferior, uncivilized, and sub-humans.
- Christian Europe determined that based upon its perception of African people, White and Black people could have not originated from the same origin.
- Christian Europe decided to search for the separate origin of Europeans and found it in the biblical narrative of Noah and the Flood.
- Renaissance artists and painters helped to change the images of the people of the Bible from Black to White (pp. 18-19)

A common tactic of oppressors is to fabricate what Albert Memmi (1965) calls a "mythical portrait" of themselves and their victims. Memmi argues that "the favored image" of the oppressors is one which cast the oppressed as inferior and the oppressors as superior. Memmi suggests this "myth" is intended to rationalize the disparate social positions of the oppressors and oppressed (pp. 79-80). The argument here for Europeans using the fabrication of the subhuman nature of Africans to generate this dominant ideology is that Spanish and Portuguese sailors and explorers depicted West Africa as politically, socially, and economically prosperous during the early fifteenth century prior to their enslavement of Africans (Clarke, 1996). Moreover, Kenneth Stamp (2000), who studied the primary documents of enslavers about effective techniques for managing enslaved Africans on plantations, states astute plantation owners knew there was a difference between the actual aptitudes of their enslaved Africans versus what enslavers chose to project about them. To bolster the ideology of Black inferiority, white enslavers in early America indiscriminately and deliberately cast "Negroes" as substandard humans. Stamp further maintains most important to the ideology of African inferiority for White cultural leaders was not just an inaccurate account of the mental capacity of Africans, but that their true mental, moral, and cultural abilities be replaced with contrived ideas. The challenge for enslavers was to implant Africans with this new identity. Stamp concluded that part of their mission was to deny Africans access to any idea that might: inspire any independent "judgment or will," make them think that their African ancestry was anything other than "tainted," or deny Africans "a consciousness of personal inferiority" (pp. 294-295). While descriptions recorded by Spanish and Portuguese explorers and sailors about their cultural and physical dissimilarities

from West Africans are evidence of ethnocentrism prior to their enslavement of West Africans, they are not evidence of a widespread belief in African subservience. It is probable that Africans also viewed Europeans as curious anomalies in these cultural exchanges. Nonetheless, the initiation of African enslavement by the Spanish and Portuguese was not grounded so much on their true belief in the innate inferiority of Africans. Enslavers and cultural leaders from Spain and Portugal instead manufactured ideas about Africans to advance slavery. European Christian leaders who supported the enslavement of Africans denounced Africans for not being Christians (Painter, 2007). However, the interpretation by European Christian leaders of non-Christian Africans may not have been the sole reason for demeaning all Africans as subhuman. Instead, the ideology of African inferiority appears to have risen from the interpretations of European Christian leaders and from the contrived notions Europeans created as a rationale for African subservience. These two ideological forces—religious/cultural ethnocentrism and fabricated ideas—shaped decrees about the inhumanity of Africans and became a very important pronouncement in the institution of slavery before the development of the American colonies. Bound up with the religious ethnocentrism and manufacture of the degenerate African idea by early enslavers was, particularly, the English comparison of African physiology and culture to their own.

The English, whose contact with Africans was much later than the Spanish and Portuguese, brought a similar religious bias into Africa. But, their ethnocentrism also amped up the view that Africans were in stark contrast to them. Although for England, trading and exploring in Africa were initially their primary activities, a type of biased logic about the physical and cultural characteristics of people in West Africa and the Congo quickly emerged (Hembree, 2003). Winthrop Jordan (1974) argues that the English juxtaposed the religion, culture, and what they assumed to be a "libidinous" nature of West Africans and the Congo against their Christian religion and culture (p. 4). One explored West Africa from 1562-1563 and wrote:

> And entering in [a river], we see a number of blacke soules, whose likeliness seem'd men to be, but as blacke as coles. Their Captaine comes to me as naked as my naile, not having witte or honistie to cover once his taile (as cited in Jordan, 1974, pp. 4-5).

The most striking feature of Africans that English travelers "rarely failed to comment upon" in their writings was their color, which constituted much of the basis of the dichotomous logic employed by the English (Jordan, 1974, p. 4). Juxtaposing the physical characteristics of the "black skinned" people in Africa was influenced by a couple of factors. First, the English contact with "black skinned" people was virtually new at this point in history (Hembree, 2003, pp. 37-38). Another factor may have been English cultural ideas about the representation of the colors black and white that formed the "most ingrained values" explorers brought with them to West Africa. Jordan (1974) argues English preoccupation with the dark color of the different ethnic groups in West Africa and the Congo may have been caused by the fact that "no other color except white conveyed so much emotional impact". Jordan (1974) cites the pre-sixteenth century meaning of black in the *Oxford English Dictionary* to support this idea:

> Deeply stained with dirt; soiled, dirty, foul.…Having dark or deadly purposes, malignant; pertaining to or involving death, deadly; baneful, disastrous, sinister.…Foul, iniquitous, atrocious, horrible, wicked…Indicating disgrace, censure, liability to punish, etc. (pp. 4-6)

Nash (1970) argues that, in particular, "the English's usage of black and white was not just a physical description to stress phenotype, but was instead bound up with implicit notions of the same negativity" and positivity "allotted to the meaning of black" and white in England (p. 11). Jordan (1974) states, "Whiteness…carried a special significance of Elizabethan Englishmen: it was…the color of perfect human beauty, especially *female* beauty." Jordan continues, "This ideal was already centuries old in Elizabeth's time and their fair Queen was its embodiment…By contrast, the Negro was ugly, by reason of his color and also his 'horrid Curles' and 'disfigured lips and nose'" (pp. 4-6). Jordan (1974) stressed that England encountered people in Africa when the standard of beauty was a fair complexion, which intensified the juxtaposition of themselves with "black skinned" people in Africa. White signified the opposite of black in England. According to Jordan, the meaning of black and white in England produced consistent opposition between "purity and filthiness, virginity and sin, virtue and baseness, beauty and

ugliness, beneficence and evil, God and the devil" (pp. 4-6). Furthermore, by encapsulating black or Negro with such negative connotations, an implicit dichotomy was formed in the cultural meaning of white. The English theorized that Africans' geographical proximity to the sun was the cause of their dark complexions. Richard Hakluyt, a preeminent Elizabethan navigator defined a Negro as "a people of beastly living, without God, law, religion, or common wealth, and so scorched and vexed with the heat of the sun that in many places they curse it when it riseth" (as cited in Hembree, 2003, p. 41). The culmination of religious and cultural ethnocentrism, the fabrication and exaggeration of ideas about Africans, and, uniquely, the English comparison of their cultural and physical characteristics to Africans resulted in a protracted ideological degradation of Africa from the 15th century onward. Europeans were so dedicated to bolstering the tenets of this ideology that they superimposed their brand on the continent of Africa during the 18th century that supported the dominant ideology. For example, Marcus Rediker (2007) supports this ideology by describing how mapmaker, Emmanuel Bowen, changed a common designation of the main enslaving region in Africa from Guinea to "Negroland" in 1747. Rediker contends that this change represented the effort to solidify "new ways of thinking" about all African descendants (pp. 242-243). Moreover, Kurtis Keim (2009) states by the 18th century the European invention of the "myth of the Dark Continent" came into fruition and defined Africans as tribes of heathens, savages, and cannibals. European enslavers cast themselves as leaders of a Christian crusade in the "Dark Continent" who were under the constant threat of 'going native'— "taking on [inferior] African customs" (pp. 42-46). Social leaders from England carried the tenets of this dominant ideology, which created a sort of dichotomy between Africans and Europeans, into the English colonies known as America. Law provided leaders in Virginia with an apparatus for vilifying Africans and exalting Europeans.

Virginia Colonial Law and Cultural Violence

Virginia began conscripting its colonial laws to establish a system of White cultural violence in the early 17th century against Africans residing in the colony. Law provides dominant groups with the ability to perpetuate their ideology and values; and the implementation of law ensures for the dominant group ideological power over the subordinate group (Williams, III & McShane, 2004; Fowler, 2000). Hence, Virginia used colonial law to make African, Negro, perpetual servant, and Black slave synonymous with a perennial state of alleged African inferiority throughout colonial America. The dominant ideology propagated in the political decrees of Virginia endorsed Africans as inferior in the diverse population, and thus, singularly worthy of enslavement. Imposing an ideology of inferiority on the outranked Africans in Virginia helped to control and determine their life-chances.

From 1619 to the 1680s, authorities reduced the initial ranks relegated to Africans in Virginia— free, servant, and perpetual servant—to a defiled genetic inheritance solely worthy of slavery. The first Africans in Virginia arrived in 1619 on a Dutch ship at Point Comfort in Jamestown. During the same year, a company from London that held authority over Jamestown granted the colonists legal rights to practice self-government. There were no legal provisions for slavery in the legislature. John Rolfe, cofounder and secretary of the Virginia colony, did not refer to Africans as slaves. Their status more closely resembled that of indentured servants (Toppin, 1996; Higginbotham, 1978). The 1623 and 1624 census supports this fact and listed Africans in Virginia as servants rather than slaves. After completing their servitude, some of the 25 Africans recorded in the 1624 census became free land-owning colonists and eventually they had other servants working for them. The colonists initially relied on European servants, African servants, and Native Americans to confront the formidable task of transforming a wilderness into communities complete with homes and productive crops. The population of European indentured servants grew to 6,000 by 1671 compared to 2,000 African indentured servants (Toppin, 1996; Higginbotham, 1978; Franklin & Moss, Jr., 2000). Between 1619 and 1651, the African population comprised three distinct social positions: indentured servants, free persons, and perpetual servants (Franklin & Moss, Jr., 2000). Portuguese, English, Spanish, French, Scottish, Turks, Dutch, Africans, Native Americans (Higginbotham, 1978), and a very small group of Irish convicts made up the population of Virginia during the seventeenth century (Levy, 2005). Virginia began very early in the systematic and gradual degradation of the social status and identity of Africans in its ethnically diverse population.

The use of authority and law to reduce the status and image of Africans began within the first two decades of their arrival in Virginia. Anthony Johnson arrived in Virginia circa 1622, making him one of the first Africans in the colony. After serving his time as an indentured servant, Johnson secured an African indentured servant named Casor. Casor complained to two other European colonists when Johnson would not set him free following the completion of his indenture. Later, the two men to whom he initially complained to about Johnson held Casor as a servant against his will. Johnson later complained in court about the two men coercively obtaining Casor's labor; subsequently, the judge ordered Casor to be a servant for Johnson until he died (Toppin, 1996). This incident demonstrates that some Africans in colonial Virginia such as Johnson had privileges like European descendants, but Casor's unmerited and perpetual punishment foreshadowed the efforts in Virginia to maneuver its free and indentured African population into permanent slaves. This is a very important point because Casor, one of the first Africans in Virginia, did not commit any crime. The law obviously condemned Casor to perpetual work, but law also codified an inference that his social status was less than the two Europeans who commandeered his labor. The identity of Casor was legally superimposed with the status of a criminal. Casor's case served as a precedent for the disparagement of the African image in Virginia; and the forthcoming system of White cultural violence. Authorities in Virginia also had to mitigate the social cohesion shared between European and African servants.

The relationships among European and African servants trumped ethnic and cultural differences. This created an urgency for social leaders in Virginia to use law as a mechanism to make African and European descent unequal. For servants in Virginia, they shared a sense of morale, whether good or bad, from the centrality of work while toiling industriously together (Toppin, 1996). Virginia's population consisted of many poor European workers often considered intractable because of their ethnic identities and opposition to the working conditions. Indentured African and European servants began running away together within the first several decades of the establishment of Virginia. The *In Re Negro John Punch* court case in 1640 augmented use of authority and law to degrade Africans in Virginia. John Punch, one of three runaway indentured servants in Virginia who fled to Maryland, was African. When Punch was captured in Maryland with James Gregory (a Scotchman), and Victor (a Dutchman), their proposed sentences were unequal. The time of service for Victor and Gregory was increased by an additional four years, while Punch's conviction consigned him to be a servant for the rest of his life (Higginbotham, 1978). Colonists used their political means to differentiate the social status of their African population from the other ethnic groups in the colony. These early efforts were very important in separating Africans from poor European descendants in Virginia.

It is critical to view more of the law passed in colonial Virginia used to promote the inferiority and, eventually, the enslavement of Africans. In 1661, Virginia passed a law that stated any runaway English indentured servant accompanied by an African indentured servant would incur the African's remaining time of servitude in addition to his or her own time left to work (Franklin & Moss, Jr., 2000). This statute acknowledges that Virginia made the repercussions for European indentured servants associating with Africans very harsh. If two or more English indentured servants fled, they received maybe four additional years to their time of indenture. However, an Englishman caught with an African could potentially serve Virginia for the rest of her/his life. This certainly was an incentive for English servants to avoid consorting with Africans, but it also perhaps led to Africans being stigmatized in the diverse population. Europeans previously justified the enslavement of Africans beginning in the fifteenth century by stigmatizing Africans for supposed inferior physical and mental characteristics. Virginia passed a very important law in 1662 that helped further defame the African population and ensure their disproportionate punishment.

In 1662, the rising mulatto population was a major concern for Virginia legislatures. Moreover, miscegenation may have contributed to the establishment of laws designed to impede sexual relations between Africans and Whites in colonial Virginia. According to Ira Berlin (1998), sexual intercourse between African men and White women produced perhaps as much as one-quarter to one-third of the illegitimate children born in Maryland and Virginia during the seventeenth century. To procure the enslavement of the offspring produced by European men and African women (Higginbotham & Kopytoff, 1967), the Virginia legislature enacted a law (Act XII) stating that children's designation as free or enslaved was determined by the status of their mother (Peters, 1995). This law is also significant because

it was the first to make being an African synonymous with the legal status of a slave (Higginbotham & Kopytoff, 1967). Moreover, Virginia legislatures attached the following penalty in 1662 law: "…and if any Christian shall commit fornication with a Negro man or woman, he shall pay double the fines of a former act" (as cited in Higginbotham, 1978, pp. 42-43). However, a document drafted 32 years prior to the 1662 law demonstrates that white Virginians were to avoid sexual relationships with inferior Africans. The proceedings from the court case read:

1630 *Virginia* [Resolution] Hugh Davis to be soundly whipped before an assembly of negroes and others, for abusing himself to the dishonor of God and the shame of Christians, by defiling his body in lying with a negro, which he is to acknowledge next Sabbath day (as cited in Henning, 1823/1968, p. 35).

The Virginia case, *Re Warwick*, marked the end of the era of ambiguity about the social status of Africans and Europeans, and it revealed consensus in Virginia that Africans were socially distinct. Hanna Warwick, a white female indentured servant, served her time under the oversight of an African. The court record does not explain the violation committed by Warwick; in one sentence, the court record merely states: "Hanna Warwick's case extenuated because she was overseen by a negro overseer" (as cited in Higginbotham, 1978, pp. 26-30). The Warwick case suggests that the Virginia court dismissed Warwick's violation during her indenture simply because she committed an infraction while serving under a "Negro overseer." This example verifies that White was becoming a legal category for the ascendancy of European descendants over Africans in Virginia. As a "White" female, Warwick was given preeminence over her African employer. Scott L. Malcomson (2000) states that the term "white" to signify European superiority took on two meanings during this period: "Being White meant not being the property of others; it also meant creating the not-White" (pp. 46-47). Two decades later, Virginia law helped shape a key construct in the ideological system under the term "White," which was also necessary to strengthen the consolidation of European descendants over Africans.

Legalizing "Whiteness" as the Signature of the Dominant Ideology

Virginia produced two important laws in 1681. In the first law, African and mulatto servants became permanent servants if their owner did not finance their transportation outside of Virginia within six months of completing their indenture. Under the second law, European descendants were barred from Virginia if they married a free or servant African, mulatto, or Native American (Peters, 1995). These are several examples of Virginia's laws that gradually repealed the legal rights of free and indentured Africans in Virginia. Also, inherent in these laws are the efforts of Virginia to establish the legitimate alliance and privilege of European descendants over its African population. The 1681 law in Virginia, which outlawed intermarriage between English or other European descendants with African, mulatto, or Native American men or women, is evidence of the commitment of law-makers in Virginia to buttress the descendants of Europeans by preventing their amalgamation with non-Europeans. As previously mentioned, Virginia had a diverse population in the seventeenth century— "Portuguese, Spanish, French, English, Turks, Scottish, Dutch, Irish, Negros (Africans), and Indians (Native Americans)" (Higginbotham, 1978, p. 29; Levy, 2005, p. 5). The 1681 law about marriage in Virginia did not apply to any European ethnic group in the colony; the law characterized trepidations in Virginia about consolidating its population of European descendants. This is further supported by the fact that, although Virginia and other colonies consisted of various European ethnic groups, laws and other recorded documents in the seventeenth century reveal that colonists began using the term "White" in law to identify all Europeans rather than using English (Higginbotham, 1978). The choice of assimilating European ethnic groups in the seventeenth century into one term—White—means Virginia was then able to fortify its system of political control and White cultural violence against Africans. Under the term "White," most European descendants in Virginia received legal preference over Africans and other non-Europeans. Moreover, "White" in the English colonies supported the cultural values of the English for purity, godly, beautiful, and good; and "black" meant evil, ungodly, dirty, soiled, and impure (Jordan, 1974).

In colonial Virginia, legislators used law to denigrate African inheritance, which simultaneously created the opportunity for various social classes of Europeans to join the legal category of "White." By the end of the seventeenth century, legal scholar, Mary Frances Berry (1994), states British Parliament and other authorities

sealed the legal distinction in Virginia of Africans as non-human while eulogizing “White” as an omnipotent classification when they considered Africans “property of great value” and “merchandise” (p. 2). Virginia law was the vehicle for appropriating Africans as worthy of enslavement. A law passed in 1691 made Africans still regarded as servants, slaves, if the person they worked for could not pay for their transport out of Virginia within six months after their tenure ended (Higginbotham, 1978). To curtail the idea that Whites and Africans were comparable, White cultural leaders in Virginia decided that the penalties of the law had to reinforce the condemnation of Africans. The ideology that undergirded Virginia law comprised the beliefs, values, and self-interests of European enslavers and cultural leaders. Confining Africans to perpetual servitude was uncommon in the early seventeenth century; many Africans and Europeans were producing children and families together. The centrality of work, a lack of social distinctions among servants, miscegenation, and the formation of close social bonds suggest that many common Europeans did not view their African counterparts as unequal or inhuman. However, the defamation of Africans by penalty of law became a tool for cultural and social leaders to reduce the social status of Africans in early America, and served as the philosophical basis of the systemic White cultural violence against Africans. Virginia was also the ideal place to transform what may be properly called religious/cultural ethnocentrism into a cornerstone of the dominant ideology in America.

Religion and Cultural Violence in Virginia

Religion reinforced the notion that Whites were superior to Africans in Virginia. In 1667, Virginia created a law (Act III) allowing the Christian baptism of slaves (Franklin & Moss, Jr., 2000). This Virginia law threatened to jeopardize the effort to make an African inheritance synonymous with that of a slave because of the 1662 law previously discussed. The children of baptized African woman evaded enslavement because of the status of their mother as Christian. In order to protect the institution of slavery and the dominant ideology, however, this law provided that “the conferring of baptisme doth not alter the condition of the person as to his bondage or freedome. Thus, diverse masters, freed from this doubt, may more carefully endeavor the propagation of Christianity” (as cited in Franklin & Moss, Jr., 2000, pp. 65-66). What presupposed the 1667 Virginia law about African Christians was a belief in the inherent inferiority of Africans and their non-Christian religious practices. Hence, not only did this encourage Africans to convert to Christianity, it also created a mechanism for controlling African converts by teaching them what it meant to be a “good Christian” while denigrating their non-Christian religions. A fervent Christian leader in Virginia will spearhead a new mission in the next century to indoctrinate into Virginians an exemplary model of a pious African Christian.

During the 18th century, Reverend Davies, a Presbyterian minister, embarked on a new mission in the Virginia to teach Africans that being good Christians was equivalent to being “good slaves” (Jordan, 1968, pp. 182-183, 188). Before the fear of slave rebellions being linked to the education of enslaved Africans occurred in America, Davies sponsored the secular and religious education of Africans. He spent much of his time in his church teaching Africans to read and write, modeling proper social conduct, and preaching sermons. Considered one of the exemplary educators in Virginia, his purpose was to make Africans Christians, loyal and patriotic to Virginia, and to conduct themselves in accordance to the laws and rules in the colony and on the plantations where they resided. Davies did speak out against the cruel treatment Africans faced on plantations (Pilcher, 1971). He also wrote a publication in 1758 called, *The Duty of Christians to Propagate Their Religion Among Heathens, Earnestly Recommended to the Masters of Negro Slaves in Virginia*. Davies later warned that some Africans “imagined themselves upon an Equality with White people” when they became Christians (as cited in Jordan, 1968, pp. 183, 188). Davies’ mission was not to abolish slavery, to make Africans feel equal to Whites, or to challenge to ideology of African inferiority in Virginia. His dedication to what he called “Africa’s gloomy sons” in a sermon on October 16, 1757 (Davies, 1810/2012, p. 49) was to use Christianity to create literate, submissive, and patriotic Africans who accepted their derided status to Whites. Others will follow this model for using Christianity in the system of White cultural violence.

Christian leaders in Virginia, like other Europeans, used “Noah’s curse” as the core of the dominant ideology to rationalize enslaving Africans by teaching that Africans descended from Ham; and their enslavement was the will of God (Haynes, 2002; Chambers, 1968). Virginia’s role in perpetuating the

ideology of African inferiority was important for Whites who embraced "monogenism," or the belief that all humans originated from a single source—Adam and Eve (Dain, 2002). White "monogenists" who struggled to reconcile the single origin of superior Europeans and inferior Africans now claimed Africans were the progeny of Ham who was cursed by God (Darkwah, 2003). Thornton Stringfellow, a Baptist minister and planter from Virginia penned, *The Bible Argument: Or, Slavery in the Light of Divine Revelation*. Stringfellow's work was first introduced in 1841 by the *Religious Herald*, a Richmond, Virginia publication (Finkleman, 2003). It is very plausible to argue there was a commitment to perpetuating this proslavery essay because it was later turned into a pamphlet and then included in an 1860 anthology—*Cotton is King*—consisting solely of authors promoting proslavery thought (Finkleman, 2003). Stringfellow (1860/2003) argues that northern abolitionists exhibited a "palpable ignorance" about biblical scriptures regarding the institution of slavery. According to Stringfellow, slavery was part of God's divine will. He supports his claim of God's decree of slavery by referencing the biblical stories of Canaan, Abraham, and Peter, all of whom were either enslaved or rewarded with slaves as part of the divine will (pp. 123-128). Other very important and influential people from Virginia helped shape and disseminate the ideology of African inferiority into the minds and hearts of the American public.

Virginia's Heroes of White Cultural Violence

The creation and effectiveness of White cultural violence in America depended much on the validation of the dominant ideology by respected, esteemed, and influential people. Prominent and influential individuals who helped to shape and sway popular opinions in the American cultural context were very instrumental at creating legitimacy about the ideas being spread concerning Africans. There is no short supply of significant individuals in Virginia who contributed to a nefarious representation of Africans. For example, George Washington, Thomas Jefferson, George Mason, Patrick Henry, and Robert Carter III all owned slaves in Virginia (Levy, 2005) and contributed uniquely to the ideology of African inferiority. These important individuals from Virginia published or otherwise presented their ideas about Africans. Paul Finkleman (2003) argues that Thomas Jefferson articulated in his 1787 publication, *Notes on the State of Virginia*, the ideological basis for the subordination of Africans upon which many future proslavery advocates would build. Jefferson (1787/2003) used social-science theories and presumptions to claim and suggest, among other things, that

African:

- genetic stock was improved through miscegenation;
- skin color was a genetic marker for inferiority and perhaps caused by their blood;
- women might have sexual intercourse with orangutans;
- males preferred European female aesthetics;
- people possessed a foul odor which came from secreting waste through their skin rather than their kidneys;
- people lacked the capacity for morality and intellectual thought;
- had a predisposition for theft;
- sullied nature may be part of God's creation;
- their enslavement is judicious; and
- this unfortunate set of differences "is a powerful obstacle to the emancipation of these people" (pp. 47-54).

Peter Wallenstein (April, 1994) states that, friend of Jefferson and founding father, George Mason, has been compared to Christ for leadership and influence on the public consciousness of America. Mason, a Virginia farmer, drafted the Virginia Bill of Rights in 1776, which included a declaration about the presupposed freedom of all men. Mason, whose number of enslaved Africans was only surpassed in Fairfax County by George Washington, used his influence to promote the enslavement of Africans in America. During a public outburst at the 1787 Philadelphia Convention, he spoke out against the international slave trade, but he also used his writings to support slavery in Virginia. Mason wanted to protect domestic slavery in America. As such, he willed all his enslaved Africans to his nine children. In 1853, proslavery advocate, Edmund Ruffin (1853/2003), expounded on Jefferson in an essay, "The

Political Economy of Slavery." According to Ruffin, slavery not only benefitted Whites; the institution also provided Africans with privileges that their recessed humanity prevented them from producing themselves. Some of these advantages for enslaved Africans, claims Ruffin, were assurance of food, shelter, medical care, and other life-sustaining needs; and while the enslavers, enslaved, and rest of White society benefitted from this formal social organization, free Africans in the North were incapable of approximating any degree of social advancement because they lacked influence and stability which came from being directed by White enslavers. Ruffin states, "the free negro class, in every part of this country, is a nuisance, and noted for ignorance, laziness, improvidence, and vicious habits" (pp. 61-76).

Publishing and lecturing about ideas that supported the dominant ideology was important for the leaders in Virginia. Samuel A. Cartwright, born in Fairfax County Virginia, worked vigorously to publicize in medical journals the ideology of African inferiority. Although Cartwright was a medical physician, he also wrote about race theory, anthropology, and religion to denigrate the image of Africans. Cartwright presented his contribution to the dominant ideology at the Louisiana Medical Association Conference in 1851. To ensure his condemnation of Africans was available to the public, *The New Orleans Medical and Surgical Journal* "promptly published the entire report, and *De Bow's Review* reprinted the report as installments" (Finkleman, 2003). In, *Report on the Diseases of and Physical Peculiarities of the Negro Race*, Cartwright (1851/2003) argued that there are natural and opposing physiological, anatomical, and mental differences between Whites and Africans: tendons, bodily fluids and secretion, muscles, bile, brains, nerves, necks, spines, thigh bones, facial structures, noses, pelvis, legs, feet, ankles, mouths, lips, eye sight, gaits, foreheads, medulla oblongata, dancing abilities, pain thresholds, and pituitary membranes. Cartwright compared Africans to apes and stated the inclination of Africans to music was for "mere sensual pleasure…without conveying a single idea to the mind." He also claimed there were diseases exclusive to Africans. According to Cartwright, a "disease of the mind", which he called Drapetomania, caused enslaved Africans to run away from plantations; and an African who broke tools, destroyed property, or displayed any rebellious behavior suffered from Dysethesia Ethiopis. Cartwright argued nature and God dealt Africans a place in history that made them display, "idleness, misery, barbarism, no progress in civilization or improvement," and caused them to construct, "no buildings, no roads, and no monuments." He also stated Africans were, like children, unable to take care of themselves, and were anatomically made by God to be "the submissive knee-bender" to Whites. It is important to note here that Cartwright suggests that Virginia is not only his place of birth, but is also the birthplace of his ideas about Africans (pp. 158-168).

Thomas Gossett (1968) states one of the most "rabid defenders" of African descendants' inferiority lived in Virginia during the nineteenth century. Monogenist and social theorist, George Fitzhugh, declared that the inherent inferiority of Africans made their enslavement wise (p. 66). Fitzhugh articulated his theory of African inferiority in two major publications in Virginia: *Sociology of the South; or, the Failure of a Free Society* (1854) and *Cannibals All or Slaves Without Masters* (1857). According to Fitzhugh (1850/2012), "He the Negro is a grown up child, and must be governed as a child…The Master occupies toward him the place of a parent or guardian." Fitzhugh continues, "…slavery relieves him from a far more cruel slavery in Africa, or from idolatry and cannibalism, and every brute vice and crime than can disgrace humanity; and that it Christianizes, protects, supports and civilizes him…The Negro slaves of the South are the happiest, and in a sense, the freest people in the world." The brief period of Reconstruction (1865-1877) following the Civil War presented many challenges to using the dominant ideology to sequester Africans as being exclusively worthy of enslavement and not being worthy of a formal education. A leader in Virginia took on this challenge by creating a leading educational model as a mechanism to indoctrinate African students with the ideology of African inferiority.

Education as a Mechanism of White Cultural Violence

Education became a conduit for Whites to propagate the dominant ideology. William Watkins (2001) contends that Samuel Chapman Armstrong produced America's leading formal educational model for dispersing the ideology of African descendants' inferiority in Hampton, Virginia during the nineteenth century. Armstrong opened the doors of Hampton Normal and Agricultural Institute in 1868 as a "normal," or teacher training school, to Africans, Native Americans, and Whites. However, Armstrong

used Hampton Institute as a political platform to address the vexing "Negro problem" following the Civil War. Armstrong chose to take on the challenge of oppressing Africans by espousing equal educational opportunities at Hampton for Africans while simultaneously indoctrinating them to accept a status of second-class citizenship. Armstrong and his instructors taught Africans to accept segregation and menial jobs, European descendants saved African descendants from inferior cultural and religious practices in Africa, and that European descendants' enslavement of Africans was a consequence of Africans' own deficiencies. One such instrument used to disseminate these ideas to students was a newspaper created by Armstrong called, *The Southern Workman*. Watkins (2001) refers to *The Southern Workman* as Armstrong's "Ideological Pulpit" because this newspaper, which advocated the disfranchisement of Africans, reviled African's pursuit of higher education in liberal arts, encouraged non-antagonistic views among Africans about slavery, and other antebellum views, was used for twenty years as students' primary text in Hampton Institute's classrooms (pp. 9, 12-14, 21, 43-61, 81). "Leading American politicians, businessman, and philanthropists came to view" the "Hampton Idea" as the national and international solution to the "Negro problem" (Anderson, 1988, p. 72).

Conclusion: The Significance of Virginia's Role in Initiating White Cultural Violence

Building on the Spanish and Portuguese, Virginia helped influence a system of White cultural violence in America against Africans by the propagation of a dominant ideology or the ideology of African inferiority. Those Whites in Virginia supporting White cultural violence worked determinedly to make the distinction between being an African (Negro, nigger, or black) and European (White) two opposing and fixed symbols to produce in American culture a prototype of the subhuman African. The symbol of African inferiority became so firmly embedded into the American culture that Wood (1968) asserts there were locations in the North and West in which Africans were disparaged by Whites who had no direct contact with Africans. In 1837, an African named Hosea Easton (1837/2010), in a published pamphlet aimed at dispelling the inherent inferiority thesis of Africans, described common expressions that Whites in Virginia and other states used to coerce their children: "Sally, go to sleep, if you don't the old nigger will carry you off; …don't cry Hark, the old nigger's coming." Easton observed that White children in schools were taught the dominant ideology when they were told to sit in the "nigger-seat," or threatened for misconduct by being made to sit with a "nigger." Easton states White adults used the following phrases to castigate disobedient white children:

> …how ugly you are, you are worse than a nigger.
> …poor or ignorant as a nigger.
> …black as a nigger.
> …have no credit [better] than a nigger.
> …have hair, lips, feet,…, like a nigger (pp. 40-42).

The examples above prove that Virginia helped being of African descent become a synonym and standard for disapproval and sub-human.

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Majoring in STEM: How the Factors of Fear of Failure, Impostor Phenomenon, and Self-Efficacy Impact Decision-Making

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Abstract

The push for increased employment within science, technology, engineering, and mathematics, or STEM, careers, has seeped to the university campus. Students are often encouraged to consider a college major in a STEM discipline. The current study was an attempt to determine influencing factors that impact a university student to withdrawn from STEM classes and change their majors to another discipline. Past research has identified that college students are prone to having self-doubt and fear of failure. The present investigation examined the impact that impostor phenomenon, fear of failure, and self-efficacy were influential in determining the decision to continue seeking a major in a STEM discipline. Both male and female genders were participants to determine gender differences in these factors. The study utilized the Performance Failure Appraisal Inventory (PFAI), the Clance Impostor Phenomenon Scale (IPS), and the General Self-Efficacy Scale (GSE) as questionnaires for the data collection. An additional demographics survey was used to identify student education level, religious background, ethnicity, age, relationship status, and sexual orientation to determine if there were any noticeable differences in student responses.

The need to attract, retain, and grow diverse student populations into the disciplines of engineering, technology, mathematics, and science (STEM) has been identified as essential by the Committee on Equal Opportunities in Science and Engineering (2004; Werner & Denner, 2009). There have been numerous recommendations within the United States to increase the number and diversity of students choosing to pursue a degree in a STEM field in order to remain competitive within the global economy (National Research Council, 2012; National Science Board, 2007; National Governors Association, 2007; National Academy of Science, 2005). The STEM subjects are quite diverse and include a wide range of disciplines (Chen & Weko, 2009). The National Science Foundation (NSF) provides a very broad definition of various STEM fields (Green, 2007). This definition includes the commonly considered categories of natural sciences, engineering, mathematics, and computer and information sciences; however, the NSF definition also comprises such social and behavioral sciences including psychology, sociology, economics, and political science (Green, 2007). Occupations in STEM careers have grown 79 percent since the year 1990, from 9.7 million to 17.3 million (Graf, Fry, & Funk, 2018). Experts have estimated that by 2018, eight million jobs in the STEM fields were available in the United States (Duran, Worch, Duran, Burgoon, 2018); nevertheless, researchers argue that the vast majority of U.S. students would not be prepared to fill those empty jobs (Carnevale, Smith, & Melton, 2011). According to the National Center for Education Statistics, nearly every state reported a significant increase in students earning degrees in STEM disciplines from the years of 2009-2010 to 2015-16 (2017). Student STEM majors in programs having a bachelor's degree or higher have flourished, increasing to 550,000 graduates in 2015-2016 from 388,000 in 2009-2010, representing a growth of 43 percent (Wright, 2017).

For innumerable reasons, there is a significant proportion of students who initially chose to major in a STEM discipline, but later changed their mind and deserted the STEM major. This phenomenon is described as *STEM attrition* (Chen & Soldner, 2013), and is typically used to describe when a student has

enrolled into a STEM major at college, but for whatever reason, chooses to leave the STEM field. STEM attrition can occur at any time during the college experience (Chen & Soldner, 2013). While nearly one-third of entering freshman expressed an interest in choosing a STEM major for their college career (National Science Board, 2012), the reality is that STEM enrollment is significantly lower. Specifically, in 2017-2008, undergraduates choosing to major in STEM only accounted for approximately 14 percent enrolled in post-secondary education within the United States (Snyder & Dillow, 2011). Recent policies in the United States have focused on the reduction of student attrition from STEM fields in college because it has been argued that even a small increase in STEM retention is potentially a cost-efficient way to substantially increase the supply of STEM workers (Chen & Soldner, 2013; Ehrenberg, 2010; President's Council of Advisors on Science and Technology, 2012).

This research study examined potential variables that may be contributing to STEM attrition. The current research studied the variables of fear of failing, impostor phenomenon, and self-efficacy with students majoring in STEM disciplines. In the past, research has identified significant correlations linking having fears of failing with the psychological constructs of self-confidence and self-efficacy (Sherman, 1988; Elliot & Sheldon, 1997; Martin, 2002). Further, fear of failure is part of the theory behind the psychological construct of the impostor phenomenon (Clance & O'Toole, 1988; Clance, Dingman, Reviere, & Stober, 1995).

Academic functioning and regulation are impacted by personal self-confidence and optimism (Chemers, Hu, & Garcia, 2001). Having personal self-confidence about our own individual task-related capabilities, also recognized as self-efficacy, is recognized as valuable for developing academic goal responsibility. This is due to the fact that the student is developing their own personal level of academic efficacy (Tinto, 1993; Bean, 1990; Chemers et al., 2001).

Past studies have identified significant correlations between the psychological constructs of fear of failure and self-confidence and self-efficacy (Sherman, 1988; Elliot & Sheldon, 1997; Martin, 2002; Nelson, 2012; Nelson, Newman, McDaniel, & Buboltz., 2013). In the 1960s, fear of failure (FF) became popular as a construct of achievement motivation literature and was hypothesized to provide several diverse purposes. Research suggests that an individual's fear of failing is likely more centered on feelings of anxiety and the appraisal of prospective danger, and/or threat, in circumstances where there is a possibility of failing (Conroy, Kaye, & Fifer, 2007). Atkinson (1964) posited that fear of failure is connected to the motivation to avert or prevent failing. Additionally, fear of failure has been characterized as a motivator to prevent failure and/or an aptitude for feeling embarrassment or disgrace as a consequence of failure (Atkinson, 1964, p.13). Fear of failure can also be defined as the fear of not accomplishing or achieving a goal (Sherman, 1988). Fear of failure has further been identified as a "tendency to appraise threat and feel anxious during situations that involve the possibility of failing" (Conroy et al., 2007, p. 239).

Having fears of failure may generate anxiety to the point that an individual will stop attempts in achieving their personal goals. Fear of failure has been identified as a type of anxiety concerning performance (Conroy, 2001). Furthermore, there are several investigators who explicitly include the concept of shame in their description of fear of failure (Atkinson, 1964; Atkinson & Litwin, 1973; Smith and Smoll, 1990; Conroy, 2001).

The psychological construct of the impostor phenomenon (IP) was initially theorized within a clinical setting (Clance & Imes, 1978; Clance, 1985). Individuals experiencing the impostor phenomenon are identified by having powerful feelings that they are frauds and they are undeserving of their actual accomplishments (Clance & Imes, 1978). Individuals with impostor phenomenon are incapable of internalizing their own sense of competency or talent (Langford & Clance, 1993). Further, the individuals exhibiting symptoms of impostor phenomenon often attribute their success to luck (Clance & Imes, 1978) or charm, error, or sensitivity instead of ability (Clance et al., 1995).

Clance theorized that the impostor phenomenon is not "a pathological disease that is inherently self-damaging or self-destructive" (1985, p. 23). Rather, it interferes with the psychological well-being of an individual. Having a higher level of impostor phenomenon creates self-doubt and anxiety, thus limiting self-acceptance of success because personal ability is perceived as absent (Clance, 1985).

These feelings of being an intellectual impostor (Clance & Imes, 1978, p. 2) create personal distress and maladaptive behaviors (Clance, 1985; Sakulku & Alexander, 2011; Harvey & Katz, 1985; Kolligian & Sternberg, 1991; Sonnak & Towell, 2001). For individuals having impostor phenomenon, success does not typically equal happiness (Sakulku & Alexander, 2011). These individuals regularly encounter fear, worry, lack of confidence, and feel awkward with their own personal successes (Sakulku & Alexander, 2011) Not only professionals experience the impostor phenomenon. Past research has identified that college students have shown evidence of experiencing the impostor phenomenon (Bussotti, 1990; Harvey, 1981; Langford, 1990).

Individuals having impostor phenomenon are stricken with fear of failure than can cause procrastination and lack of success (Clance et al., 1995; Clance & O'Toole, 1988). Because individuals having impostor phenomenon often experience terror as fear of failure, they will go to great lengths to avoid mistakes (Clance & O'Toole, 1988). These individuals experience high levels of anxiety when subjected to an achievement-related-assignments because they fear possible failure (Sakulku & Alexander, 2011; Clance, 1985). These individuals believe that if they make a mistake, they will be humiliated. They also have internalized that failure on a task will cause them to either appear laughable or feel foolish (Clance & O'Toole, 1988). Fear of failure has been theorized as being the underlying motive of most individuals having impostor phenomenon (Clance & O'Toole, 1988). As a result, most individuals with impostor phenomenon are inclined to overwork to ensure that they will not experience failure (Clance, 1985).

Bandura defined self-efficacy (Bandura, 1977; 1982; 1994; 1997; 2005) as those beliefs that an individual has about their ability to perform certain tasks in order to accomplish specific, distinctive goals. Initially, Bandura coined the term self-beliefs for the concept (Bandura, 1977), but the term was later amended to self-efficacy. Personal self-efficacy was identified as those views that influence how a person is motivated to achieve personal success and individual contentment (Bandura, 1986). Further, Bandura asserts that personal self-efficacy views are impactful for attaining personal achievement and satisfaction (Bandura, 1986). Self-efficacy has been identified as a predictor for career choice because having higher levels of personal self-efficacy can increase job exploration and training for jobs that would have been otherwise unexplored (Dawes, Horan, & Hackett, 2000). Further, self-efficacy has been identified as a predictor of success for students choosing to be STEM majors (Rittmayer & Beier, 2008, 2009; Pajares, 2005; Zimmerman, 2000), and has also been shown to be related to levels of determination, drive, level of interest, and achievements or success in students that intend on studying engineering as a career choice (Rittmayer & Beier, 2009; Schaefers, Epperson, & Nauta, 1997; Lent et al., 2003; Hackett, Betz, Casas, & Rocha-Singh,1992).

Method

Participants for the current study were recruited within university STEM courses. The subjects were asked to answer a self-report survey that involved questionnaires to measure various types of constructs including fear of failure, the impostor phenomenon, and beliefs about personal self-efficacy.

Participants

Participants were student volunteers enrolled in undergraduate STEM classes at a mid-size southern university. From an initial sample of 142 participants, there were 83 males and 57 females. The male participants comprised 58.5 percent of the research sample. The female participants included 40.1 percent of the study sample. There were two missing responses for the demographics question for sex/gender (1.4%). The age of participants ranged from 17 to 37 years old (M = 19.72, SD = 2.536).

In terms of university classification, the participants were comprised of 38.0% freshmen, 35.9% sophomores, 14.8% were juniors, and 11.3% seniors. The ethnicity of the sample consisted of 87 Caucasians (61.3%), 29 African-Americans (20.4%), ten Asian-Americans (7.0%), five Latino/Latina Americans (3.5%), six Multiracial (4.2%), one Native-American (0.7%), and three others (2.1%) who did not include their ethnic backgrounds. One participant did not include any response to the ethnicity question.

The range for ACT scores spanned from a low ACT score of 17 (0.7%) to a high score of 36 (0.7%). The mean score for the demographic question regarding ACT scores was 24.98 (SD = 4.175).

Materials

Consent form. The investigators provided a consent form to the participants prior to the beginning of the research study. The consent form contained all contact information that is required to reach the principal investigator of the research experiment. Participants were asked to sign this document and return it to the researcher.

Demographic questionnaire. The demographic questionnaire consisted of six items designed to gather data on standard demographic information of the participants. The demographic questionnaire included questions such as current age, sex/gender, sexual orientation, ethnicity/race, and current educational level. Additionally, the participants were asked what their ACT or SAT scores were prior to beginning college.

Performance failure appraisal inventory. The Performance Failure Appraisal Inventory (PFAI; Conroy, 2001; Conroy, Willow, Metzler, 2002) is a 25-item multidimensional measure of cognitive-emotional-relational appraisals associated with fear of failure (Conroy et al., 2002). The PFAI originally was a 41-item inventory that has been made into two shorter versions, including a 25-item and a 5-item version (PFAI-S). The present study used the 25-item inventory. The PFAI identifies five aversive consequences that are associated with fear of failing (Conroy, 2001). Each item on the PFAI begins with either of two question stems, When I am failing... or When I am not succeeding… that is followed by a perceived failure consequence that is potentially aversive to the individual (Conroy, Metzler, & Hofer, 2003). The PFAI includes five undesirable consequences of failure. These are the following: Fears of Experiencing Shame and Embarrassment (FSE), Fears of Devaluing One's Self-Estimate (FDSE), Fears of Having an Uncertain Future (FUF), and Fears of Important Others Losing Interest (FIOLI), and Fears of Upsetting Important Others (FUIO) (Conroy et al., 2007; Conroy, 2001). Responses for the PFAI are on a five-point Likert-type scale ranging from *do not believe at all* (-2) to *believe 100% of the time* (+2).

The PFAI (Conroy, 2001; Conroy et al., 2002) has demonstrated good construct validity and a high-degree of cross-validity due to its hierarchical model of scoring (Conroy et al., 2003) based on simultaneous factorial invariance analyses in separate samples. External validity (Conroy, 2001; Conroy et al., 2002; Conroy et al., 2003) is considered strong against similar and different constructs. The PFAI (Conroy et al., 2003) has also been determined to exhibit strong differential stability, factorial invariance (LFI), and latent mean stability. The latent variable differential stability has been determined to be better than conventional criteria (e.g., .70) and ranged from .80 to .96; while test-retest reliability ranged from .65 to .92 (Conroy et al., 2003). The PFAI has internal consistency, as determined by Cronbach's alphas that range from .74 to .81. The two subscales Fear of Experiencing Shame and Embarrassment (FSE) and Fear of Having an Uncertain Future (FUF) both have been determined to have Cronbach's alpha of .80. The subscale Fear of Upsetting Important Others (FUIO) demonstrated a Cronbach's alpha of .78. The Fear of Important Others Losing Interest (FIOLI) subscale was determined to have an alpha of .81. The lowest alpha was found to be .74 for the subscale of Fear of Devaluing One's Self-Estimate (FDSE).

Clance Imposter Phenomenon Scale. Clance's Impostor Phenomenon Scale (CIPS; Clance, 1985) is a self-administered instrument comprised of 20-items measuring characteristics and feelings, including having a fear of being evaluated, fear of failing, even with previous success, and fear that the individual will not live up to the expectations of others. The scale also assesses the level that the individual attributes their success to luck. The instrument is a five-point Likert-type scale; higher scores on the CIPS indicates increasing levels for impostor phenomenon experience. A total score results in a range from 20 to 100. The CIPS has been validated for both clinical and non-clinical populations (Castro, Jones, & Mirsalimi, 2004). The reliability for the instrument demonstrates alpha coefficients ranging from .84 (Prince, 1989) to .96 (Holmes, Kertay, Adamson, Holland, & Clance, 1993)

General Perceived Self-Efficacy Scale. Schwarzer and Jerusalem's General Perceived Self-Efficacy Scale (1995) was originally developed in German. It has since been translated into 28 different languages, including English (Schwarzer & Jerusalem, 1995). This instrument identifies a person's beliefs about their own capabilities to handle novel and often challenging responsibilities within various environments or areas. An example item is "I can handle whatever comes my way." Higher scores on this measure indicate higher levels of General Self-Efficacy (Schwarzer & Jerusalem, 1995).

The majority of psychometric evidence supporting the General Self-Efficacy measure has been positive. Past analysis for this measure has reported that the internal consistency coefficients for a variety of samples and countries have ranged from .75 to .91 (Scholz, Gutierrez-Dona, Sud, & Schwarzer, 2002). Some research has indicated reports of internal consistency coefficients being below the generally accepted cut off for basic research (Scherbaum, Cohen-Charash, & Kern, 2006; Henson, 2001; Nunnally & Bernstein, 1994). Longitudinal studies have reported variable stability coefficients ranging from .47 to .75 (Scholz et al., 2002).

Procedure

Prior to the onset of this study, approval was obtained from the Institutional Review Board (IRB) at Southern Arkansas University. All pertinent ethical guidelines established by the American Psychological Association (APA, 2002) were adhered to during the duration of the research study, as well as after the experiment in regards to confidentiality and anonymity. No personal information for the research participants, including individual name or campus identification number, was included in the permanent data record. All information obtained from participants in this study was kept in strict confidentiality.

The participants were recruited for the investigation, and they were provided a survey packet that included a consent form. The primary investigator reiterated to the participants that their participation was completely voluntary, and they could withdraw their participation at any point during the research investigation. The purpose of the study was very briefly discussed to the volunteer research subjects; then, participants were encouraged to read the consent form thoroughly. After reading the consent form, the investigator instructed the participants to complete the information at the bottom, including their signature and the date of participation. After completion of the consent form, the participants were asked to turn it in to keep it separate from the research questionnaires to ensure anonymity and confidentiality were maintained for each participant.

Results

Data Analysis

Data from this research project was taken from three separate questionnaires, plus an additional demographics survey, to assess the variables' impact on students who have chosen to major in a STEM field.

Correlations

Data from 142 participants was analyzed to assess the validity of several hypothesizes. As shown in Table 1, significant correlations were found between the following variables: General Fear of Failure (GFOF) and General Self-Efficacy ($r = -.313$, $p < 0.01$), General Fear of Failure (GFOF) and Imposter Phenomenon ($r = 0.418$, $p < 0.01$), Imposter Phenomenon (IP) and General Self-Efficacy ($r = -.215$, $p < .05$).

Discussion

Career selections are vital due to the sheer number of hours that most individuals spend working in their lifetimes (Nelson, 2012). The present study aimed to identify factors that are influential in the decision to major in a specialty of science, technology, engineering, or mathematics (STEM). This study examined the factors of the impostor phenomenon, fear of failure, and personal self-efficacy and their potential impact on choosing and remaining in a STEM major. Results indicated that fear of failure can be considered as a contributor in the decision to major in a STEM discipline. Outcomes further identified that a negative correlation exists between the variables of fear of failure and self-efficacy. Specifically, as fear of failure grows for a student who has chosen to major in a STEM discipline, their individual self-efficacy feelings dissipate. This disintegration of personal self-efficacy causes the student to experience self-doubt about their personal capabilities for tasks related to STEM careers. Therefore, the desire to pursue an education or future job in a STEM field is influenced when the student fears that they will not be successful in their scholastic endeavors or occupational selection.

In addition, this study identified a positive correlation between fear of failure and the impostor phenomenon. As fear of failure increases, students are likely to display more characteristics of the impostor phenomenon. The impostor phenomenon is characterized by feelings in students that they are

undeserving of their actual accomplishments and only achieved their current position due to luck or some type of error (Clance & Imes, 1978). Therefore, the positive correlation noted in the current study is not surprising. The construct of the impostor phenomenon has been theorized as having a component of fear of failure; current findings in this study reinforce the original theoretical framework identifying fearing failure as a significant factor element to having impostor phenomenon (Clance, 1985).

Countless individuals in modern society suffer from fear of failing due to the considerable significance placed upon being successful in their scholastic pursuits and careers (Shaver, 1976). Often, past research has identified that students will attempt to avoid failure in academics and other educational settings to prevent shame (Elliot & Thrash, 2002). Students who experience increased fears of failing may endeavor to establish goals which are focused on the avoidance of responsibilities that could exhibit their ineptitude and will even at times employ objectives to circumvent mastery or performance (Bartels & Magun-Jackson, 2009; Conroy, 2004; Conroy & Elliot, 2004; Thrash & Elliot, 2002; Elliot & McGregor, 1999; Elliot & Church, 1997; Elliot & Sheldon, 1997).

The current study identifies fear of failure as a significant contributor in the decision to major in STEM as an educational college choice. Investigators in past studies have acknowledged that there is a correlation between having feelings of low self-efficacy and having fears of being unsuccessful or a failure in some STEM disciplines, specifically engineering (Sherman, 1988; Elliot & Sheldon, 1997; Martin, 2002). In particular, females have been highlighted in previous studies as having significant fears of not being valued within the field of engineering; these fears were likely associated with their individual views of personal self-worth and self-esteem (Dawes et al., 2000; Nelson et al., 2013). Additionally, female college students were found to be less self-efficacious regarding their abilities in math than males (Nelson & McDaniel, 2018; Lent, Lopez, & Bieschke,1991; O'Brien, Martinez-Pons, & Kopala,1999). For males, having higher self-efficacy feelings significantly contributed to their consideration of a career that would utilize mathematics and science abilities (Lent et al., 1991; Hackett & Betz, 1989). Former investigations have identified that females are vulnerable to feelings of low self-esteem and low self-worth regarding personal self-efficacy, which is influential when they consider education or employment in engineering or other science and math fields (Papastergiou, 2008; Hyde, Fennema, & Ryan, 1990; American Association of University Women, 2008 [AAUW]; Dawes et al., 2000). Females having low self-efficacy was significantly correlated to the numbers of females who chose and remained in engineering as a career (AAUW, 2008; Rittmayer & Beier, 2009).

Success in educational endeavors has been identified as significant and impactive for the development of individual self-confidence (Chemers et al., 2001). This specific self-confidence is recognized as the base construct of self-efficacy, which can be defined as having belief in one's own individual task-related competencies. Self-efficacy has been readily identified as being valuable for the development of educational and academic goal accountability (Chemers et al., 2001; Tinto, 1993; Bean, 1990).

Present findings indicate a negative correlational relationship between the variables of self-efficacy and fear of failure. These results indicate that as a student experiences an increase in fear about their performance, specifically fears of being a failure, then their levels of personal efficacy will disintegrate. Fear of failure has long been identified with the problems with low self-esteem, self-confidence, and self-efficacy (Sherman, 1988; Elliot & Sheldon, 1997). Fear of failure has also been identified as an influential variable in the decrease of student grades and affecting educational pursuits (Eme & Lawrence, 1976; Elliot & Sheldon, 1997; Elliot & Church, 1997). Because fear of failure is anxiety-provoking, an individual may stop striving to achieve their individual ambitions, including pursuit of an education in a STEM major (Conroy, 2001).

Fear of failure is one of the primary characteristics in the development of the impostor phenomenon (Clance, 1985; Clance & O'Toole, 1988). Having a higher level of impostor phenomenon creates self-doubt and anxiety, which further exacerbates fears of failing (Clance, 1985). Past research indicates that individuals having impostor phenomenon regularly experience distress, anxiety, and a lack of self-assurance (Sakulku & Alexander, 2011). Studies have also documented that it is not only professionals who suffer from the impostor phenomenon. Investigators have identified university students experience

the impostor phenomenon (Bussotti, 1990; Harvey, 1981; Langford, 1990). This past research is linked to our present study findings. Results in the current investigation identified a positive correlation between the variables of fear of failure and the impostor phenomenon. Expressly, as fear of failure increased for a student, there was greater likelihood that the individual would correspondingly exhibit features of the impostor phenomenon.

The current study was conducted with male and female students majoring in a STEM discipline at a single small southern university. Results could be significantly different regarding findings in different locations and at different-sized universities. It would be beneficial to have studies done at varying locations to diversify results. Males made up the majority of the sample (58.5%), which may have somewhat influenced the data results. Also, a noteworthy majority of our sample was Caucasian (61.3%). Future investigations should focus on attaining a more diverse sample of students to assess if differences in ethnicity are consequential in students majoring in STEM when examining the variables of fear of failure, self-efficacy, and the impostor phenomenon. Prospective studies should also examine if these variables are compounded following graduation and entrance into the STEM workforce. Examination of fear of failing, fear of being an impostor, and lower feelings of personal self-efficacy are dynamic questions to consider, especially after the individual has achieved their career goal for gainful employment within a STEM profession. These are valid research questions which identify meaningful topics for future consideration regarding STEM as an education major and future career selection.

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Table 1
Correlations between GFOF, GSE, and IP

Correlations			
	GFOF	**GSE**	**IP**
General Fear of Failure (GFOF)	1	-.313**	.418**
General Self-Efficacy (GSE)	-.313**	1	-.215*
Impostor Phenomenon (IP)	.418**	-.215*	1
**Correlation is significant at the 0.01 level			
*Correlation is significant at the 0.05 level			