2015 JOURNAL OF UNDERGRADUATE RESEARCH

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CABRINI COLLEGE

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LETTER FROM THE PRESIDENT

April 20, 2015

Dear Cabrini College community,

Reading through the Cabrini College Journal of Undergraduate Research is an inspirational experience. The peer-reviewed research, critical analyses, innovative interpretation, and scholarly inquiry in this Journal is a testament to both the disciplined efforts of Cabrini's students, and the rigorous academic mentorship that faculty provide to those students. Congratulations to every student who has work published in this Journal of Undergraduate Research, and to the co-editors, editorial review board, students, faculty and staff who produced this publication.

Pursuing undergraduate research is an essential complement to classroom learning for students who wish to expand inquiry beyond the textbook. When something piques a student's interest and raises questions and ideas, students should know how to address those questions critically, prove a hypothesis, or defend a position. By conducting undergraduate research and scholarship with the guidance of faculty mentors, students learn the skills to do exactly that.

Experience in research and scholarship is required for graduate study and is also immensely valuable in whatever profession a student may choose. Equally important, proficiency in those areas is necessary for a vigorous intellectual life, which is one of the goals of a liberal arts education like the one that Cabrini provides.

What's more, the Association of American Colleges and Universities cites undergraduate research as one of the High-Impact Educational Practices that increases student engagement, retention, and overall success in college and beyond. Many students cite undergraduate research (and other High-Impact Educational Practices) as some of the most memorable and formative experiences of their collegiate careers. That makes sense, since engaging in scholarship, formulating conclusions, and publishing the results builds confidence and self-esteem in students.

This Journal of Undergraduate Research is yet another example of what makes Cabrini College such an extraordinary place to learn and pursue dreams. Working side-by-side with faculty and seeing students' work blossom and grow into something publishable is a truly noteworthy experience. My hope is that every student who participated feels rewarded, and that for the rest of their lives they continue to explore the world that surrounds them.

In the Cabrini tradition,

Donald B. Taylor

Donald. B. Taylor, Ph.D.
President

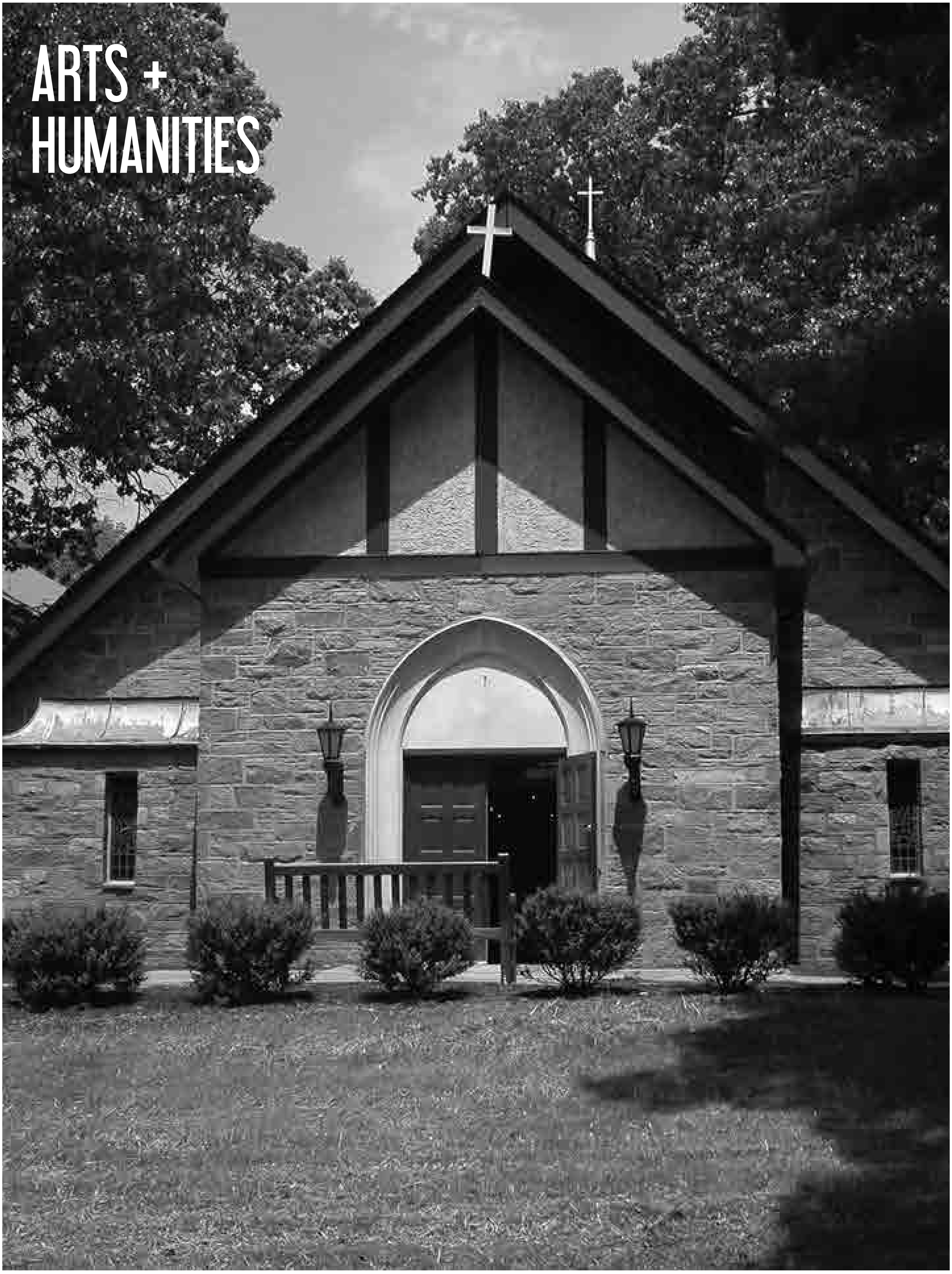
EDITORIAL STATEMENT

The Cabrini College Journal of Undergraduate Research is an annual, reviewed publication dedicated to the discovery, promotion and publication of outstanding work done annually by Cabrini undergraduates. The Journal's Editorial Board reviews, selects and cultivates the best work for inclusion. Drawn from the Undergraduate Arts, Research & Scholarship Symposium—an annual event where students present and showcase their research to the College community—the Board seeks academically rigorous and distinctive efforts that demonstrate Cabrini students' evolution into public intellects with a firm grasp of the stakes and conventions of meaningful scholarship. Articles are selected for publication based on their scholarly and rhetorical quality. They are from all disciplines, and exemplify one or more of the following accomplishments:

- An original research project
- Unique contribution to the scholarship of the student's field
- A new interpretation of an intellectually important problem; phenomenon or text
- An interdisciplinary endeavor that suggests an innovative approach to an altogether new subject for scholarly inquiry.

The board also considers for publication any work of artistic merit that demonstrates academic seriousness and intellectual ambition.

ARTS + HUMANITIES



Circles of Care

By Sarah MacIntosh
Faculty Advisor: Harvey Lape

It is common in much morality to confer moral standing by attributing some 'special feature', which, by its mere possession, makes its bearer count morally. 'Human dignity' is just such a widely used 'special feature'. In acknowledging human dignity, we believe that we are immune from becoming moral monsters. But even a brief look at human history reveals that we have often stripped away that special quality from those we have decided are 'other'. Since human dignity is supposed to set humanity apart from the rest of the world, whenever we do this, we usually claim that some group cannot possibly possess or has forfeited full human status. Whether the 'other' evokes our disfavor by acts, beliefs, or by their mode of life, once we have dehumanized them and stripped them of dignity they are no longer included in our "circle" of moral concern.

Thus we should not be complacent, believing that we will always act out of kindness and respect towards others simply because we acknowledge all humans have 'dignity'. Dignity has been often severed from those we would harm. We seldom question the dignity and so the moral standing of those who, for whatever reason we care for. So perhaps we must pursue avenues through which we will have a greater chance at achieving a sincere kind of care or concern for more of our fellow humans. Right now almost all can be counted on to care for at least the self, family, friends. A smaller number can extend care to their tribe, their nation, or their team. What we need are many more of the few who now care for everyone; for all humans everywhere. The different levels of human concern can be modeled by concentric circles, in the innermost indicting self, the next family and friends, the tribe, nation, etc. and finally the outermost indicating all mankind.

Without first pushing our "circle of care" towards others in our larger communities, we cannot move towards extending those circles to other nations and other areas within our world. In order to rid ourselves of the idea of a dangerous "other" as well, we must understand that which prompts us to consider them as such. Martha Nussbaum's recent book, *Political Emotions: Why Love Matters for Justice,* helps us begin to progress in understanding and contemplating these difficult issues.

More specifically, Nussbaum asks: can powerful ties that bring people together, such as the phenomena of patriotism, be harnessed and yet still be non-jingoistic and in all ways beneficial? Nussbaum explores this issue in detail in her work, along with contemplating the psychology behind why positive patriotism does not work in some cases. The fact of the matter is that such a society is an ideal, and it is quite daunting to propose the steps to make it real. I argue however that Nussbaum does provide realizable concepts that could indeed be achieved to harness the powerful drives of patriotism to societal good. Going beyond her premises, which are explored in the book, there is a starting point established that is ripe for expansion. There needs to be discussion on this topic if the important issues of today are to be confronted, mindfully considered, and moved towards solution.

Before tackling patriotism in the nation at large, Nussbaum first examines why exclusionary behavior happens. The factor most frequently used to exclude is projective disgust.

This "projective" disgust is where ideas such as women being unclean, homosexual relationships being dirty, and other similar irrational thought processes have their origin. Whatever group is the target of the disgust is thought to be so different from the self that they cannot possibly live happily with or around them. This is not to say that the physical effects of disgust are not real for to the individual being repulsed these things seem all too real. However, this should in no way be regarded as legitimatizing their rejection of the "other". Legitimate disgust comes into play in cases such as feeling disgust at a violent act— or even say in the presence of bodily harm. These cases involve disgust not targeted at individuals or a certain group, but to an event or something indeed really harmful.

She considers the psychology of the matter, explaining that the elements that cause us to recoil from others are often factors relating to our "animal nature". "Disgust, as a large body of experimental research shows, is, at least in the first instance, a negative response toward substances with marked bodily characteristics: ooziness, bad smell, stickiness, sliminess, decay." (Nussbaum 183) So, not merely psychological *but even physical disgust* is how many rationalize their own feelings of dislike or even hate. Disgust concerns itself with feelings of contamination, which can project itself onto objects (or individuals) who may not actually have these characteristics, but are somehow thought to be involved with them anyway.

We often rationalize prejudices in this fashion, appealing to our physical reactions of disgust. Nussbaum uses the example of how German scientists during WWII could be perfectly loving and kind to their families at home while during the day they would perform horrendous actions upon their Jewish captives. The individual self becomes so segmented by projective disgust, that such atrocities and incongruences are able to occur, when normally you'd never think an individual that cruel to someone could be anything but "monstrous" to everyone else. Recent attempts, for example, in Arizona might allow business owners to refuse services to homosexual couples based merely on their religious disgust. These owners claim to be disgusted to the point where they would refuse these couples service and funds, which is discriminatory and cruel.

These feelings do not in any way aid the cause of the common good. Normally, people develop beyond selfish behavior and learn to expand their "circle" at least to some degree when growing up. Empathy must be a high priority in education in order to break down these barriers of irrational projective disgust. It is important to note that education, which tends to "explode" ethnic and religious stereotypes, should be a key factor in lowering levels of disgust for other groups. In addition to knowledge and understanding, encouraging empathy must also be a high priority in order to break down these barriers of irrational projective disgust.

So we need to focus first on education, because it not only will allow for us as a nation to be more aware, choose actions more intelligently, and allow for members in society to think critically about politics. This education should focus on examples of persons from history who have become models of how to promote the common good and who show us as a culture how to bring ourselves together for a cause. A successful society needs the stability and efficiency provided by social structure to move forward, and this can be handled without losing individual freedoms—but it is a line to tread carefully. Nussbaum sees education as an important factor in these matters - I think it's the most important factor of all - but she is more concerned with the societal structures she sees as a necessary backbone for the success of education. Nussbaum does state that the way education will succeed is that aside from continuously teaching critical thinking, students should, through acquaintance with its highest and finest ideals, learn to love their nation. This however should not be a blind love, for faults in history are not erased over time. (250-254) The only way to continuously avoid the dreaded "Scylla and Charybdis" on both sides of the patriotic path is by keeping individuals knowledgeable and aware. (207) It is very easy to fall prey to one extreme or another, which will cut short any hope for a stable and just society as the one being proposed here.

As Nussbaum states, the issue that advocates of patriotism must grapple with is that it not only faces outward, positively calling the population together, but inward, giving the individual a reason to feel apart from others and that their group is the "good" group. (206) But, as mentioned, if patriotism or nationalism is not attempted at all, there is no social glue— there is no broad-based call to action. There is always the danger of misplaced values in a society, history has certainly taught every person such a thing— but to not try to instill the right values at all also leaves room for harmful beliefs to trickle into a society. There have been great leaders who were able to guide their nations through hardship and Nussbaum names many. While such individuals are exceptional, they do show that amazing actions can come about when society comes together, and that a national narrative can be inclusive. We should all aspire towards the behaviors of people like Martin Luther King Jr. or Gandhi. It is key that narratives brought about by political leaders push for ideals that are not based upon any one trait of a group, rather emphasizing commonalities than differences. There is no way to completely remove such a call from society and expect it to still be stable. Individuals generally are kinder than expected, but if mistrust breeds amongst a nation's inhabitants, I would not know how else to rectify this than to bring the groups together somehow. That somehow would be some sort of patriotism, and so if this cultural construct is unavoidable, it should be crafted with the utmost care. The warnings are there, the issues arising from misplaced values, from coerced behaviors, and also from unmeasured homogeneity. (Nussbaum 211) The concept of American Exceptionalism is a good example of homogeneity for many—on this view, America was founded and moved forward by European settlers blessed by God. This conservative misunderstanding belies a more plausible reason why America is exceptional, namely that it has been a "melting pot" in which the characteristics and abilities of immigrants from diverse backgrounds have been combined and put to use. Individuals throughout the world come to this country. It is this American diversity which is amazing, admirable and truly exceptional.

Whenever a nation moves to encourage patriotism the issue of coercion will likely arise and Nussbaum offers the example of the Pledge of Allegiance. Since loyalty oaths are an anathema to free societies, but it can be applied to any requirement to force everyone to participate in some activity is coercive. Visitors from other countries often report they find the pledge to be a bit eerie or even threatening. Although at the time of its creation the pledge brought people positively together, it has now become something of a blinder, being repeated without care for its meaning. Today, our views are more open minded on not reciting the pledge, but in the 1950s if someone was to not recite it, there would often be trouble. (215) Such is indeed a case of mindless or blind patriotism at its worst: such incidents showed that dissent was not welcome— and as earlier mentioned, critical thinking, which involves thoughtful dissent at times, is key to a successful social structure. The way to counter these troubles is to celebrate independent thought and to also congratulate those who are able to aid in the progress of society as a whole, who are often individuals with ideas different than the majority in a society. Then the issue of homogeneity without difference comes into play. If dissent is not allowed, then all must act the same, lest there be consequences. This is not something patriotism alone must deal with, as peer pressure and the perceived need to obey authority only enforce these problems from a psychological standpoint. (218) These matters, (meaningful dissent versus blind patriotism) need to be addressed in the educational system, and underline the importance of encouraging and strengthening support for critical thinking from an early age into adulthood and throughout an individual's life.

One worry I do have is how we would be able to achieve this when previous generations most certainly do not have the benefit of an education which emphasized the importance of critical thinking and thoughtful dissent. But, in practice, this is indeed the clearest way in which the dangers of blind or mindless patriotism could be addressed. But at the other end of the patriotic spectrum, there are of course the dangers involved for a society that has no patriotic social glue nor any way of summoning the deep emotions that are often needed in time of crisis. Without deep emotions bubbling up into the collective national spirit, people would become distant and disillusioned. 2,500 years ago, Plato received this criticism from Aristotle: that his ideal city where things are purely principle-based and emotional ties are severed within families, in the hopes this would cause citizens to care for all members as their larger family. (219) The criticism is that without a clear definition and feeling of "this is my own", motivations can be "watery" at best. (Nussbaum 219) People care to a higher degree when something is identified with them or is related to themselves directly in some way or another. This sounds like a narrow sentiment, but it is indeed how the psychology of the situation seems to work. People who can go beyond this (Leaders like those mentioned, King Jr. Gandhi, Lincoln, etc.) are exceptional, but it is unrealistic to expect that the citizens at large will be able to function at such a level. Hence, patriotic emotions must be relied upon to move the nation at large, even if there are the dangers and pitfalls involved. People must feel as though they belong to a strong collective sentiment, but not to the point of blindness.

Other emotions besides disgust can be hindrances to this process as well. Patriotic sentiment can only go so far without considering the emotions that act in the hearts and the minds of people— these are the emotions of fear, envy, and shame. Nussbaum mentions these emotions after discussion of patriotic strategies in order to further propel the knowledge that emotion, whether it is thought of as important or not, continually plays a larger role in society than may be previously thought. "Creating civic compassion requires us to understand what threatens it." (Nussbaum 314) This is the ultimate goal of these societal strategies to bring the country together- creating a compassionate civil society, that can work towards the common good. The difference between these three emotions, fear, envy, and shame in particular from the earlier mentions of narcissistic behavior or disgust, are that these emotions usually do have a healthy component to them as well, it is just that the damaging aspects of these emotions truly can cause catastrophic results.

Fear for example is an emotion that in many cases allows us to be aware of dangerous situations or events. A healthy amount of fear can push individuals into action in the case of a true threat; it is a state of heightened awareness of one's surroundings. Thanks to these provocations of fear however, it is easy to have fear come into existence for a misguided reason. A threat may not truly be something dangerous, it may only be a perceived threat. (As is the case with rhetoric used against minority groups in the situations that provoke disgust, they also provoke misguided fear.) Fear is also an extremely narrow emotion, and because of this it can be too exclusive as well if members of the "perceived" threat are truly and utterly feared by a main group. Political rhetoric sometimes utilizes fear for its benefit as well, as is most commonly seen in instances of wartime. Nussbaum makes mention of Winston Churchill's famous speech of May 13, 1940, in which he boldly confronted Nazi Germany and rallied the public to aid in the fight, and also inspire them that they could fight off the threat. "You ask, what is our aim? I can answer in one word: It is victory, victory at all costs, victory in spite of all terror…" (323) All the same, politicians must be wary at employing fear in rhetoric, and that they also use it in times of due cause if it must be manipulated in such a fashion. Churchill's speech is a brilliant example of a politician using fear in the "right way".

Envy is another emotion that comes into play at many points in various forms of politics— democracies have been threatened by it "since they began to exist". (Nussbaum 339) It is a painful emotion that is different from jealousy, as jealousy focuses on the possibility of loss while envy focuses upon status or other qualities which are unequal in all societies. Resentment is also similar, but different from envy in that resentment usually stems from a feeling of an injustice being committed or done to the individual. Envy however, cannot be satisfied for the most part, as the envier usually envies the rival figure no matter how the situation changes. The problem, of course, is that inequalities of some sort will always remain in a democratic society, and animosity can fester in the individuals afflicted by the emotion. It is a cause of social distress, since that kind of mental and emotional comparison to others is hard to counter. Nussbaum puts forward that a possible way to combat it in school settings may be to open avenues for more students to have access for a chance to succeed— such as having both art competitions and athletic competitions. (343) On a broader scale, once again politicians must be wary of feeding into envious sentiments in their speeches.

The sentiment of shame is also a powerful social emotion, which has affected possibly every individual at some point in their lifetime. "Shame is, then, a painful emotion responding to one's own failure to exhibit some desirable characteristic." (Nussbaum 360) No one can have all the desirable traits of a society or culture, but despite this near universal cause of shame some groups are more marked for it than others— which is a very exclusionary fact for feelings of shame. The "dominant" group will be portrayed as normal, while the other group(s) will be made to feel abnormal, or lacking. Shame is also very similar to guilt, but they differ in that guilt pertains usually to an action, while shame pertains to feelings of inferiority. (Nussbaum 361) Due to the issue of shame perhaps springing from one's own ideals however, this emotion is not merely social, public, or political. It can be a very destructive personal emotion, especially if an individual feels that they have not lived up to their personal ideals. The political and societal component involves humiliation, and that is what society must combat. "Why is hostile shaming so ubiquitous? Probably because shame itself is ubiquitous, and it gives rise to protective strategies." (Nussbaum 362) Political leaders and society as a whole must not condone such defensive behaviors which turn individuals into separate and hostile groups. It thus must be a primary concern of our political institutions to strongly discourage that which produces needless and destructive alienation of citizen from citizen.

I have only tried to establish a starting point and Nussbaum's work does provide that and more. This fear of blind emotions cumulating into some form of chaotic storm is reasonable when confronting these concepts of patriotism, shame, envy, fear, and disgust that are ever so powerful. National sentiment can be a force for amazing things, but it can also be something which causes great hardship for many, such as the case with Germany and the rise of the über-patriotic Nazis. Thankfully, the more these dangers are pondered, the more we can do to avoid them. But without some resort to patriotism it is hard to see how we might unify the fragmented society that we are today. Of course, to actually assemble a government and policies worthy of patriotic feeling is another matter entirely. Are there among us those who can lead in such a manner that we can diminish envy, fear and shame, and bring positive patriotism to fruition? That is the important question, even though such individuals are desperately needed to inspire and lead nations to a successful tomorrow. To produce such individuals is the goal at which these theories should be aiming— without them, I doubt that they can gain much ground. If such individuals could be created and/or discovered, bringing people together and utilizing patriotic emotions as a strong and positive force surely could happen. There is no doubt that with the right leadership and the right education, these ideas are possible.

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Corporate Personhood: Implications Before and After Citizens United

By Robyn Suchy

Faculty Advisor: Dr. Sharon Schwarze

The ideas of freedom and individuality are concepts that we cherish as Americans. We proudly live out the rights guaranteed to us in the Constitution and embrace the idea that we are endowed with inalienable rights as well as rights given to us by legislators on merit of justice. United States citizens enjoy the famous declarations of the Bill of Rights which includes freedom of speech, freedom to practice religion without government interference, freedom to bear arms, the right to due process, the right to vote, and a host of other rights and freedoms. A series of Supreme Court cases though, have brought into question the idea of "personhood" and who or what is eligible to hold these protected rights and freedoms. Though *Citizens United v. Federal Elections Commission (2010)* has most recently received media attention because of the sweeping decision expanding the rights of free speech in election spending to corporations, there is a long history around the idea of corporate personhood and its immeasurable impact on how we govern and how our voices are heard.

In January 2008, Citizens United, a nonprofit corporation, released a 90 minute documentary entitled *Hillary: The Movie*. The movie expressed opinions about whether then- senator Hillary Clinton, a candidate for the Democratic presidential nomination, was fit for the presidency and was marketed as a documentary, not an endorsement or attempt to sway opinions in the upcoming presidential primary elections. Citizens United distributed the movie in theaters and on DVD, but also wanted to make it available through video-on-demand. It produced advertisements promoting the film and wanted to show them on broadcast and cable television. To pay for the video-on-demand distribution and the advertisements, Citizens United planned to use its general treasury funds. Federal law prohibits corporations and unions from spending their general treasury funds on "electioneering communications" or for speech that expressly advocates the election or defeat of a candidate. An "electioneering communication" is any broadcast, cable, or satellite communication that refers to a clearly identified candidate for federal office, is made within 30 days of a primary election or 60 days of a general election, and is publicly distributed (SCOTUSblog).

The Supreme Court held two hearings on the case and its ruling ultimately went far beyond what the plaintiffs had sought. The 5-4 decision permits corporations, unions and other special interests to spend as much as they like to advocate the election or defeat of political candidates. Laws that bar those interests from contributing directly to candidates remain in place but the ruling lifted controls on political giving that had been in place for decades (SCOTUSblog). This sweeping decision has opened up arguments around the rights of corporations more broadly including individual rights dictated by the Constitution and the idea of corporate rights, or corporate personhood. Though there was a great deal of public and political backlash against this decision expanding corporate personhood, there was a long history of historical context that led to the expansion of corporate rights in the Citizens United case.

There was a great deal of precedent from prior Supreme Court cases that dealt specifically with corporate personhood and the evolving idea of citizenship that came with the passage of the Fourteenth Amendment. The precedent that artificial persons known as corporations can be created by laws for the purposes of society and government is inherited from the common law. In *Trustees of Dartmouth College v. Woodward (1819)***,** Justice Joseph Story described how these artificial persons have a life of their own and possess certain legal rights equal to that of a natural person:

> "An aggregate corporation, at common law, is a collection of individuals, united under one collective body, under a special name, and possessing certain immunities, privileges, and capacities, in its collective character, which do not belong to the natural persons composing it. Among other things, it possesses the capacity of perpetual succession, and of acting by the collected vote or will of its component members, and of suing and being sued in all things touching its corporate rights and duties. It is, in short, an artificial person, existing in contemplation of law, and endowed with certain powers and franchises which, though they must be exercised through the medium of its natural members, are yet considered as subsisting in the corporation itself, as distinctly as if it were a real personage" (Lugosi).

Justice Story identified "aggregation" as a defining characteristic of an artificial person, for it was the "aggregate" of natural persons that constituted the components of the corporation (Lugosi).

Chief Justice John Marshall also defined the corporation as an artificial being, but differed from Justice Story, in 1819, by identifying the element of "invisibility" as a feature of an artificial person: "A corporation is an artificial being, invisible, intangible, and existing only in contemplation of law. Being the mere creature of law, it possesses only those properties which the charter of its creation confers upon it, either expressly, or as incidental to its very existence (Lugosi). In other words, while corporations were capable of immortality and perpetual succession of individuals, these artificial persons did not possess any inherent inalienable rights like natural persons. Neither were corporations granted the status of citizenship under Article IV, Section Two of the Constitution, which entitles citizens of each state to "all the privileges and immunities of citizens of the several states" **(**Pollman).

In an earlier case, Chief Justice Marshall declared, "That invisible, intangible, and artificial being, that mere legal entity, a corporation aggregate, is certainly not a citizen..." (Denniston). While artificial persons could legally enforce property and contractual rights, the attributes of citizenship were denied to corporations until 1853 when Justice Robert Cooper Grier created an exception (the "Grier exception") allowing corporations to be presumed citizens to establish jurisdiction needed to maintain and defend lawsuits. Justice John Campbell dissented vigorously, predicting future "doubt, contest and contradiction," for there was no telling of "when the mischief would end" ("The Rights of Corporations").

The ratification of the Fourteenth Amendment spawned litigation to determine the meaning of "citizen" and "person" in the Fourteenth Amendment. Most of the litigation revolved around the question of whether a corporation was a "person" and entitled to equal protection of the laws. In 1870, Judge Woods in *Insurance Co. v. New Orleans (1870)* visited that question and found that since the passage of the Fourteenth Amendment, "...citizenship in a state is the result and consequence of the condition of citizenship of the United States" (Lugosi). The Fourteenth Amendment itself defined "citizen" to be, "All persons born or naturalized in the United States"(U.S. Const. amend. XIV). Judge Woods concluded that, based on a plain reading of the text, citizens of the United States must be natural and not artificial persons (Lugosi).

By definition, this would exclude corporations, which cannot be born or naturalized. Judge Woods then turned to the question of whether corporations were "persons" within the meaning of the Amendment. Judge Woods noted that the word "person" was used three times in the Fourteenth Amendment. In the first two clauses, it was obvious that a corporation had no claim to these rights, for it did not possess the attributes contemplated by the Amendment: "Only natural persons can be born or naturalized; only natural persons can be deprived of life or liberty; so that it is clear that artificial persons are excluded..." (Lugosi). The last clause, "deny to any person...the equal protection of the laws," was more challenging, for it was possible for "person" to have a "wider and more comprehensive meaning" (Pollman). Judge Woods concluded that this last clause also referred only a natural person, to be consistent with the plain and evident meaning of "person" in the two prior clauses (Lugosi).

Then in 1882, Justice Field of the U.S. Supreme Court, sitting as a Circuit Judge in California, expanded the meaning of person in the Fourteenth Amendment to include an artificial person. A corporation, the Southern Pacific Railroad, complained that its tax treatment by San Mateo County was unfair, contrary to the Equal Protection Clause. While conceding that the original purpose of the Fourteenth Amendment was to "protect the newly-made citizens of the African race in their freedom," Justice Field utilized the generality of the language in the Equal Protection Clause to extend protection to "persons of every race and condition" (Pollman).

Justice Field emphatically rejected as "without force" the argument that, "a limitation must be given to the scope of this amendment because of the circumstances of its origin" (Pollman).

The Fourteenth Amendment was portrayed by Justice Field as a "...perpetual shield against all unequal and partial legislation by the states, and the injustice which follows from it, whether directed against the most humble or the most powerful..." Railroad corporations, perceived as rich and powerful, were entitled "to have the same justice meted out to them which is meted out to the humblest citizen. There cannot be one law for them and another law for others" (Pollman).

Artificial persons like corporations were "persons" within the meaning of the Equal Protection Clause on the theory they were "aggregations of individuals united for some legitimate business" (Lugosi). In addition, the courts as a matter of public policy "will always look beyond the name of the artificial being to the individuals it represents" (Pollman). Just because an artificial person is invisible does not mean those who do business with a corporation do not deal with real natural persons. Therefore, the term "person" includes a corporation, for the court "will look through the ideal entity and name of the corporation to the persons who compose it, and protect them..." (Lugosi).

At the United States Supreme Court four years later in the case *Santa Clara County v. Southern Pacific Railway Co. (1886),* Chief Justice Waite saw no need to add to the analysis of Justice Field in the Railroad Tax Cases and summarily expanded the meaning of "person" in the Fourteenth Amendment to include corporations:

"The court does not wish to hear argument on the question whether the

> provision in the Fourteenth Amendment to the Constitution, which forbids a State to deny to any person within its jurisdiction the equal protection of the laws, applies to these corporations. We are all of the opinion it does" (Pollman).

This statement arguably altered the landscape of corporate personhood to a new level and made possible the cases and controversy that have followed and built up to the Citizens United case.

The rich and complexly nuanced history of corporate personhood came to a head in the *Citizens United vs. Federal Elections Commission (2010)* and potentially opened up new arguments and avenues for businesses and corporations to fight for constitutional rights. Justice Kennedy, on the behalf of the majority of the court, wrote, " If the First Amendment has any force, it prohibits Congress from fining or jailing citizens, or associations of citizens, for simply engaging in political speech" ("Citizens United v. Federal Election Commission"). However, Justice Stevens disagreed on behalf of the court's minority dissenters:

> "The basic premise underlying the Court's ruling is its iteration, and constant reiteration, of the proposition that the First Amendment bars regulatory distinctions based on a speaker's identity, including its "identity" as a corporation. While that glittering generality has rhetorical appeal, it is not a correct statement of the law. Nor does it tell us when a corporation may engage in electioneering that some of its shareholders oppose. It does not even resolve the specific question whether Citizens United may be required to finance some of its messages with the money in its PAC. The conceit that corporations must be treated identically to natural persons in the political sphere is not only inaccurate but also inadequate to justify the Court's disposition of this case" ("Citizens United v.
> Federal Election Commission").

This groundbreaking decision followed precedent to an extent but went far beyond the bounds of what the plaintiffs were seeking and created ways for other parties to not only pursue expanded rights around election spending but reignited the issue of corporations seeking constitutional rights generally only applicable to natural persons.

Though not a case that dealt specifically with the concept of corporate personhood, *McCutcheon v. Federal Elections Commission (2013)* reinforced the decision in the Citizens United ruling and expands it to granting greater individual rights around election spending. Justice Bryer, on behalf of the minority dissenters in the decision, explained, "If Citizen's United opened a door, today's decision, we fear, will open a floodgate…[the ruling] overturns key precedent, creates serious loopholes in the law, and undermines, perhaps devastates, what remains of campaign finance reform" ("McCutcheon v. Federal Election Commission.").

Though exceptionally different kind of cases, *McCutcheon v. Federal Elections Commission (2013)* and *Citizens United v. Federal Election Commission (2010)* will undoubtedly have an impact on the decision in *Sebelius v. Hobby Lobby Stores, Inc (2014).* The Affordable Care Act stipulates that employers need to provide health care for their employees that covers all forms of contraception at no cost. However, some for-profit corporations have insisted they should not have to pay for all of these services, especially those that conflict with their beliefs.

The owners of Hobby Lobby do not take issue with insurance covering some forms of birth control but they are not willing to cover emergency contraceptives. Hobby Lobby contends its "religious beliefs prohibit them from providing health coverage for contraceptive drugs and devices that end human life after conception." *Sebelius v. Hobby Lobby Stores, Inc (2014)* seeks to answer the question if for-profit companies have a right to exercise freedom of religion and if the government is putting an unfair burden on their exercise of religion ("Sebelius v. Hobby Lobby Stores, Inc").

The First Amendment protects the rights of the "people." While typically the Supreme Court has not had much patience for extreme arguments that stretch precedent and laws to fit specific instances, with the recent decisions in Citizens United and McCutcheon and the reaffirming that corporations could maintain some of the rights usually reserved for citizens, the decision in Hobby Lobby becomes less clear. I would like to say that the Supreme Court could and will identify a *reductio ad absurdum* argument. But after its decisions in the last four years and the strong division on the bench, I believe there will be a great deal of contention and surprises around this decision.

Is the United States still upholding its pledge to be a "government by the people, for the people?" When corporations gain more and more power in the political process through the elimination of election spending limits and are considered "people" alongside the average citizens, it is difficult to find places in which the motto is upholding its promise. When corporate conglomerates move beyond their purpose and try to claim rights that exist because of inherent humanity there is a slippery slope. Power and money will always play a part in our political system and our day to day lives but when the voices of the individual citizens have the potential to be overpowered for corporate interest we move further away from a democracy and the concepts and ideals that the United States was founded upon.

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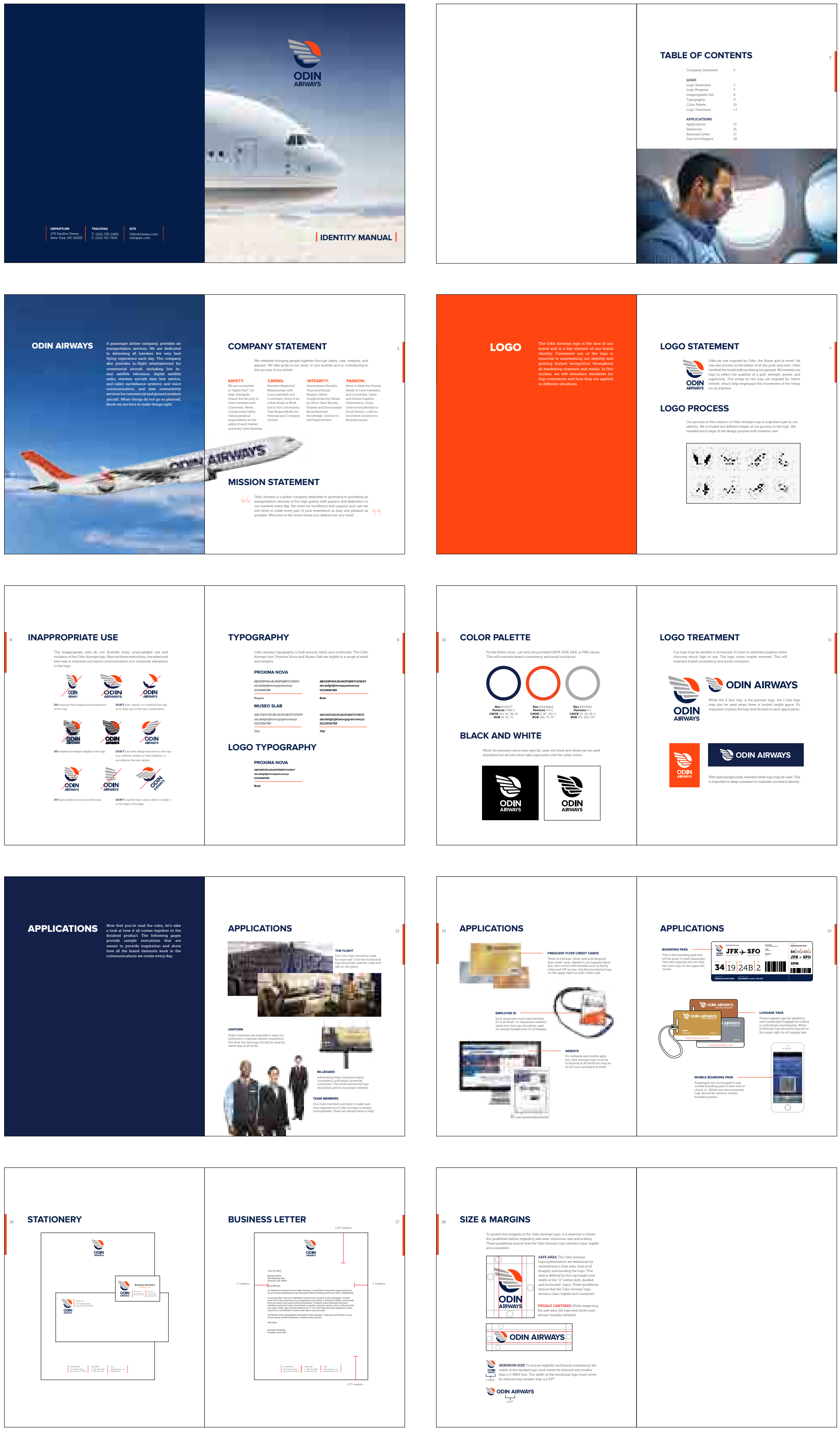
Natalie Alarcon
Odin Airways Style Guide
Professor Don Dempsey

ODIN AIRWAYS IDENTITY MANUAL



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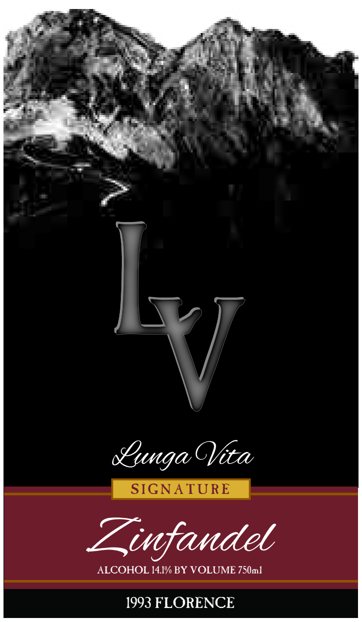

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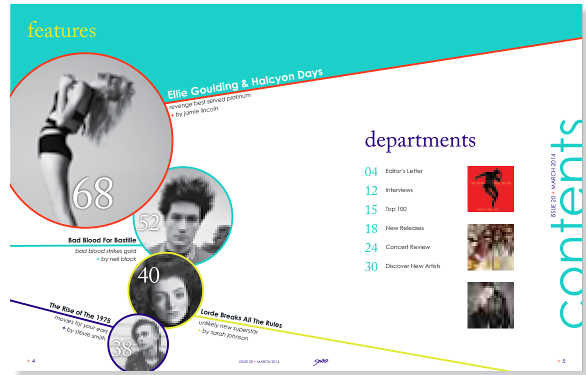

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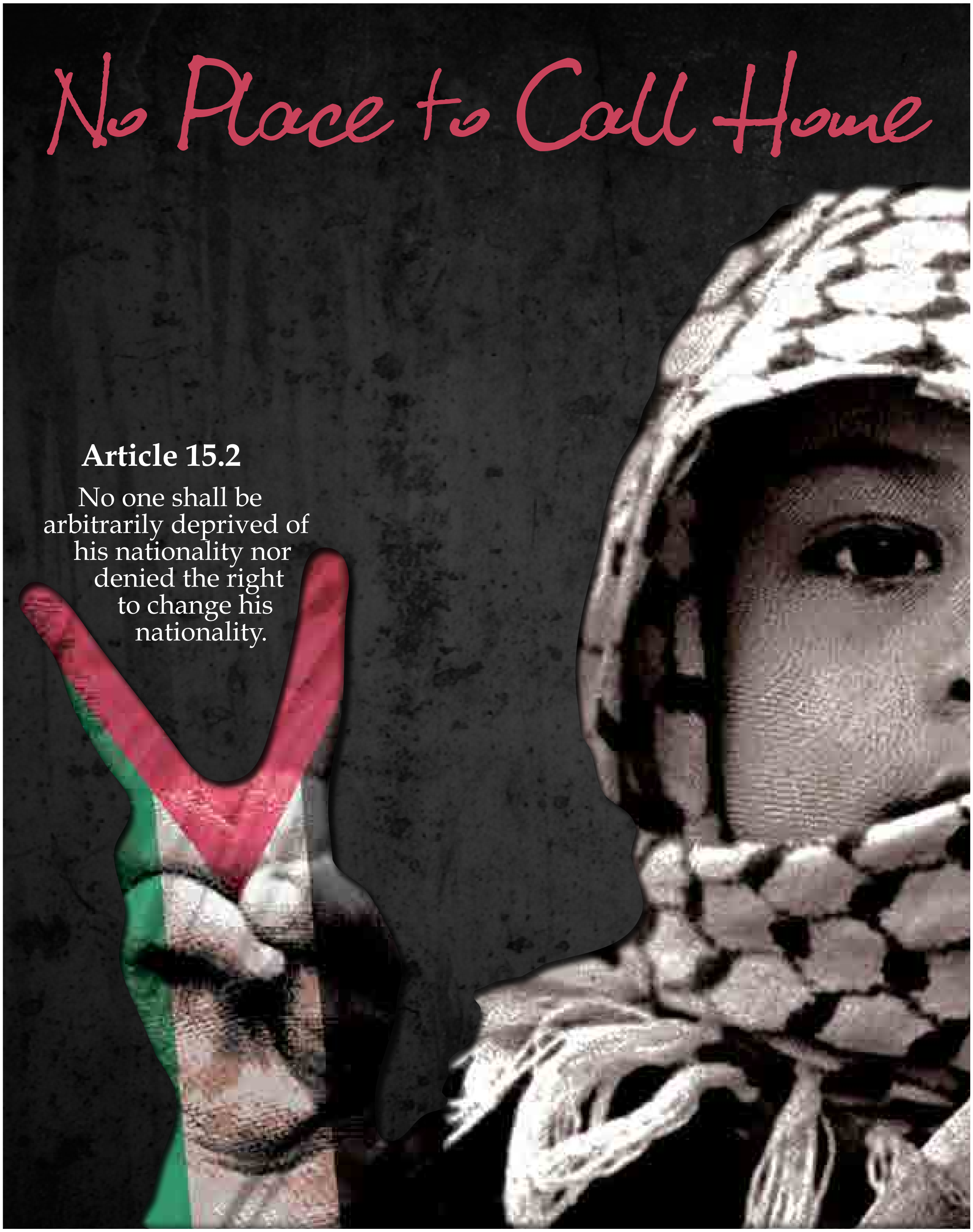

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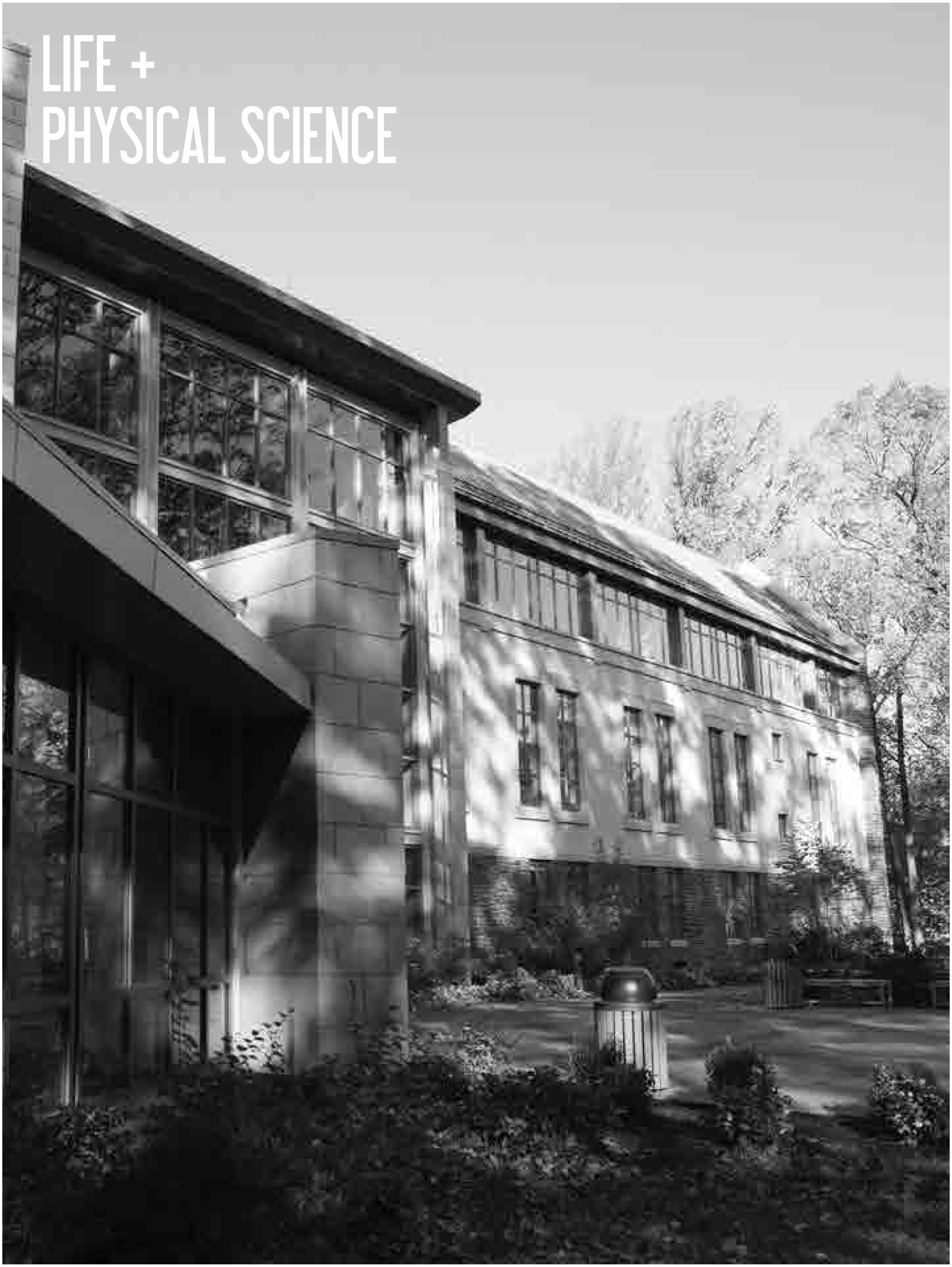

A Flow Cytometric Method to Measure Nitric Oxide Production in Coelomocytes of *Eisenia hortensis* in Response to Soil-Dwelling Bacteria

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Abstract

This goal of this *in vitro* study was to determine if nitric oxide (NO), a highly-reactive, free radical gas, in produced coelomocytes of the invertebrate annelid *Eisenia hortensis* as part of an innate immune response to microbial challenge. Following extrusion from individual earthworms, coelomocyte samples were pre-loaded with a fluorescent indicator, 4-amino-5-methylamino-2', 7'-difluorofluorescein diacetate (DAF-FM DA), and incubated for 16 hours with chemically-fixed, intact Gram positive bacteria *Bacillus megaterium* and *Arthrobacter globiformis*, and Gram negative bacteria *Pseudomonas stutzeri* and *Azotobacter chroococcum* at a range of multiplicities of infection (MOIs). Flow cytometric analysis measuring increases in relative fluorescence intensity (RFI), which is directly proportional to the amount of intracellular NO produced, permitted determination of statistical significance ($p < 0.05$) of exposed coelomocytes compared to baseline controls. Significant increases in NO were detected reproducibly in coelomocytes treated with all bacterial species used. The most prominent results were observed after exposure to Gram positive *B. megaterium* and *A. globiformis* where 100% of earthworms tested exhibited statistically significant increases of RFI at MOIs of 100:1 and 500:1, respectively. This research provides supporting evidence of the deployment of NO as an antimicrobial defense mechanism used by earthworms.

Introduction

Presently there is much less known about the defense mechanisms employed by invertebrates than by vertebrate organisms. However, it has been well established that invertebrates possess an innate immune system, while vertebrates have both innate and adaptive immune systems. Therefore, research into the innate immune responses employed by invertebrates to combat infection by pathogenic organisms is of great importance, especially in an evolutionary context (Rivero, 2006).

The innate immune system encompasses a diverse array of general, non-specific defense mechanisms that are inherited as part of an organism's natural structure and function. One specific mechanism employed in the innate immune reaction to pathogenic challenge is the process of phagocytosis, during which microbial species are recognized, ingested, and killed by host immunocytes, such as macrophages (Willey, Sherwood, & Woolverton, 2009, 662-673). Microbes are recognized through a variety of pattern-recognition receptors (PRRs) found on the surface of phagocytic cells. One class of PRRs include the toll-like receptors (TLRs), which function as signaling receptors that facilitate the induction of the immune response. Another class includes the phagocytic receptors, which bind to the pathogen and aid in its engulfment into the host cell by receptor-mediated endocytosis. Although these two classes of PRRs function in different ways, both are proposed to recognize pathogens by their characteristic extracellular structures or products of microbial metabolism, called microbe-associated molecular patterns (MAMPs) (Cooper, 2006). For example, lipopolysaccharide (LPS), a major component of Gram negative bacterial cell walls, is a type of MAMP recognized by these macrophage surface receptors (Willey et al., 2009, 670).

During phagocytosis, the receptor-bound pathogen is brought into the cytoplasm of the host macrophage via a membrane-bound vesicle called a phagosome (Parham, 2009, 45). The phagosome then fuses with the lysosome of the host cell to form the phagolysosome, where different enzymes are activated to catalyze the production of toxic compounds, such as reactive oxygen intermediates (ROIs) and reactive nitrogen intermediates (RNIs), to facilitate the killing and digestion of the pathogen (Willey et al., 2009, 672-673).

Our lab has been interested in the production of nitric oxide (NO), a specific RNI, by coelomocytes (leukocyte-like cells capable of phagocytosis) of the invertebrate *Eisenia hortensis* (earthworm) following microbial challenge of several species of soil-dwelling bacteria (Engelmann et al., 2004). Nitric oxide (NO) is a highly reactive, free-radical gas that is formed within the phagolysosome during phagocytosis, where it serves as an important defense mechanism that aids in the elimination of infectious agents. Once NO is produced, it reacts with oxygen and oxygen-related intermediates to form toxic species that have DNA-damaging and enzymatic properties that facilitate the destruction of the pathogen (Rivero, 2006).

Earlier research performed on mammals has established most of what we presently know about NO and its broad range of functional roles (Rivero, 2006). From these studies of vertebrate groups, NO has been shown to play important physiological and pathological roles including neurotransmission and immunological defense. The first evidence of the production of NO in invertebrates came about from research performed on the horseshoe crab, *Limulus polyphemus*, by Radomski, Martin, and Moncada (1991), in which hemocytes of the crab were found to produce NO that was shown to control cell aggregation in the same way as previously described in mammalian platelets. These results have supported later studies proposing a strong evolutionary conservation of this primitive, non-specific defense mechanism of NO production (Colasanti & Venturini, 1998). Using more recently established biochemical and physiological techniques, the production and potential roles of NO have been analyzed in a greater number of invertebrate groups including annelids, echinoderms, nematodes, flatworms, coelenterates, and even in protozoa and bacteria. For example, NO production has been demonstrated in molluscan *Viviparus ater* immunocytes (Ottaviani, Paeman, Cadet, & Stefano, 1993), the fruitfly *Drosophila spp.* (Nappi, Vass, Frey, & Carton, 2000), and in hemocytes of the mussel *Mytilus galloprovincialis* (Gourdon, Guerin, Torreilles, & Roch, 2001).

This *in vitro* investigation used a flow cytometer to detect NO production in response to bacterial challenge. A flow cytometer efficiently analyzes large numbers of cells at a rapid rate on a single-cell level (Strijdom et al., 2004). Cell subpopulations can also be distinguished through gating on specific regions correlating to specific cell types of interest. Coelomocyte populations extruded from individual earthworms were incubated overnight with several different species of bacteria that are commonly found in the same types of soil environments where *E. hortensis* is naturally found, in an effort to induce the earthworm's innate immune response.

Four different types of bacteria were chemically-fixed with a 10% paraformaldehyde solution, rendering them metabolically inactive, but structurally intact to allow immunogenic detection by the coelomocytes. The bacteria included Gram positive *Bacillus megaterium* and *Arthrobacter globiformis* and Gram negative *Pseudomonas stutzeri* and *Azotobacter chroococcum*. Flow cytometric measurement of the NO production by *E. hortensis* was accomplished by pre-labeling coelomocytes, before bacterial challenge, with the cell-permeable reagent 4-amino-5-methylamino-2'7'-difluorofluorescein diacetate (DAF-FM DA), which reacted with intracellular NO, resulting in a fluorescent benzotriazole derivative (Molecular Probes, 2011). As a positive control, the reagent (S)-nitroso-N-acetylpenicillamine (SNAP) was employed to provide a source of NO to react with DAF-FM DA. The relative fluorescence intensity (RFI) of the fluorescent product is quantitatively proportional to the concentration of intracellular NO, and can be measured by the FL 1 detector (fluorescence channel 1 height detecting green fluorescence) within the flow cytometer (Schachnik et al., 2009).

Materials & Methods

Culturing & Fixation of Bacterial Cells

The intact soil-dwelling bacterial species used in the NO assays included Gram positive *B. megaterium* and *A. globiformis,* and Gram negative *P. stutzeri* and *A. chroococcum* (Carolina Biological Supply Company and Presque Isle Cultures). Cultures were generated by inoculating tryptic soy agar (TSA) plates with the bacterial stock culture and incubating at 37°C overnight. From this starter plate, a few colonies were transferred into 10mL of tryptic soy broth (TSB) and incubated overnight on a shaking incubator at 220 RPM at a temperature of 37°C. The next day, the broth culture was added to 100mL of sterile TSB in a 250mL flask and placed back on the shaking incubator at 220 RPM, 37°C to grow bacteria into log phase. After 3-5 hours, the bacterial cultures were centrifuged at 3280 RPM for 5 minutes at 4°C. The cell pellet was re-suspended in 10mL of 10% paraformaldehyde in phosphate-buffered saline (PBS, Hyclone) and incubated at room temperature for 1 hour to allow for chemical fixation. Then, the bacterial cells were washed three times with 25mL of PBS through centrifugation at 3280 RPM for 5 minutes at 4°C. After the final wash, the bacterial cell pellet was resuspended in 2mL of BD BaculoGold (BG) medium (BD Biosciences). This medium was fully-supplemented with kanamycin, ampicillin, penicillin, streptomycin, chloramphenicol, tetracycline, amphotericin B, non-essential amino acids, glutamine, and HEPES buffer (Invitrogen & Sigma Aldrich). Ten-fold serial dilutions from 10^{-1} to 10^{-4} were made and each dilution sample was enumerated using a hemacytometer and phase-contrast microscopy to determine the final concentration of bacterial cells per mL of BG. The sample was stored at 4°C until needed for use.

Animal Husbandry

E. hortensis were purchased from Vermitechnology Unlimited (USDA Permit #52262) and shipped overnight. Short-term colonies of earthworms were kept in habitats containing moistened, autoclaved pine wood beddings, a reasonable amount of Single Grain Rice Cereal or Oatmeal Banana Cereal (Gerber) for nutrients, and a top layer of shredded, autoclaved paper towels, all of which was supplied by Cabrini College. The colonies were maintained in the dark at a controlled temperature of 20°C, and the habitats were cleaned twice weekly. After extrusion of coelomocytes, the earthworms were euthanized by freezing at -20°C.

Harvesting of Coelomocytes

On the day prior to the extrusion of coelomocytes from *E. hortensis*, a predetermined number of healthy and active earthworms were chosen from their habitats and placed by groups of five into sterile Petri dishes containing paper towels saturated with 2.5 µg/ml Fungizone (Fischer Scientific), which served to minimize the amount of fecal and other contaminants from the earthworm digestive tract and surface during the extrusion process. The next day, each individual earthworm was placed by sterile forceps into sterile plastic troughs containing 3mL of BD FACSFlow sheath fluid (BD Biosciences), which served as an extrusion buffer into which the earthworm would become agitated and subsequently release its coelomocytes from its coelomic cavity through the dorsal pores. The coelomic suspension was transferred into 0.5mL of Accumax™ (Innovative Cell Technologies, Inc.), an enzyme solution containing trypsin, collagenase, and DNAse, which was used to obtain single cell suspensions. After 5 minutes, the cell culture was diluted with 5mL of PBS and centrifuged at 800 RPM (150g) for 5 minutes at

4°C with a Beckman Coulter centrifuge. Coelomocytes were then re-suspended in 1mL of BG and enumerated with a hemacytometer (Fischer Scientific) through phase-contrast microscopy. The samples containing the highest cell count and lowest proportion of autofluorescent eleocytes were used and adjusted to $1x10^6$ coelomocytes per mL of BG.

Pre-Labeling of Coelomocytes with DAF-FM DA

In a sterile vial, 4µL of 10µM DAF-FM DA (Molecular Probes) was added to every 2mL of coelomocyte solution, and the samples were then placed on a shaking incubator at 220 RPM at 25°C for 90 minutes. The samples were then diluted with BG supplemented with 10% calf serum (BG-S) (Hyclone) and washed twice by centrifugation at 800 RPM (150g) at 4°C for 7 minutes with final resuspension in BG-S.

Nitric Oxide (NO) Assays

Each NO assay used a range of multiplicities of infection (MOI), which is a ratio between the number of bacteria and host cells (coelomocytes).For example, a 500:1 MOI correlates to 500 bacterial cells per 1 earthworm coelomocyte. Concentrations of bacterial and earthworm cells were adjusted for each desired MOI. The MOIs ranged from 4:1 to 500:1, with three different MOIs used in each assay in order to detect a dose response of NO production in *E. hortensis* coelomocytes.

For each assay conducted, 96-well V-bottom plates were used, with each treatment performed on at least three individual earthworm coelomocyte populations and prepared in triplicate. 100µL of the specified *E. hortensis* coelomocyte sample ($1x10^5$ coelomocytes) and 100µL of the treatment solution (bacteria at desired MOI, SNAP, or medium) was added and thoroughly mixed within each well. Several important negative controls were used, including unlabeled coelomocytes only, bacteria only, and a combination of the two. The plates were incubated for 16 hours in a HERA Cell 150 cell culture incubator at 25°C, in 5% CO_2. Following incubation, assay plates were centrifuged at 800 RPM (150g) for 7 minutes at 4°C, and the coelomocytes were resuspended in 200µL of ice-cold PBS. The samples were transferred by sterile pipette into numbered flow cytometry tubes containing 50µL of FACSFlow buffer, placed on ice and kept in the dark and run immediately on the flow cytometer.

Flow Cytometry & Statistical Analysis

A FACSCalibur flow cytometer (BD Biosciences) and Cell Quest Pro software was used for all assays. Voltages for forward scatter (FSC) correlating to size, side scatter (SSC) correlating to granularity, and FL-1, which detects green fluorescence, were set by previewing the negative control samples on set-up mode, and increasing the FSC threshold as needed per each bacterial species in order to minimize free bacteria from the acquired cellular events. Gating through specific size and granularity was performed to ensure the collected data represented coelomocytes only, disregarding unwanted events such as bacteria, cellular debris, and highly fluorescent eleocytes (see **Figure 1a**). A total of 10,000 events per sample were collected.

In order to prevent false results, a region (R1) was placed around the most concentrated area corresponding to the hyaline amoebocytes (coelomocytes) on a dot plot of FSC vs. SSC, based upon previous understanding of the size and granularity of relevant coelomocyte cells (see **Figure 1b**). A histogram gated on R1 with the number of coelomocytes in linear scale on the vertical axis vs. the RFI value detected in FL-1 in log scale on the horizontal axis was created, and two markers were set. The first marker (M1) represented 100% of the events within the gated region R1 and provided the geometric mean of RFI, and the second marker (M2) was set at the median of baseline control and provided data for the number of positive events in that region (see **Figure 1c**). From the histogram data, the geometric mean value of M1 and the percent gated value of M2 was recorded for subsequent statistical analyses (see **Figure 1d**). In Microsoft's Excel 2010, the *t* test: paired two sample for means was used to determine statistical significance of the data obtained from the treatment (bacteria) and the positive control (SNAP) wells in each earthworm by comparing it to the data obtained in the baseline(untreated) wells of that same earthworm. The average and standard deviation of each triplicate set of samples pertaining to a particular control or treatment was determined and recorded in a table format. Statistical significance was granted to resulting *p*-values within particular treatments that were less than or equal to 0.05, indicating a 95% confidence interval. The response of interest was in those samples that showed an increase in RFI, which correlates to NO production.

Results

A minimum of three separate assays to demonstrate inter-assay reliability and reproducibility were conducted to measure the NO production after overnight incubation with each of the four bacteria (*B. megaterium, A. globiformis, P. stutzeri,* and *A. chroococcum*) at a range of MOIs as indicated. For each treatment sample, a histogram of FL-1 (RFI) versus cell count was generated by gating on the coelomocyte population and creating markers (M1 and M2) to facilitate the geometric mean of RFI and percent of positive events above the baseline control median.

Following exposure to all four types of bacteria, analysis of labeled coelomocytes demonstrated significant increases in RFI values above the baseline controls, which represents an increase in the production of NO. **Figure 2** contains two representative histogram overlays of RFI (FL-1) versus cell count obtained from the same earthworm coelomocyte population, upon which both markers M1 and M2 were set to obtain the geometric mean in each. The numbers displayed in each panel of Figure 2 represent the mean RFI values of coelomocytes within the gated region. Shown in the top panel, a clear shift in the peak geometric mean of the RFI value can be observed, as the RFI of 53.04 in baseline control coelomocytes increased after incubation with the positive control, SNAP, resulting in a statistically significant increase of RFI to 84.01. A similar shift was observed after coelomocytes were incubated with *B. megaterium* at an MOI of 100:1, with an increase in RFI from the baseline control (53.04) to 70.27 following coelomocyte exposure to this bacterium.

Displayed in **Figure 3** are the total percentages of significant results of increased NO production above baseline controls in all earthworms tested after coelomocyte challenge to each type of bacteria at a range of MOIs. In parentheses is the number of earthworms that resulted in significantly increased NO production out of the total number of earthworms analyzed at that specific MOI. The pattern of the overall results obtained is indicative of a dose-response, as observed by a decrease in the percentage of statistically significant results of NO production as MOI decreased. From this data, we are able to deduce the minimum MOI required to induce the reaction of NO production in *E. hortensis* coelomocytes. For example, a minimum MOI of 10:1 is needed to facilitate a response in coelomocytes following exposure to *B. megaterium*.

Discussion

Our findings of increased NO production in coelomocytes following microbial challenge by four different types of soil-dwelling bacteria confirm that the earthworm is able to produce NO as a defense mechanism of its innate immune response. The data obtained indicate a dose response of decreased NO production as the number of bacteria per coelomocyte also decreased, and we were able to determine a representative minimum MOI needed to induce this particular innate immune reaction. Also observed was a greater significant response rate in coelomocytes challenged with Gram positive bacteria than with Gram negative bacteria. Following exposure to either *B. megaterium* or *A. globiformis*, 100% of the earthworms analyzed resulted in increased NO production levels at the MOIs of 100:1 and 500:1, respectively. A lower response rate was seen when challenged with *P. stutzeri*, with a maximum of 66% of earthworms showing significant results at an MOI of 100:1, and *A. chroococcum*, with a maximum significant response of only 37.5% at an MOI of 500:1. The difference in the number of significant results could have possibly been due to the different types of MAMPs found on each type of bacteria. It may be that the MAMPs found on Gram positive bacteria, such as peptidoglycan and lipoteichoic acid, could be more stimulatory than the MAMPs found on Gram negative bacteria, such as lipopolysaccharide. Further research on different MAMPs could provide evidence as to the specific molecular triggers of NO production in *E. hortensis*.

Future Investigations

As an extension of this study, our lab plans to investigate if earthworms are able to produce NO following exposure to bacteria through the same highly conserved enzymatic pathway that is used in vertebrates and a small number of other invertebrates. It has been demonstrated that the production of NO is a result of the oxidation of the amino acid L-arginine to L-citrulline, facilitated by the enzyme NO synthase (NOS) (Rivero, 2006). The presence of NOS in mammalian cells was first identified and described in 1989, which led to the discovery of three isoforms of the NOS enzyme that were cloned and purified between 1991 and 1994 (as reviewed in Alderton, Cooper, & Knowles, 2001). The three known isoforms are the protein products of three distinct genes, and each differs greatly in subcellular location, expression, regulation, structure, and catalytic property, thereby providing each with a unique functional role. The NOS isoforms can be categorized into two groups that have been termed constitutive NOS (cNOS) and inducible NOS (iNOS). The group of cNOS includes two isoforms: neuronal NOS (nNOS), found in the cytosol of both neuronal and skeletal muscle cells and tissue, and endothelial NOS (eNOS), which is membrane-bound within endothelial cells. The activity of cNOS depends on the intracellular calcium (Ca2+) concentration, in which an increase in Ca2+ level results in the production of NO in small amounts for a short period of time, where NO plays a role in physiological regulation or neurotransmission (Andreakis et al., 2011; Nussler & Billiar, 1993). In contrast, iNOS includes a single isoform that is absent in resting cells, but is rapidly synthesized after stimulation by pro-inflammatory cytokines like interferon gamma and tumor necrosis factor-alpha, and/or microbial products (MAMPs), such LPS (Rivero, 2006). Studies performed on vertebrate species have established that iNOS is an important component acting within the innate immune system through assisting in the elimination of pathogens through catalyzing oxidation reactions resulting in antiviral and antibacterial compounds (Eddy, 2005, as cited in Rodriguez-Ramos et al., 2010). Following the evidence of NO production in the hemocytes of invertebrate horseshoe crab *L. polyphemus*, Eloffson et al. (1993) demonstrated the presence of NOS activity in several invertebrate phyla including annelids, mollusks, arthropods, echinoderms, and urochordata. Since then, the presence of NOS activity has been investigated in many other invertebrate groups, including those of the nematodes, flatworms, coelenterates, and even particular species of protozoa and bacteria (Colasanti & Venturini, 1998). To determine if the NO production observed in coelomocytes of *E. hortensis* induced upon exposure to pathogenic challenge is the consequence of iNOS activity, we will employ the use of several different iNOS inhibitors at a range of concentrations through an *in vitro* assay in which coelomocytes will be stimulated by the bacterial species *B. megaterium* and *P. stutzeri*. The effect of the iNOS inhibitor on the production of NO will be quantitatively measured and analyzed by flow cytometry through the fluorescent indicator DAF-FM DA as explained earlier.

We intend to determine the effects of NO production in pathogen-stimulated coelomocytes by using four different NOS inhibitors that all have a high degree of selectivity for iNOS versus cNOS.

We also want to expand our study of MAMP-induced NO production by including unmethylated CpG oligonucleotides. For our investigation, we are interested in studying the response of the earthworm coelomocytes to unmethylated CpG. Although not much is yet known about TLRs in earthworms, recent studies with *Eisenia andrei* showed that a TLR gene named EaTLR exists. Real-time PCR results showed that there was a significant up-regulation of the TLR mRNA with *Bacillus subtillis* (Gram-positive) challenge but not with the *Escherichia coli* (Gram-negative) challenge (Škanta, Roubalová, Dvořák, Procházková, & Bilej, 2013).

Cytosines, one of the four building blocks of DNA, usually are not methylated in bacteria and viruses genome (Medzhitov, 2001; Takeda & Akira, 2005). Although there are no reports of methylated DNA in *E. hortensis*, there have been numerous studies validating methylated DNA in a variety of other annelids. For example, *Chaetoplerus variopedalus, Aporrectodea caliginosa trapezoid, Aphrodita aculeata* and *Nephtys ciliata* were all shown to have methylated DNA (Del Gaudio, Di Giaimo & Geraci, 1997; Regev, Lamb, & Jablonka, 1998). When pathogens infect these annelids, the microbe-associated unmethylated DNA may be seen as foreign and cause an innate immune response in a manner analogous to vertebrate defense mechanisms. We will expose the coelomocytes of *E. hortensis* to three different synthetic CpG oligonucleotides and determine if NO is produced using a flow cytometric method.

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Appendix

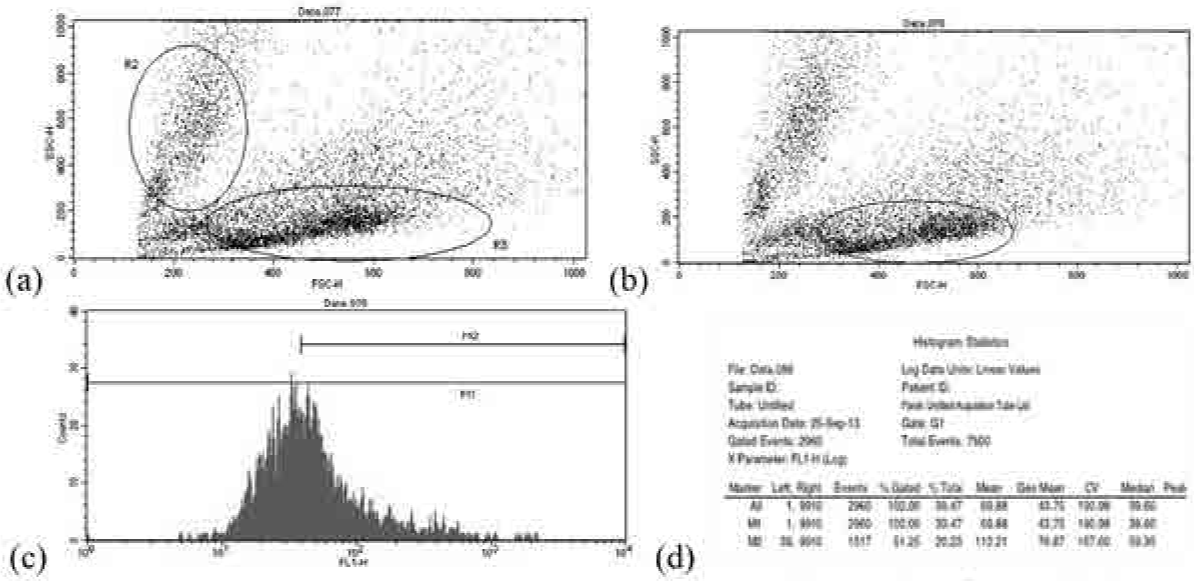

Figure 1. **Representation of sample set-up and gating.** (a) Dot plot of FSC (size) (abscissa) versus SSC (granularity) (ordinate), containing all events collected, gated on regions to show different cell populations. The left-most region is composed of eleocytes and the right-most region includes both small and large coelomocytes. (b) Dot plot of FSC (abscissa) versus SSC (ordinate), containing all events collected, gated on the large coelomocytes in a smaller region (R1) drawn as an oval. (c) Histogram of baseline sample gated R1, with FL-1 RFI (abscissa) versus cell number (ordinate) showing marked areas (M1 and M2) from which data was collected from 100% and ≈50%, respectively, of total events collected. (d) Sample histogram table from which numerical data was obtained for statistical analysis. The geometric mean (Geo Mean) of M1 and the percent gated (% gated) of M2 were recorded and analyzed for statistical significance. All representative images used above were prepared using data from NO assay 14, earthworm sample number 5 and created using the Cell Quest Pro Software (BD Biosciences).

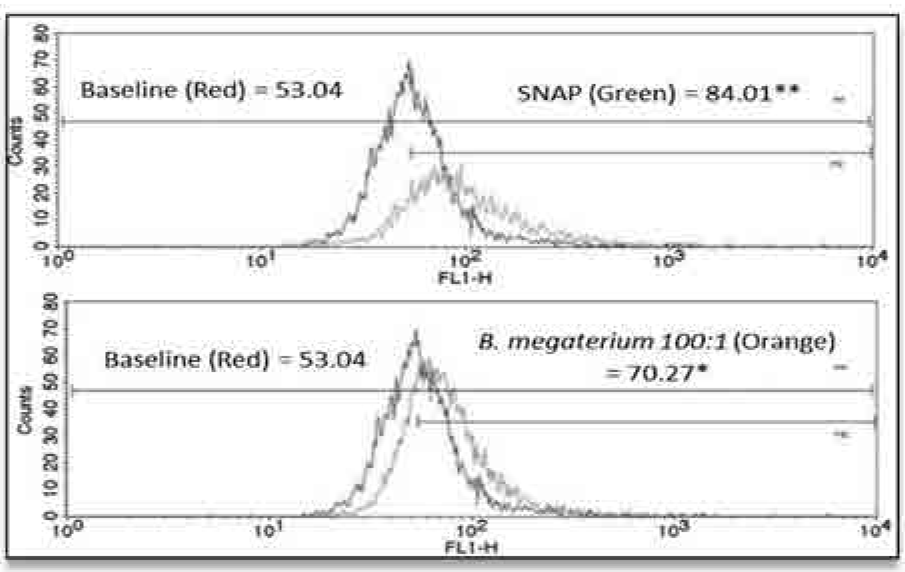

Figure 2. Representative histograms of FL-1 (RFI) vs. cell counts from an *E. hortensis* coelomocyte population. Top panel: In coelomocytes incubated with the positive control SNAP (green), a significant increase in NO production above the baseline control (red) was observed by an increase of 30.97 in the geometric mean of RFI values between the baseline control (53.04) and the SNAP-treated coelomocytes (84.01). Bottom panel: In coelomocytes incubated with *B. megaterium* at an MOI of 100:1 (orange), a significant increase in NO production above the baseline control (red) was also observed by an increase of 17.23 in the geometric mean of RFI values between the baseline control (53.04) and the *B.megaterium*-treated coelomocytes (70.27). Statistical significance is shown as: * = $p \leq 0.05$; and ** = $p \leq 0.005$ as determined by *t* test: paired two samples for means.

		Bacterial Challenge [% significant; n]			
		B. megaterium	*A. globiformis*	*P. stutzeri*	*A. chroococcum*
MOI	500:1	NT	100% (6/6)	66% (2/3)	55% (5/9)
	100:1	100% (12/12)	44% (4/9)	89% (8/9)	17% (2/12)
	20:1	66% (2/3)	11% (1/9)	22% (2/9)	17% (2/12)
	10:1	33% (1/3)	NT	NT	NT
	4:1	0% (0/3)	0% (0/3)	17% (1/6)	NT

Figure 3. Percentage of *E. hortensis* exhibiting statistically significant increases in NO production following exposure to each bacterium at a range of MOIs. Coelomocytes were incubated at a range of MOIs using each bacterium with a dose-dependent pattern of significant response observed. In general, as the MOI decreased, the percentage of responding *E. hortensis* coelomocyte populations also decreased. This table shows the percentage of statistically significant responses for each MOI and bacterium used. The number of earthworms used is shown in parentheses. NT = not tested.

SOCIAL SCIENCES

Are We Flipping the Script?: A Content Analysis of Gay Male Stereotypes in Film

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Abstract

Homosexual imagery in film provides a vast assemblage of stereotyped portrayals that extend over many decades (Benshoff and Griffin 2009). Considering the fact that gay individuals constitute a sizeable minority group in the US today, little attention is directed toward how they are represented in film (Fouts and Inch 2005). The current content analysis examined stereotypes of male homosexuality in film from a historical and evolutionary perspective. The author explored patterns in how film media reflects and sustains social ideology, stereotypes, and attitudes; and how stereotypes perpetuate and change over time. Three homocentric films and their three remakes were targeted for analysis, spanning 1933 to 2013, and an additional five films were included chosen from empirical data in order to represent other film genres and eras. The findings of this study indicate that stereotypes have not changed significantly across time. "Closeted" was the only stereotype variable exhibiting significant change over time with modern films portraying gays as more often "out," than earlier era films. Modern films tended to have more gay primary characters than earlier films. The combination of these two factors lead the author to conclude that gay males are more visible in modern cinema, but such exposure has not yet drastically changed the stereotype landscape.

Are We Flipping the Script?: A Content Analysis of Gay Male Stereotypes in Film

According to Horton and McDougal (1998 as cited in Champoux 1999), films mirror cultural norms, values, and beliefs present in society during the time of their creation. Russo (1987) posits that mainstream films containing homosexual characters do not authentically represent the gay minority but remain true to addressing the majority via a minority experience, essentially leading to a history of stereotypical representation. In the documentary, *The Celluloid Closet* (1995), based on his literary work of the same name, Russo states:

> In a hundred years of movies, homosexuality has only rarely been depicted on the screen. When it did appear, it was there as something to laugh at--or something to pity--or even something to fear. These were fleeting images, but they were unforgettable, and they left a lasting legacy. Hollywood, that great maker of myths, taught straight people what to think about gay people... and gay people what to think about themselves (00:02:40).

Media representations aid in the creation and perpetuation of viewer perceptions which shape overall attitudes toward minority groups and promote beliefs in stereotypes (Sanders and Ramasubramanian 2009). The current study examines the depiction of gay men and male homosexuality in film from a historical and evolutionary perspective. The analyses conducted explore patterns and trends in how media reflects and sustains social ideology, stereotypes, and attitudes; and how those stereotypes evolve or perpetuate over time. This study will investigate gay male stereotypes pervading the cinematic sample and look for signs of change in the modern film landscape.

Stereotypes can be defined as beliefs that are often oversimplified regarding the attributes of members of a group (Snyder and Miene 1994). Research has shown that changing stereotypes is a challenging process because they perform the social function of strengthening self identity as well as in-group identity, and they perform cognitive functions based on schema theory; the collection of information for quick assessment (Devine 1989; Tajfel 1981; Anderson 1983).

Many theories including priming (Roskos-Ewoldsen, Roskos-Ewoldsen and Carpentier 2009), stereotype theory (Harris and Bartlett 2009) and social learning theory (Bandura 1963) provide insight into how media impacts viewer's perceptions of social outgroups. Collectively these theories point to long term utilization of stereotypes as quick judgment tools that can lead to generalizations about outgroups based on incomplete information (Allport 1954).

The empirical literature on homosexual character stereotyping in the media studied via content analysis is sparse, especially in the realm of film. There have been recent content analyses conducted to investigate homosexual stereotyping as it relates to television, specifically situation comedies (Fouts and Inch 2005; Bonds-Raacke, Cady, Schlegel, Harris and Firebaugh 2007), animation (Pavada 2008), and advertising (Kates1998; Sender 2001 as cited in Bonds-Raacke et al.). Despite this fact, homosexual imagery in film provides an extensive compilation of stereotyped portrayals that span many decades (Benshoff and Griffin 2009). A study on lesbian, gay, bisexual, and transgender (LGBT) population surveys by Gates (2011) suggests that there are more than 8 million adults in the U.S. identifying as lesbian, gay or bisexual. Lesbians and gays make up 1.7%, and bisexual individuals 1.8% of that total. Gates estimates the total LGBT population of the United States to be approximately 9 million, making up 3.8% of the adult population. Considering the fact that gay individuals constitute a significant minority group, there is little attention directed toward how they are represented in film (Fouts and Inch 2005). Structured content analyses with regard to homosexual stereotypes and the value-heavy social imagery they represent are needed to contribute to the body of empirical data that exists on this topic. This study seeks to contribute to that body of data.

Social comparisons across time in popular media such as film can shed light on the way in which gayness is perceived in American culture (Russo 1987). Horton and McDougal (1998 as cited in Champoux 1999) posit that remakes of films, especially those created 30 to 40 years apart, are especially advantageous for social comparisons. Films that have a common storyline and are spaced at wider intervals in time highlight dynamic changes in values, and are therefore powerful resources for the analysis of the social world (Champoux 1999); this is the rationale for the inclusion of remakes in this study. The current study's sample will include three films containing homosexual characters and their respective remakes, spanning 1933 to 2013. Those six are the entirety of the selections empirical research yielded at the time of this study, barring one not available in English translation. An additional five films will be included in the sample to represent other genres, and eras (spanning 1923-2006), chosen form empirical sources and with the help of an established researcher.

Situating Homosexuality in Film

Gross (1991 as cited in Chung 2007) notes that the depiction of homosexuality in early American media was often negative and exclusive, cementing the perception that homosexuals were a deviant group. Silent Hollywood filmmakers of the early 20th century employed visual gender cues to connote homosexual characteristics and constructed a stereotype of male homosexuals as effeminate, or acting like women, creating the 'pansy' character which was considered incongruous and humorous. Early Hollywood under the Hays Code of 1930 (a motion picture production code that restricted the content of films to protect the morality of viewers) supported the ideology that heterosexuality was the correct kind of sexuality, and in most cases the *only* kind. As expressed in film, this perspective reinforced negative stereotyping and also implied that there was no room for homosexuality as anything other than a dirty secret (Benshoff et al. 2009; Russo 1987). According to Russo (1987) early European films approached homosexuality from a more sophisticated angle; though if they played in American theaters they were heavily censored and lost most of their meaning. In pre-war Germany and France homosexuality was present in many pictures throughout the silent film era (Russo 1987).

Benshoff et al. (2009) explain that 1961 was the year in which the Hays Code was relaxed to allow the discreet and restrained depiction of homosexuality in the U.S, however the Hays code was not officially abandoned until 1968. The films of this time viewed homosexuality as sickness, flaw or shameful state; often resulting in gay character suicides, loss of social status, or blackmail (Benshoff et al. 2009). Queer and transgender imagery was also used to label characters who exhibited criminality, or who were insane (Benshoff et al. 2009). Homosexuality was considered a criminal act at the time, and resulted in arrests for perpetrators; it was also 1961 when the act of sodomy was decriminalized (Painter 2005). Even those these strides would seem to create increased freedom for the expression of homosexuality in film, discrimination was still perpetuated (Gross 2001). Gross (2001) posits that discrimination of sexuality is ever-present even in today's film industry. According to Gross, in the years post-production code, gay and lesbian individuals have become more visible in the media. Even with this increased visibility, rarely are they ever allowed to express gay physicality. A study by Moddelmog (2009) contends that portrayals of same-sex relationships are entirely comic, utterly tragic, mostly asexual, always with white actors and often one of the lovers must perish if same-sex desire is exposed.

LITERATURE REVIEW

Recent research into the areas of homosexual stereotyping in film investigates and provides a wide range of impacts related to this phenomenon. Chung (2007) explored media expressions of lesbian and gay stereotypes. According to Chung, media portrayals aid in the creation of social reality and provide a behavioral template for children. Social cognitive theory (Bandura 1986 as cited in Chung 2007) suggests that individuals learn and imitate others, even if those others are fictional (e.g. film and television characters). Media representations generally project over-generalized and stereotypical images of gays and lesbians as well as other minority groups (Chung 2007). Cultivation theory (Gerbner, Gross, Morgan, Signorelli, and Shanahan 2002) puts forth the idea that spectators inundated with portrayals of media defined reality can acquire perceptions based on those portrayals. The Pew Research Center (2003) posits that media portrayals could be the primary source of information on gays and lesbians for 40% of adult Americans who declare that they do not personally know any gay or lesbian individuals. The contact hypothesis (Allport 1954) posits that prejudicial stereotypes result from a lack of information about the group in question. Making direct contact with the outgroup allows the exchange of new, or more comprehensive knowledge about that group. Acquiring knowledge leads to counteracting negative stereotypes, and can lead to changes in well established negative stereotypes. Media, including film, supplies information about outgroups when direct contact is limited or not possible in social settings (Schneider 2004; Stangor and Schaller 1996). The exemplar model of stereotype change (Smith and Minda 2000) states that when individuals are exposed to perceived positive exemplars this leads to positive stereotypes; negative exemplars lead to negative stereotypes in the mind of the viewing audience. The current study uses the contact and exemplar theory models to predict stereotype change.

Wyatt (2001 as cited in Chung 2007) documents the frequency of homosexual and bisexual characters on more than thirty television networks in Australia, Canada, United Kingdom, and the US starting in 1960, progressing by decade and ending in 1990. The results show that the portrayal of homosexual characters is on the rise, from just one character in 1960 to 306 in 1990; but Chung (2007) argues that this broader representation is not helping when it is negative stereotypes that are repeatedly portrayed. Fouts and Inch (2005) conducted a content analysis on 22 situation comedies from October of 2000, determining frequency of gay characters, demographics of those characters, and whether or not they comment on their sexual orientations (as compared to heterosexual characters). Less than 2% of the 125 central characters were homosexual; all the homosexual characters were found to be males in the age range of 20-35 years (Fouts et al. 2005). Fouts et al. interpreted these results to indicate that homosexual adolescents are severely lacking in role models for their own age group. The absence of role models can symbolize that hiding your sexuality, as queer characters are hidden from view, is what is expected in society. It also implies that homosexuality is only appropriate for adults and that gay children/adolescents are non-existent (Fouts et al. 2005). Gerbner and Gross (1976) suggest that the absence of role models in entertainment is a type of "symbolic annihilation" emphasizing the lack of power held by the spectators who identify with the targeted group. Fouts et al. argues that the same holds true for the lack of lesbian role models. Additionally, the results presented by Fouts et al. (2005) show that homosexual characters commented more frequently about sexual orientation signifying that sexual orientation is what matters most in the lives of queer individuals. These type of representations, and the overall reinforcement of gay stereotypes contribute to feelings of hegemonic marginalization represented by heterosexually dominant main-stream television and its producers (Fouts et al. 2005). Chung (2007) notes that although modern reality television series like *Big Brother* (Us/UK/ Australia), *The Real World* (US) and *Survivor* (US) have included gay characters, in order to denote equal representation, they have selected competitors that correspond to socially embedded gay stereotypes. The media purposely uses stereotypes to convey a quick message to viewers. They understand how people relate to stereotypes and use them as a critical instrument to tell stories efficiently. Exploring the complexity and authenticity of a character is not in the media's best interest as far as making profits are concerned. The representation of homosexual characters is purposefully misleading and constructed to maintain queer stereotypes (Chung 2007).

Commenting on the real world perpetuation of gay stereotypes, a contemporary study by Boysen, Vogel, Madon, and Wester (2006) looked at mental health stereotypes of gay men among samples of college students and therapist trainees seeking Masters degrees in counseling. The authors found that despite the removal of homosexuality from the Diagnostic and Statistic Manual of Mental Disorders (DSM) in 1987, stereotypes still exist when it comes to the mental health of gay men. Both the college students and therapist trainees sanctioned similar stereotypes. Respondents from both groups stereotypically associated the following mental health conditions with homosexual men: anxiety, mood disorders, sexual disorders, eating disorders, and gender identity disorders (Boysen et al. 2006). The perception of homosexuals as mentally ill or sick is an old stereotype which includes the public sanctioning of homosexuality as a mental illness, and also the belief that gay men suffer from mental health issues (Simmons 1965; Levitt and Klassen 1974; as cited in Boysen et al 2006). Gameson and Moon (2004) examined the history of sexuality and found that research of the 1950s, 60s and 70s mostly focused on the deviance and coping mechanisms of disreputable and shamed individuals, as well as the deviant, underworld activities of crime, prostitution, and corrupt morality. Anything but heterosexuality was immediately construed as deviant (Leznoff and Westly 1956; Reiss 1961; Humphreys 1970 as cited in Gameson et al. 2004). Chung (2007) points to US state laws, like the laws against same sex marriage, as legal factors encouraging continuing discrimination against homosexuals and media representations of homosexuality as criminally oriented. Gallup poll results for 1977 indicated that 43% of Americans felt that relations between gay or lesbian consenting adults should not be legal, the number rose steadily to a high of 57% recorded in 1988, and has declined since then to a low of 31% recorded in 2013 (Gallup 2013a).

The above Gallup (2013a) results also indicate that while some Americans still believe homosexuality should be illegal, the number is decreasing. Gallup (2013b) also reports that the moral acceptability rating for homosexuality is up from 40% of Americans finding homosexuality as morally acceptable in 2001, to 54% in 2012. Even though Gameson et al. (2004) agree about the history of homosexuality as deviant, their study differs from the work of Chung (2007), Fouts et. al. (2005), and Boysen et al. (2006). Included in their work is the discussion of the social construction of sexuality and the rise of Queer Theory. Based on these models they indicate that the study of homosexuality has moved away from deviance and toward political life and community. They state that since the 1950s there has been a social movement towards redefining the relevance of sexuality in new areas of study, and critically examining old issues such as taboos, sexual regulation, stereotypes, and how sexuality interacts with other methods of oppression (Gameson et al. 2004). Such erudition leads to changes in societal viewpoints regarding homosexuals (Gameson et al. 2004) and could potentially support the evolution in attitudes towards gays and lesbians reported in the 2013 Gallup polls. Additional support for this view comes from the research of Pavada (2008) which is based on a content analysis of the episode "Homer's Phobia," from the animated television show *The Simpsons* (1997*)*. Pavada contends that with humor, *The Simpsons* (1997) episode deconstructs the codes of both heterosexual and homosexual behavior and parodies homophobia and the fixation on gender roles allowing spectators to better identify with queer characters. The researcher states that before the 1990s homosexual characters were usually either disregarded in television and films, or presented as non-normative and negatively stereotyped. Opponents of homosexuality were less dissuaded by presenting gays and lesbians in a negative light because socially there was less reaction to bigotry against them as compared to other minorities. Pavada (2008) concludes that reviewing stereotyped material and humorous parodies through a pedagogical framework teaches and promotes sexual tolerance and change in attitudes.

The idea of moving away from stereotyped portrayals indicates a directional move toward something different. Evans (2009) examines the gay subculture relationship with the popular cinema of Hollywood, and sheds light on the connection between Hollywood and gay authenticity. The author suggests that a shift occurred in the gay subculture's relationship with Hollywood in the 1980s and continues today. The once cult-like love for old Hollywood glamour represented by Marlene Dietrich and Judy Garland gave way to the absolute converse, queer abandonment. Gay spectators find it difficult to accept attempts at authenticity by Hollywood due to its history of creating homophobic and stigmatized queer representations (Evans 2009; Russo 1987). Evans points to camp, and types of camp in regard to authenticity. The film *Too Wong Foo, Thanks for Everything, Julie Newmar* (1995 as cited in Evans 2009) [*Wong Foo*], is contrasted with *The Adventures of Priscilla Queen of the Desert* (1994as cited in Evans 2009) [*Priscilla*]. Both *Wong Foo* and *Priscilla* were drag themed road movies, both of queer authorship, and filmed in parallel production. *Wong Foo* is seen as a culturally hegemonic remake of an authentically gay, and great original. Medhurst's (1991 as cited in Evans 2009) theory said that gay audiences would hinge support for films on queer authorship because of long fought liberational battles for cultural and political value. This theory did not prove true in the case of *Wong Foo*. It was rejected by queer spectators because it employed a nostalgic type of camp that recalled the hegemonic ideology of old Hollywood; a straight articulation of camp which is today is outdated. Queer audiences are moving away from parodies of queerness by Hollywood moviemakers and supporting more authentic portrayals of gay characters (Evans 2009). The 2005 release of *Brokeback Mountain* was a departure from camp and a more progressive representation of gay masculinity which struck a chord with gay spectators. Evans (2009) finds the real tragedy of the movie to be the lack of gay identity and gay subculture in the main characters Jack and Ennis. Evans suggests that the authenticity offered in *Brokeback Mountain* (2005 as cited in Evans 2009) is in fact straight authenticity- the cowboy archetype, the man's man. Instead of allowing gay authenticity to truly represent queer culture, heterosexuals are creating acceptable queerness in their own image (Evans 2009). This follows the theory of compulsory heterosexuality as solidified by Adrienne Rich (1980). The idea of compulsory heterosexuality was originally formed by lesbian activists in the 1960s and 70s as an analysis of the enforcement of heteronormitivity from a queer perspective. Rich discusses the history of the universal idea that heterosexuality is the norm and the default sexuality for men and women, and how that idea is ingrained in society. The author also points out that the biggest problems regarding discussions and representations of homosexuality in popular media is that they chronically come from positions of marginalization, or at best tolerance (1980). Benshoff and Griffin (2009) discuss the compulsively heterosexual formula for the Hollywood narrative which consists of a male protagonist conquering the villain and winning the heart of the female. Evans (2009) posits that acceptable queerness in cinema is rejecting a true queer identity and displaying a queerness that is made in the image of heterosexuality.

Based on the history and empirical literature that denotes stereotypical portrayals of homosexuals in the media, and societal attitudes toward homosexuals, the focus of the current study will include the exploration of the following research questions: (1) What stereotypes (in the categories of: physical, personality, sexual, moral, mental health, and social) actually occur in the films represented by the sample? (2) Have stereotyped portrayals changed over time? (3) What are the gay character's primary relationships with other characters in the films? (4) How are the gay characters treated by other characters? (5) Is there violence perpetrated against the gay characters in the films? (6) what is the end-of-film mortality rate for gay characters? (7) How many gay versus straight primary characters are featured in the sampled films?

METHODS

Content Analysis

A content analysis is a quantitative and/or qualitative analysis of media messages summarized using scientific method (Neuendorf 2002). The current research uses human coding, with two coders to ensure intercoder reliability, in order to analyze the representation of gay characters in 11 films with known male homosexual characters. A codebook was created by the current author specifically for this study. In addition to variables related to the research questions, a short demographic section for the characters was also included.

Codebook Development

A character codebook was developed to uniformly assess the measured variables for the homosexual characters. The codebook template is based on the work of Smith (1999) who utilized this method of analysis to explore women’s images in modern as well as "Golden Age" Hollywood films. The demographic codes were set up based on Smith's design and modified to fit this study; the stereotype codes were compiled from two empirical studies on sexual prejudices and gay stereotype content (Chonody 2013; Madon 1997). Chonody (2013) developed and tested the Sexual Prejudice Scale (SPS) as an accurate measurement instrument for attitudes toward gay men and lesbian women. The scale was tested and honed to a final version that proved statistically sound for measuring sexual prejudices against homosexuals. Madon's (1997) study tested 491 attributes that related to behaviors or physical characteristics of gay men. Rutgers University students responded on a Likert scale as to whether the attributes were very uncharacteristic of gay males, somewhat uncharacteristic, no more characteristic of gay males than any other group, somewhat characteristic, and very characteristic of male homosexuals. The current researcher included coding based on the stereotypic traits most strongly associated with gay males according to the results of Madon's (1997) research. The codebook was originally developed to include lesbian stereotypes; those variables relating to lesbians will not be utilized for this analysis. A short film codebook was also developed to provide film demographic information for use in the current analyses, based on the work of Smith (1999).

Sample

The primary film sample consists of three films and their respective three remakes containing homosexual characters spanning 1932 to 2013. Those six are the entirety of the selections empirical research yielded at the time of this study, barring one not available in English translation. The genres include comedy, drama, musical, and crime/drama. An additional five films will be included in the sample to represent other genres and historical decades, chosen from two empirical authorities on queer cinema (Benshoff and Griffin 2009; Russo 1987) with the help of an established researcher. According to Horton and McDougal (1998 as cited in Champoux 1999), cinema theorists agree that the medium of film mirrors cultural norms, values, and beliefs present in society during the time of their conception. Due to the current study's film sample being relatively small, 11 films, remakes offer direct comparisons highlighting socio-cultural ideologies from different eras. A complete list of films and their demographic information can be found in Table 7 (Appendix B p.51).

Data Collection

The coders will watch the selected films in entirety at the same time without discussion of content or coding. The study unit is each homosexual character who is shown for at least five seconds in two or more scenes of the film. In order to determine if a character is homosexual and viable to be a subject for coding the following criteria will be used: (1) overtly romantic or sexual contact with a same sex partner-either direct or implied, (2) character talks about his/her sexual orientation, (3) other characters discuss the sexual orientation of the character in question. The character must meet one of the previous three criteria in order to be included in the coded sample. A separate code sheet will be created for each homosexual character. The coders will watch the movies additional times as needed, coding separately for each homosexual character presented in the narrative. The coders will categorize the movie genre based on a scale created from the Internet Movie Database (as cited in Smith 1999). The short character demographics section will also be adapted from the work of Smith (1999). The coders will be analyzing the communication content of movie both verbal and non-verbal as put forth in the code form. Each homosexual character will be assessed based on a number of attributes: demographic, physical, personality, sexual, social, criminality and mental health status. Actions toward the character by other characters will be assessed for treatment: acceptance or non-acceptance toward, violence toward, and apathy toward (adapted from Madon 1997; Chonody 2013). Orientating the character in the narrative as primary, secondary, tragic, comic, and noting if the character perishes during the presentation of the film will also be integral to this study. Physical attributes include style of dress: tight clothing, feminine clothing, make-up, measured using yes or no answers; attractiveness measured on a Likert scale; walks like a girl, limp wrist measured using yes or no answers; impeccable grooming measured on a Likert scale. Personality attributes include good listener, melodramatic, emotional, flirtatious, gentle, artistic, sensitive etc, and are measured using yes or no answers. Sexual attributes include asexuality, associated with kinky sex, associated with molestation, confused about sexuality, measured using yes or no answers. Social attributes include open minded, has female friends, flirtatious. Mental health will include depressed, suicidal, crying jags, unhappy, overly anxious, nervous, and unstable, measured using yes or no answers. Treatment will be assessed by choosing if the other characters react overall positively or negatively on a Likert Scale. Violence toward the character will be measured by yes or no answers, and a follow up question about number of incidents. Assessing the death of the character will start with a yes or no question determining if the character lives or dies during the narrative. If death is chosen, the coder will choose between death at the hand of another character, death by suicide, accidental death and natural death (adapted from Madon 1997; Chonody 2013; Smith 1999).

Training and Reliability

The team of two coders consists of the current study author, and a peer of the author. The second coder was trained on the codebook and an intercoder reliability test was conducted using a television show: *Glee,* episode one from season five (2013). Intercoder agreement is necessary in content analysis because it measures only "the extent to which the different judges tend to assign exactly the same rating to each object" (Tinsley & Weiss 2000, p 98). The *Glee* 2013 episode was used for the test of intercoder reliability because of thematic similarity. A total of 3 homosexual characters were identified: two male, and one female. Both coders identified the three characters as code-able in relation to the criteria of the study.

RESULTS

Reliability

The pilot study sample used to assess intercoder reliability was separate from the research study sample. A total of three homosexual male characters were identified as meeting the study criteria and were deemed "codeable" by both coders. No qualified characters were passed over. Intercoder reliability was assessed via percentage of agreement. The current author found this measure recommended for research that involves the coding of behavior (Bakeman, 2000).
One variable in the sexual stereotype category, "sexual relations," failed to prove reliable, with each coder answering it differently for one character, indicating a PAo=.996, or 99.6% intercoder agreement. After this first reliability test, that variable was examined and deemed unclear with regard to "implied sexual relations." It was modified by adding a definition for "implied sexual relations," and additional coder training was conducted. A second reliability test was executed on *Glee* (season 5, episode 2, 2013) using the modified codebook and achieved a PAo= 1.00, or 100% intercoder agreement.

Descriptives

The current study coded a total of *N*=33 homosexual male characters from 11 films sampled ranging in year from 1923 to 2013. Each character is considered a case in the sample. Analyses of character demographics found that the gay male characters' roles in the films were coded in 51.5% of the cases as a principal role, and 42.4% of the cases as a supporting role, and 6.1% of cases as a minor role. The bulk of the characters coded were in the19-29 age range (48.5%), followed by the 41-50 age range (27.3%), and the 30-40 age range (21.2%), with only one case (3%) representing characters age 51-64. Young children, adolescents, and individuals 64 and older were represented in the codebook but no cases were found in the sample. The majority of the characters were found to be Caucasian (93.9%), with both African American and Asian representing 3% each. No other races were represented in the sample. Apparent socio-economic status of the characters was coded as follows: middle class made up 33.3% of the cases, upper class/upper-middle class made up 21.2% of the cases, lower class/working class made up 21.2% of the cases, with 24.2% undeterminable due to the fact that supporting and minor characters were not always fully contextualized in the films, and therefore were unable to be assessed on certain variables. The most frequently coded occupation was in the entertainment industry with 36.4% of the cases. The occupations of farmer, student, prostitute, law-enforcement, and hairdresser each constituted 6.1% of the cases. The following coded occupations represented 3% of cases each: construction worker, attorney, waiter, secretarial, writer, maid, and body guard, with 12.1% remaining undeterminable as previously noted.

Research Questions

Research question one inquires what prominent stereotypes (personality, physical, sexual, social and mental health) actually occur in the films sampled, categorized by era. Era was determined by the film's release date. Era one includes 1968 and earlier, 1968 being the year in which the motion picture censorship code, also known as the Hays code was disbanded. Era two includes 1969 through 1990. Era three includes 1991 through 2013. Some variables across these categories were not included in the analysis due to creation of a nearly identical variable during the codebook construction, or for the reason that some variables were meant to depict known lesbian stereotypes, which were not examined for this study.

The common gay male stereotypes coded via this study were sorted into five categories: personality stereotypes, containing 10 separate variables; physical stereotypes, containing 15 separate variables; sexual stereotypes, containing 13 separate variables; mental health stereotypes, containing 9 separate variables; and social stereotypes, containing 10 separate variables. Results of descriptive statistical analysis showed that a majority of characters (frequency >75%) were portrayed with overall personality stereotypes at a rate of 60% during Era 1 (1968 and earlier); at a rate of 10% during Era 2 (1969-1990); and in 30% during Era 3 (1991-2013). Descriptive results for physical stereotypes showed that a majority of characters were portrayed with overall physical stereotypes at a rate of 6% in Era 1; the characters portrayed with overall physical stereotype variables were at a rate less than 75% across Era 2; and the majority of characters were portrayed with physical stereotypes at a rate of 6% during Era 3. Descriptive results for Sexual stereotypes indicated that a majority of characters were portrayed with sexual stereotypes at a rate of 8% across all three Eras. Descriptive results for mental health stereotypes indicated that a majority of characters were portrayed with overall mental health stereotypes at a rate of 11% during Era 1. In both Eras 2 and 3 the characters portrayed with mental health stereotypes were at a rate less than75%. Descriptive results for social trait stereotypes revealed that the majority of characters were portrayed with social trait stereotypes at a rate of 20% in Era 1; 40% in Era 2; and 50% in Era 3.

The overall categories, frequency, and percentages are presented in Table 1 (Appendix B p. 45). A complete listing of the descriptive statistical results for stereotypes by variable are presented in the following tables: Table 2 (Appendix B p. 46) shows the results of frequency and percentage analyses for gay male personality stereotypes across three film eras, and including an overall total. Table 3 (Appendix B p. 47) shows the results of frequency and percentage analysis for gay male physical stereotypes across three eras, including an overall total. Table 4 (Appendix B p. 48) shows the results of frequency and percentage analysis for sexual gay male stereotypes across the same three eras and a total. Table 5 (Appendix B p. 49) shows the frequency and percentages of mental health stereotypes across three eras, with an overall total.

Table 6 (Appendix B p. 50) illustrates the frequency and percentages of social trait stereotypes across three eras with overall totals.

Research question two asks if common stereotype portrayals have changed over time. Multiple one-sample chi square tests were conducted using the weighted cases approach to analyze the relationship of the frequency scores for each stereotype coded (57 individual variables) to the era of film release across the three eras in order to determine if any significant relationship exists between era and frequency score.

Only one variable out of 57, the sexual stereotype "Is closeted," proved to be significant, $\chi^2(2, N=11)=7.54$, $p=.023$, and Cramer's V = .48, indicating that 48% of the variance in "closeted" was attributable to time period. In Era 1, 85.7% of gay characters coded for this study were portrayed as closeted; in Era 2, 14.3% of gay characters sampled were closeted; in Era 3, 25% of characters coded were portrayed as closeted. The frequency and percentages for all sexual variables are reported in Table 4 (Appendix B p.48). Some of the variables which proved not to be significant had very low frequency numbers. A larger sample size would result in more reliable testing of those variables, and perhaps lead to an increase in overall significance.

In addition, the current author created several variables to explore research question three, the gay male character's relationships with other characters in their respective films. Types of relationships experienced by the homosexual characters were coded according to depiction (see Appendix A p.33-34 of the character codebook for full description), and were counted only once as they were presented in the narrative for each character. The most common relationship was "business associate or coworker, " with 21 occurrences in the cases coded, followed by "friendship with no romance," with 19 incidences found the cases coded. The third most common relationship was "same-sex sexual relationship," with 15 occurrences noted in the cases coded."Parent to a child," occurred in 6 of the cases coded. "Steady dating of a same-sex partner" occurred in five of the cases coded. However, "Marriage to a same-sex partner" was noted in only two of the cases coded. "Marriage to an opposite sex partner," was noted at the same rate, two occurrences in the cases coded. Depiction of kissing as part of romantic relationships with other characters was explored. Kissing was experienced by 33.4% of the characters coded, with 18.2% experiencing same-sex kissing, 9.1% experiencing opposite sex kissing, and 6.1% kissing both sexes. Lack of kissing (no kissing whatsoever) occurred for 66.7% of gay male characters coded.

Research question four involves exploring the treatment of the gay character by other characters. Descriptive results indicated that 54.5% of gay characters in the sample were treated overall positively, followed by 21.2% overall very positively, and also 15.2% overall negatively, with the remaining 9.1% coded as being treated overall very negatively. The reactions of other characters to the gay character's sexual orientation was 54.5% overall positive, 18.2 % overall negative, and also 18.2% overall very negative, with the remaining 9.1% being overall very positive.

Research question five seeks to assesses acts of violence perpetrated against the gay characters in the film sample.. The majority of gay characters (60.6%) experienced violence directed against them during the narrative, with 39.4% experiencing no violence. Incidence of gay characters being arrested was also noted as a variable. The majority of gay characters in the sample were not arrested during the narrative (69.7%), with 30.3% arrested at least once during the narrative.

Research question six delves into the mortality of gay characters. Figures for the mortality rates by the end of the films were as follows: 21.2% of gay characters died before the end of the film; 78.8% remained alive. The most popular means of death for gay characters was death at the hand of another character, making up 57.1% of those who perished. Suicide, accident, and natural causes accounted for 14.3% each, of those who perished during the narrative.

Research question seven seeks to examine the gay and straight character frequency by era in primary roles across the sample. A one -way analysis of variance was conducted to evaluate the relationship between primary straight male characters and era of film release. The ANOVA was significant, $F(2,17) = 4.25$, p=.03. The strength of the relationship between number of straight male characters and era of film release was strong, η^2=.33, with era of film release accounting for 33% of the variance in number of straight male characters. Follow up tests were conducted to evaluate pair wise differences among the means using the Bonferroni procedure at the .05 level across all three levels; the comparison indicated that 1968-earlier differed significantly from 1991-2013, p= .038, though comparisons with 1969-1990 did not differ significantly. A second ANOVA was conducted to evaluate the relationship between primary homosexual characters and era of film release. The ANOVA was not significant, p>.05. Figure 1 presents the distribution of the frequency by era of straight and gay characters in primary roles. The distribution, as shown in Figure 1 (Appendix B p.52), shows a high frequency of straight primary male characters in Era 1, and a much lower frequency of straight primary male characters in Era 3, accounting for the significance.

DISCUSSION

A lack of age diversity and ethnic diversity existed across the sample. Most gay males are presented as white, and age 19-29. Some symbolic annihilation is created here with regard to adolescents, middle aged, elderly, and ethnically diverse gay men, rendering individuals who fall into those categories cinematically invisible. This supports the findings of Fouts and Inch (2005) who noted an absence of role models for these groups in their research.

The most frequently occurring relationships between gay characters and other characters were friendship, and business associate; very few were parents, even fewer were dating or married to same sex partners. The current author postulates that this presents a very narrow view of homosexual men in a social context. A lack of romance and physicality was also noted across the sample. Around half of the characters were noted to be in same-sex sexual relationships; though at the same time a third of characters were presented as asexual during the narrative. These results support the research of Gross (2001) and Moddelmog (2009) who found that the physicality of gay romance in films is rarely expressed. Also supporting this was the finding that two thirds of gay characters analyzed in the current study were depicted with no kissing.

Violence against gay characters was prevalent in the sample. More than two-thirds of characters experienced violent acts perpetrated against them by other characters. Mortality rate in the sample did not prove as high as expected based on the research of Moddelmog (2009), who contended that in every 'out' couple, one of the lovers would perish.

Some important small positive changes were made evident in the analysis of this study's data. Modern era gay characters were depicted as less passive and more talkative than their earlier counterparts; they were also depicted as more friendly and helpful. Modern era gay characters are also depicted as more active in the gay community. Characters from Era 1 showed higher instances of mental health issues than other eras. This supports the research of Benshoff and Griffin (2009) who noted that traditionally gay characters were portrayed often with mental illnesses. All of these small positive changes contribute to the creation of a new exemplar, with positive traits leading to more positive stereotypes.

Overall the portrayal of stereotypes did not change significantly across the time periods. "Closeted" was the only variable exhibiting significant change over time with modern movies portraying gays as more often "out," than earlier films. Additionally, the findings that heterosexual males are cast in fewer lead roles in modern homocentric films, indicates that modern films tend to have mostly gay primary casts. Relating these two points, the author concludes that this leads to more visibility of gay males in modern cinema, supporting the research of Gross (2001); but such exposure has not yet drastically effected the stereotype landscape. This does not support change via contact and exemplar theory models as posited in this study unless we are in the early stages of change where contact and positive exemplars are not yet creating notable changes.

Additional research on homosexual stereotypes, both gay male and lesbian, should be conducted to continue the exploration of their representation in film. Over time, more significant changes may become evident and reveal adherence to the framework of contact and exemplar theory models of change. Exploration of a wider breadth of modern homocentric films such as independent films, international films, and films of gay authorship would also benefit this research.

Limitations

The main limitation of this study is sample size. Once the films were separated into eras the sample size became small, in some variables less than five cases were present. A larger sample could produce results with greater significance for chi square tests run on specific stereotype variables. A greater variety of films genres would also contribute to the generalizability of these findings. Despite these limitations, the majority of the current study's findings were supported via empirical research.

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Film Analysis Codebook (adapted from Smith 1999)

Items 1-7 are to be filled out by the principal coder for each film with homosexual character(s).

Each film with homosexual character(s) is defined as a film in which at least one character in the narrative can be identified as homosexual. In order to determine if a character is homosexual and viable to be a subject for coding the following criteria will be used: (1) overtly romantic or sexual contact with a same sex partner-either direct or implied, (2) character talks about his/her sexual orientation, (3) other characters discuss the sexual orientation of the character in question.

1. Name of Film:
2. ID# of Film (a four digit number consisting of a number for watching order plus the last two digits in the year of the film):
3. Year of the Film's release:
4. Genre: Defined by Gehring (1988) as "the division of movies into groups which have similar subjects and/or themes" (p.1). Genres will established using The Internet Movie Database, Ltd (2013, www.imdb.com) for each film. If more than one genre is applicable, multiple genres will be recorded.

01 Comedy	02 Romance	03 Action Adventure
04 Drama	05 Western	06 Film Noir
07 Women's Film	08 Melodrama	09 Horror
10 Science Fiction	11 Fantasy	12 Musical
13 Romantic Comedy	14 Gangster	15 War
16 Thriller	17 Crime	18 Documentary

5. If applicable, did this film win any awards (academy award, Cannes film festival, etc.)?
   Yes :______________ No
6. If able to identify, box office gross: _
7. If able to identify, brief notes on how was the movie critically received at the time of its release. Notes: ____

Items 8- 11 are to be filled out by any coder for each film with homosexual character(s) as described on the first page of the codebook. In order to determine if a character is homosexual and viable to be a subject for coding the following criteria will be used: (1) overtly romantic or sexual contact with a same sex partner-either direct or implied, (2) character talks about his/her sexual orientation, (3) other characters discuss the sexual orientation of the character in question. In order to determine if a character is bisexual the following criteria will be used: (1) overtly romantic or sexual contact with both a same sex partner and opposite sex partner-either direct or implied, (2) character talks about his/her sexual orientation, (3) other characters discuss the sexual orientation of the character in question. In order to determine if a character is straight: (1) overtly romantic or sexual contact with an opposite sex partner-either direct or implied,(2) character talks about his/her sexual orientation, (3) other characters discuss the sexual orientation of the character in question.

8. Time Period in which the film takes place:
   (write in year/decade of the plot's primary time e.g. 1930's, 1950s etc. Use 9999 for cannot be determined)
9. According to sexual orientation and gender write in the number of principal characters

Principal straight male   Principal bisexual male   Principal homosexual male
Principal straight female   Principal bisexual female   Principal homosexual female
unknown sexuality principal male   unknown sexuality principal female
other________________________

- A principal character is defined as a main character, one whom the plot centers around and who presence is essential to the story (The Free Dictionary 2013).

10. According to sexual orientation and gender write in the number or supporting characters:

Supporting straight male   Supporting bisexual male   Supporting homosexual male
Supporting straight female   Supporting bisexual female   Supporting homosexual female
unknown sexuality supporting male   unknown sexuality supporting female
other_________________________

- A supporting character is defined as a character who has a significant relationship with, and actively impacts the principal characters in some aspect of their life. The impact is important to the storyline. Supporting characters may develop a complex back-story of their own, but this is usually in relation to the main character, rather than entirely independently (The Free Dictionary 2013).

11. According to sexual orientation and gender write in the number of minor characters:

Minor straight male   Minor bisexual male   Minor homosexual male
Minor straight female   Minor bisexual female   Minor homosexual female
unknown sexuality Minor male   unknown sexuality Minor female
other________________________

- A minor character is defined as one who has no active impact on the story. He or she isn't expected to play a continuing role in the story. He or she might be momentarily involved in the action, but then disappear. Still, their individuality will set a mood, add humor, add information, make the storyline more interesting or complete (Card 2012).

Character Analysis Codebook (as adapted from Smith 1999)

Demographics section

All items are to be filled out for each homosexual character qualified for coding as set forth by the criteria for this study, who appears in the film for at least 5 seconds in two or more scenes, either male or female.

1. Name of Film:
2. ID #of Film (same as that from the Film Codebook section):
3. Character name (write in the name or a brief identifying description of the character if no name is given):
4. Character ID # (to be filled in by principal coder):
5. Type of character role: 01 Principal 02 supporting 03minor
6. character gender: 01 male 02 female 03 _____________
7. character race:
   00 -Caucasian 01-African-American 02 -Asian 03-Hispanic
   04-Native American 05-Pacific Islander 06- Mixed race 07-cannot be determined
   08-other____________________(write in)
8. apparent character age:
   00-child (3-12 years old) 01-adolescent (13-18 years old) 02- young adult (19-29)
   03-adult(30-40) 04-Middle age adult (41-50) 05-mature adult (51-64)
   06-senior adult (65 or greater) 07-cannot determine age
9. Apparent occupation of character:
   01-None identified
   02-Athlete
   03-Attorney
   04-Businessperson
   05-Educator
   06-Entertainment Industry
   07-Factory Worker
   08-Farmer
   09-Homemaker
   10-Law Enforcement
   11-Physician/Medical
   12-Restaurant Business (owner, waiter/waitress, bartender)
   13-Sales
   14-Secretarial/Clerical
   15-Student
   16-Writer
   17-Artist
   18-Hotel/ Hospitality Management
   19-Spy/ Government Agent
   20-Independently Wealthy (does not need to work)
   21-Unemployed
   22-Criminal/Convict
   23-Prostitute
   24-Military

25-Service-Oriented (Any other occupation not listed which is customer focused. For example, a flight attendant, hairdresser, consultant. (write in)_________________

26-Other (write in)________________________

10. SES: Write in the corresponding number to the apparent socio-economic status for the character (Capwell 1997 as cited in Smith 1999).

01-Upper/upper middle class: Well-to-do, high-level job or no job, not dependent on monthly income to live.

02-Middle class: Works for a living, has all necessities and some luxuries.

03-Working class/lower class- Does not have all necessities, does not possess luxuries, may be unemployed, and/or on public assistance.

99-Cannot be determined

11. Marital Status at Beginning of Film: Write in the corresponding number to the apparent marital status of the character in the beginning of the film. Use 1-Single, if the character is unattached and if it is not indicated if the character is divorced, separated, or widowed.

01-Single 02-Married 03-Separated
04-Divorced 05-Widowed 99-Cannot be determined

12. Marital Status at the End of Film: Write in the corresponding number to the apparent marital status of the character at the end of the film. Use 1-Single, if the character is unattached and if it is not indicated if the character is divorced, separated, or widowed.

01-Single 02-Married 03-Separated
04-Divorced 05-Widowed 99-Cannot be determined

13. Relationships: Circle the corresponding numbers to all the apparent roles/ relationships the character has with other characters (principal, supporting, and minor) in the film. For example, a character who is a wife, mother, and child of a parent herself would be coded as 04, 03, 01.

01-Child
02-Sibling
03-Parent
04-Spouse, of opposite sex partner
05-Spouse, of same sex partner
06-steady dating, of opposite sex partner (Implied Romance)
07-steady dating, of same sex partner (Implied Romance)
08-Fiancé, opposite sex partner
09- Fiancé, same sex partner
10-Friend (No Implied Romance)
11- sexual relationship, opposite sex partner
12-sexual relationship, same sex partner
13-Business Associate/ Co-worker
14-Other (write in)_________________
99-No relationships with other characters

14. Character's apparent level of education. Use 9-Cannot tell, if the character's level of education is not obviously determinable or stated. For example, a doctor or lawyer would have obviously had to go to medical or law school at the Graduate level to practice.

01-Less than High School 02-High School Graduate
03- Trade School 04-College Graduate
05-Graduate (Masters or Ph.D.) 99-Cannot tell

15. Orienting the character in the narrative. Choose the best description of the type of role the character is playing in the film:

01 farcical/humorous 02 tragic 03 criminally inclined (villain, prostitute, or other criminal)
04 victim of crime 05 hero 06 Romantic interest pursuer 07 Romantic interest pursued
08 other(write in)________________________

16. Character dies during the narrative: 01-yes 02-no

17. If *yes* to 16--how the character meets their demise:

01 death by the hand of another character
02 death by suicide
03 accidental death

04 natural death (illness, old age)

Physical Trait Stereotypes (adapted from Madon 1997; Chonody 2013)

Style of dress:

1. 01-male attire 02-female attire 03-both
2. tight clothing: 01-yes 02-no
3. wears business attire: 01-yes 02-no
4. wears athletic attire: 01-yes 02-no
5. wears flamboyant/flashy attire: 01-yes 02-no
6. wears casual attire: 01-yes 02-no
7. wears earrings: 01-yes 02-no
8. wears makeup: 01-yes 02-no
9. is a cross-dresser: 01-yes 02-no
10. wears rings: 01-yes 02-no
11. wears leather or fetish attire: 01-yes 02-no
12. wears a bandana (or scarf): 01-yes 02-no <u>if yes</u>: 03 on neck 04 in pocket

13. attractiveness:

01-very attractive 02- attractive 03-average 04-unattractive 05-very unattractive

14. walks like a man: 01-yes 02-no

15. walks like a girl: 01-yes 02-no

16. limp wristed:: 01-yes 02-no

17. grooming (neatness of clothes, hair, and appearance):

01-impeccable 02 good 03 average 04 not so good 05 sloppy

18. Body size:

01-very large (heavy or muscular)

02-large (fairly heavy or muscular)

03- Average (medium build)

04 slim (smaller build, thinner, fit)

05 petite (very small build, very thin, little muscle tone)

19. overall looks masculine: 01-yes 02-no

20. overall looks feminine: 01-yes 02-no

21. voice: 01 deep for gender 02 average for gender 03 soft for gender

22. talks with a lisp: 01-yes 02-no

Personality trait stereotypes (adapted from Madon 1997; Chonody 2013)

23. Good listener: 01-yes 02-no

24. melodramatic *behaving, speaking, done, or said in a way that is more dramatic, shocking, or highly emotional than the situation demands (The Free Dictionary 2013)

01 yes 02 no

25. tough demeanor: 01 yes 02 no

26. gentle demeanor: 01-yes 02no

27. artistic: 01-yes 02-no

28. sensitive-01 insensitive-02

29. open minded-01 closed minded -02

30. open about feelings-01 not open about feelings-02

31. warm hearted: 01 cold-hearted-02

32. sentimental-01 unemotional-02

33. passive-01 aggressive-02

34. talkative-01 quiet-02

35. individualistic: 01-yes 02-no

*focused on the pursuit of personal happiness and independence more so than collective goals or interests (The Free Dictionary 2013).

36. macho: 01-yes 02-no

Sexual trait stereotypes (adapted from Madon 1997; Chonody 2013)

37. closeted-01 out of the closet-02
38. sexual relations:
    01-asexual; or no apparent sexual relations actual nor implied
    02-having opposite sex sexual relations
    03-having same sex sexual relations
    04-having both same sex and opposite sex sexual relations
    05-implied sexual relations with a same sex character
    06-implied sexual relations with a opposite sex character
    07- implied sexual relations with both same sex and opposite sex characters.
    * Implied sexual relations is defined as character is romantically involved and set up for a sexual situation but sex is not actually shown. Example: character is married, kisses and goes to bed with spouse. Screen fades to black.
39. partner relations:
    01-single partner 03-no partner
    02-multiple partners

For the below questions, use N/A for "not applicable," if the character is asexual.

40. character engages in anal sex: 01-yes 02-no 03-unknown 04-N/A
41. character associated with kinky sex: 01-yes 02-no 03-N/A
42. character associated with molestation: 01-yes 02-no
    * molestation is defined as to force unwanted sexual attentions on somebody, especially a child or physically weaker adult (The Free Dictionary 2013).
43. character has anonymous sex in public: 01-yes 02-no 03-N/A
44. character is promiscuous (has more than one sexual partner): 01-yes 02-no 03-N/A
45. character kisses another character of the same sex-01 opposite sex-02 no kissing-03
46. character pays for sex: 01-yes 02-no 03-N/A
47. character gets paid for sex: 01-yes 02-no 03-N/A
48. character is confused about his/her sexuality: 01-yes 02-no
49. character engages in unsafe sex practices: 01-yes 02-no 03-N/A

Social trait stereotypes (adapted from Madon 1997; Chonody 2013)

50. character has mostly female friends-01 mostly male friends-02 03 no friends
51. character has mostly straight friends-01 mostly gay friends-02 03 no friends
52. character is active in the gay community-01 not active-02
53. towards other characters:
    character is friendly-01 character is not friendly-02
54. towards other characters:
    character is helpful-01 character is not helpful-02 character hurts others-03
55. character enjoys being the center of attention 01-yes 02-no
56. character avoids attention 01-yes 02-no
57. character likes to crack jokes: 01-yes02-no
58. character is touchy-feely with others: 01-yes 02-no
    *touchy-feely is defined as being in another's personal space, touching another with hands during conversation. Physically demonstrative (The Free Dictionary 2013).
59. character is flirtatious: 01 with same sex 02 with opposite sex 03 with both 04neither
    *flirtatious is defined as behaving playfully and in a way that gives the impression of sexual interest (The Free Dictionary 2013).
60. character associates with criminals: 01-yes 02-no

Mental health stereotypes (adapted from Madon 1997; Chonody 2013)

61. rate the characters apparent overall happiness level:
    very happy-01 happy-02 somewhat unhappy-03 very unhappy-04
62. rate the characters apparent overall sadness level:
    very sad-01 sad-02 occasionally not sad-03 never sad-04
63. the character is depressed: 01-yes 02-no

64. the character is subject to crying jags:
    very often-01 often-02 not very often-03 never -04
65. the character is overly anxious/nervous
    very often-01 often-02 not very often-03 never -04
66. the character has apparent mental health issues: 01-yes 02-no
67. the character is suicidal: 01-yes 02-no
68. the character is mentally stable-01 mentally unstable-02
69. the character uses alcohol heavily: 01-yes 02-no
70. the character uses drugs heavily: 01-yes 02-no
* heavy use is defined as character is seen using, or is drunk or high in 3 or more scenes

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*Treatment by other characters (*adapted from Madon 1997; Chonody 2013; Smith 1999)
71. the majority of other characters treat this character:
    01-very positively 02-positively 03-negatively 04-very negatively
72. the majority of other characters react to the character's homosexual orientation:
    01-very positively 02-positively 03-negatively 04-very negatively
73. other characters behave violently toward the homosexual character: 01-yes 02-no
74. If yes for #73, number of violent incidents _______
    *one incident is defined as any violence in one continuous scene by one assailant.
75. character gets arrested during the narrative: 01-yes 02-no
76. If yes for #75, number of arrests_________
77. character is blackmailed for his/her sexual orientation: 01-yes 02-no
78. character loses their primary relationship due to sexual orientation: 01-yes 02-no
79. character is alienated from family due to sexual orientation: 01-yes 02-no
80. character loses a job due to sexual orientation: 01-yes 02-no

Film Code Form

Film Info

1. name of film:____

2. ID#___________

3. year of release___________

4. Genre: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18

5. awards? Y____ N

6. box office gross_________________

7. time period_________

8. Principal characters #: PSM_______ PBM_________ PHM______ unksexPM______

   PSF________PBF_________PHF_______ unksexPF______ O _________

9. Supporting characters#: SSM_______ SBM_________ SHM______ unksexSM______

   SSF________SBF_________SHF_______ unksexSF______ O _________

Character Code Form

Character Demographic Section: (pg 12 in codebook)

1. name of film____

2. ID# ______________

3. Character name or description____

4. Character ID#_____________

5. Type of role: 01 02 03

6. Gender: 01 02 03__________

7. Race: 00 01 02 03 04 05 06 07 08______________

8. Age: 00 01 02 03 04 05 06 07

9. Occupation: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25__________

10. SES: 01 02 03 99

11. Marital status beginning: 01 02 03 04 05 99

12. Marital status end: 01 02 03 04 05 99

13. Relationships: 01 02 03 04 05 06 07 08 09 10 11 12 13 14____________ 99

14. Education level: 01 02 03 04 05 99

15. Role Type: 01 02 03 04 05 06 07 08_______________________

16. Dies? 01 02

17. How they die: 01 02 03 04 05

Character Physical Trait (Pg 16 in Codebook)

1. dress 01 02 03
2. tight 01 02
3. business 01 02
4. athletic 01 02
5. flashy 01 02
6. casual 01 02
7. earrings 01 02
8. makeup 01 02
9. CDress 01 02
10. rings 01 02
11. fetish 01 02
12. bandana 01 02 03 04

13. attractiveness: 01 02 03 04 05

14. walks like a man 01 02

15. walks like a girl 01 02

16. limp wristed 01 02

17. grooming 01 02 03 04 05

18. size: 01 02 03 04 05

19. looks masculine: 01 02

20. looks feminine: 01 02

21. voice: 01 02 03

22. lisp: 01 02

Character Personality Trait (Pg 18 in codebook)

23. good listener 01 02

30. open feelings 01 02

24. melodramatic 01 02
25. tough 01 02
26. gentle 01 02
27. artistic 01 02
28. sensitive 01 02
29. open minded 01 02
31. warm hearted 01 02
32. sentimental 01 02
33. passive 01 02
34. talkative 01 02
35. individualistic 01 02
36. macho 01 02

Character Sex Trait (Pg 18 in codebook)

37. closeted? 01 02
38. sexual relations: 01 02 03 04 05 06 07
39. partner relations: 01 02 03
40. anal sex: 01 02 0304
41. kinky sex: 01 02 03
42. molestation: 01 02
43. sex in public: 01 02 03
44. promiscuous: 01 02 03
45. kiss?: 01 02 03
46. pays for sex: 01 02 03
47. gets paid for sex: 01 02 03
48. confused: 01 02
49. unsafe sex: 01 02 03

Character Social Trait (Pg 20 in codebook)

50. gender friends: 01 02 03
51. orientation friends: 01 02 03
52. active: 01 02
53. friendly: 01 02
54. helpful: 01 02 03
55. center of attention: 01 02
56. avoids attention: 01 02
57. crack jokes: 01 02
58. touchy-feely: 01 02
59. flirtatious: 01 02 03 04
60. associates with criminals: 01 02

Character Mental Health Trait (Pg 21 in Codebook)

61. happy: 01 02 03 04
62. sadness: 01 02 03 04
63. depressed: 01 02
64. crying jags: 01 02 03 04
65. anxious/nervous: 01 02 03 04
66. mental health issues: 01 02
67. suicidal: 01 02
68. stable: 01 02
69. alcohol: 01 02
70. drugs: 01 02

Treatment By Others (Pg 21 in Codebook)

71. treat: 01 02 03 04

72. react orientation: 01 02 03 04

73. violence: 01 02

74. # violent incidents_____________

75. arrested: 01 02

76. # arrests: ___________

77. blackmailed: 01 02

78. loses relationship: 01 02

79. alienated from family: 01 02

80. loses job: 01 02

additional notes:

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Table 1. Descriptive Statistics for Stereotype Groups Illustrating the Percentage of Variables with Character Adherence Frequency>75% Across Three Time Periods

	Number of Variables with Frequency >75% and Percentages by Time Period°								
	1968 and earlier			1969-1990			1991-2013		
Stereotype Group	Variables *f* >75%	Total Variables *N*	Percent	Variables *f* >75%	Total Variables *N*	Percent	Variables *f* >75%	Total Variables *N*	Percent
Personality	6	10	60%	1	10	10%	3	10	30%
Physical	1	15	6%	0	15	0	1	15	6%
Sexual	1	13	8%	1	13	8%	1	13	8%
Mental Health	1	9	11%	0	9	0	0	9	0
Social	2	10	20%	4	10	40%	5	10	50%

Note: ° N=*7 Characters analyzed for 1968 and earlier, N=14 Characters analyzed for 1969 -1990, N= 12 Characters analyzed for 1990-2013; sample consisted of N=33 Characters total*

Table 2. Frequency and Percentage of Characters Portrayed with Gay Stereotype Personality Traits by Time Period

	Frequency and Percentage of Characters by Time Period°							
	1968 and earlier (*N*=7)		1969-1990 (*N*=14)		1991-2013 (*N*=12)		Total (*N*=33)	
Stereotype Variable	N	Percent	N	Percent	N	Percent	N	Percent
Good Listener	7	100%	6	42.9%	10	83.3%	23	69.7%
Melodramatic	3	42.9%	5	35.7%	4	33.3%	12	36.4%
Gentle	6	85.7%	6	42.9%	6	50%	18	54.5%
Artistic	3	42.9%	9	64.3%	6	50%	18	54.5%
Passive	7	100%	8	57.1%	7	58.3%	22	66.7%
Talkative	2	28.6%	6	42.9%	8	66.7%	16	48.5%
Macho	0	0	4	28.6%	5	41.7%	9	27.3%
Sensitive	7	100%	7	50%	7	58.3%	21	63.6%
Open Minded	7	100%	13	92.9%	10	83.3%	30	90.9%
Open with feelings	7	100%	5	35.7%	9	75%	21	63.6%

Note: ° N=4 films analyzed for 1968 and earlier, N=3 films analyzed for 1969 -1990, N= 4 films analyzed *for 1990-2013; sample consisted of N=11 films total*

Table 3. Frequency and Percentage of Characters Portrayed with Gay Stereotype Physical Traits by Time Period

	Frequency and Percentage of Characters by Time Period°							
	1968 and earlier (*N*=7)		1969-1990 (*N*=14)		1991-2013 (*N*=12)		Total (*N*=33)	
Stereotype Variable	*N*	Percent	*N*	Percent	*N*	Percent	*N*	percent
Wears Only Female Attire	0	0	2	14.3%	1	8.3%	3	9.1%
Wears Both Genders Attire	2	28.6%	3	21.4%	4	33.3%	9	27.3%
Wears Tight Clothing	0	0	10	71.4%	9	75%	19	57.6%
Wears Fetish Clothing	0	0	6	42.9%	7	58.3%	13	39.4%
Wears Earrings	0	0	2	14.3%	5	41.7%	7	21.2%
Wears Make-up	1	14.3%	6	42.9%	5	41.7%	12	36.4%
Wears Rings on Fingers	4	57.1%	7	50%	6	50%	17	51.5%
Crossdresses	2	28.5%	4	28.6%	5	41.7%	11	33.3%
Wears a Bandana or Scarf:	3	42.9%	7	50%	7	58.35	17	51.5%
In Pocket	4	57.1%	2	28.6%	3	25%	5	15.2%
On Neck	3	42.9%	5	71.4%	4	33.3%	12	36.4%
Is Attractive or Very Attractive	4	57.1%	7	50.2%	7	58.3%	18	54.6%
Walks like a Girl	2	28.6%	5	35.7%	5	41.7%	12	36.4%
Is Limp Wristed	3	42.9%	7	50%	5	41.7%	15	45.5%
Impeccable Grooming	6	85.7%	5	35.7%	5	41.7%	16	48.5%
Voice is soft for gender	4	57.1%	2	14.3%	4	33.3%	10	30.3%
Talks with a lisp	1	14.3%	3	21.4%	2	16.7%	6	18.2%

Table 4. Frequency and Percentage of Characters Portrayed with Gay Stereotype Sexual Traits by Time Period

	Frequency and Percentage by Time Period°							
	1968 and earlier (*N*=7)		1969-1990 (*N*=14)		1991-2013 (*N*=12)		Total (*N*=33)	
Stereotype Variable	*N*	Percent	*N*	Percent	*N*	Percent	*N*	percent
Closeted *	6	85.7%	2	14.3%	3	25%	11	33.3%
Out of the Closet	1	14.3%	12	85.7%	9	75%	22	66.7%
Has Multiple Partners	1	14.3%	9	64.3%	2	16.7%	12	36.4%
Asexual	4	57.1%	3	21.4%	5	41.7%	12	36.4%
Participates in Anal Sex	0	0	1	7.1%	2	16.7%	3	9.1%
Participates in Kinky Sex	0	0	5	35.7%	3	25%	8	24.2%
Has Sex in Public	3	42.9%	5	35.7%	1	8.3%	9	27.3%
Is Promiscuous	1	14.3%	8	57.1%	3	25%	11	33.3%
Pays for Sex	0	0	0	0	0	0	0	0
Gets Paid for Sex	0	0	2	14.3%	0	0	2	6.1%
Confused About Sexuality	2	28.6%	1	7.1%	3	25%	6	18.2%
Engages in Unsafe Sex	0	0	5	35.7%	4	33.3%	9	27.3%
Associated with Molestation	0	0	1	7.1%	0	0	1	3%

Note: ° *N=4 films analyzed for 1968 and earlier, N=3 films analyzed for 1969 -1990, N= 4 films analyzed for 1990-2013; sample consisted of N=11 films total*
**p<.05*

Table 5. Frequency and Percentage of Characters Portrayed with Gay Stereotype Mental Health Traits by Time Period

	Frequency and Percentage by Time Period°							
	1968 and earlier (*N*=7)		1969-1990 (*N*=14)		1991-2013 (*N*=12)		Total (*N*=33)	
Stereotype Variable	*N*	Percent	*N*	Percent	*N*	Percent	*N*	percent
Unhappy or very unhappy	5	71.5%	6	42.9%	2	16.7%	13	39.4%
Often subject to crying jags	0	0	2	14.2%	1	8.3%	3	9.1%
Often anxious or nervous	6	85.7%	6	42.9%	5	36.7%	17	51.5%
Apparent mental health issues	2	28.6%	3	21.4%	1	8.3%	6	18.2%
Suicidal	2	28.6%	1	7.1%	1	8.3%	4	12.1%
Overall mentally unstable	3	42.9%	2	14.3%	3	25%	8	24.2%
Depressed	1	14.3%	1	7.1%6	2	16.7%	4	12.1%
Heavy alcohol use	1	14.3%	0	0	1	8.3%	2	6%
Heavy drug use	0	0	0	0	0	0	0	0

Note: ° *N=4 films analyzed for 1968 and earlier, N=3 films analyzed for 1969 -1990, N= 4 films analyzed for 1990-2013; sample consisted of N=11 films* total

Table 6. Frequency and Percentage of Characters Portrayed with Gay Stereotype Social Traits by Time Period

	Frequency and Percentage of Characters by Time Period°							
	1968 and earlier (*N*=7)		1969-1990 (*N*=14)		1991-2013 (*N*=12)		Total (*N*=33)	
Stereotype Variable	N	Percent	N	Percent	N	Percent	N	Percent
Mostly male friends	4	57.1%	11	78.6%	12	100%	27	81.8%
Is active in gay community	0	0	12	85.7%	9	75%	21	63.6%
Is friendly toward others	6	85.7%	13	92.9%	10	83.3%	29	87.9%
Is helpful toward others	6	85.6%	9	64.3%	10	83.3%	25	75.8%
Likes to be center of attention	1	14.3%	8	57.1%	5	41.7%	14	42.4%
Cracks jokes/is funny	1	14.3%	6	42.9%	6	50%	13	39.4%
Is touchy-feely	1	14.3%	2	14.3%	2	16.7%	5	15.2%
Is flirtatious with same sex	2	28.6%	8	57.1%	7	58.3%	17	51.5%
Associates with criminals	5	71.4%	7	50%	0	0	12	36.4%
Mostly gay friends	2	28.6%	11	78.6%	10	83.3%	23	69.7%

Note: ° N=4 films analyzed for 1968 and earlier, N=3 films analyzed for 1969 -1990, N= 4 films analyzed *for 1990-2013; sample consisted of N=11 films total*

Table 7. Films Selected for Analysis

Film Title	Distributor	Release Date	Rating at Release	Genre	Box Office Gross	Awards	Time period
The Soilers	Pathe Exchange	November 1923	Not rated	Silent Comedy Short	unknown	none	Current to release
First a Girl (UK)	Gaumont British Distributors	December 1933	Not rated	Comedy Musical	unknown	none	Current to release
Tea and Sympathy	MGM	November 1956	Not rated	Drama	$3,445,000	BAFTA Awards 1958	Current to release
Victim (UK)	Rank Film Distributors	August 1961	X-Adult	Suspense	unknown	Nominated BAFTA Awards 1962 ; Nominated Venice Film Festival 1962	Current to release
La Cage aux Follies (Fr/It)	United Artists	October 1978	R	Comedy	$20,424,259	Nominated Academy Awards 1980; Won Golden Globe 1980; and others	Current to release
Cruising	Lorimar/United Artists	February 1980	R	Crime Thriller	$19,798,718	Nominated Razzie Worst picture 1981	Current to Release
Victor Victoria	MGM	March 1982	PG	Comedy Musical Remake	$28,215,453	Academy Award won best original song score 1983; Golden Globe 1983; others	Approx 1930
The Birdcage	MGM	March 1996	R	Comedy Remake	$185,260,553	Nominated academy awards, and Golden globes 1987; Won screen actors Guild 1987; Won American Comedy Awards 1987	Current to Release
The Adventures of Priscilla, Queen of the Desert (AU)	Grammercy Pictures	August 1994	R	Comedy Drama	$29,679,915	Academy Awards won best costume 1995;Won BAFTA best costume 1995; Nominated Golden Globes 1995; others	Current to Release
Brokeback Mountain	Focus	December 2005	R	Western	$178,062,759	Academy Award Won for Directing, Screenplay and Original Score 2006	Approx 1960
Interior. Leather Bar	Strand Releasing	January 2013	Not-rated	Documentary Remake	$11,142	None	Approx 1960

Note: ° *N=4 films analyzed for 1968 and earlier, N=3 films analyzed for 1969 -1990, N= 4 films analyzed for 1990-2013; sample consisted of N=11 films total*

Smartphone Technology:
Youth Dependency, Excessive Use, and Lack of Self-Control

By Jenna Lindinger
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Abstract

Given the considerable growth of smartphone technology, various studies have researched the implications of such devices' use among adolescents. This paper evaluates the assortment of such research in light of Hirschi and Gottfredson's General Theory of Crime. The literature aims to determine whether the increase of smartphone use among youth has a negative impact on their discretion and self-control. It is hypothesized that youth lack self-control as they are unable to resist the temptation of using their phone due to instant gratification. This paper concludes with methodology and analysis of a study to test cell phone use among college students in relation to self-control and dependency.

*Mobile phone, Cell phone, Smartphone, Self-Control, Dependency, Attachment, Social Bond Theory

Over the last decade, the development of smartphone technology has significantly impacted the daily lives of Americans. From landline phones to mobile devices that provide endless tools for communication, internet service, entertainment, and endless applications with an infinite variety of purpose; the development of this technology continues to progress on a daily basis. Balakrishnan and Loo (2012) state, "It is not surprising that the number of mobile phones have outnumbered landline telephones in many countries...Short Messaging Service (SMS) is known to be the most popular application for mobile phones. Mobile phones and SMS are hugely popular amongst its users, especially the younger generation" (p. 364). Although most adults utilize smartphones, the younger generation has grown into this new age of technology, making the use of these devices a new common norm. The fact that the younger generation has more experience with smartphones than the older generations implies that youth tend to rely on these devices a lot more than adults. According to Bianchi and Phillips (2005), "Past research has shown that older people are less likely than younger people to embrace new technology…based on such evidence, we would not expect older mobile phone users to spend as much time on their mobile phones as younger users, or to experience as many mobile phone–related problems" (p. 40). Consequently, the perpetual advancement of smartphone technology has caused much concern regarding the influence of smartphone technology among youth; a potential problem being the distractions during everyday activity.

Notwithstanding the many advantages provided by smartphone technology, past research has exposed numerous issues related to distractions caused by mobile phone use. Many of these problems have been studied and reported in several countries around the world. Balakrishnan and Loo (2012) illustrate the most problematic concerns, as "classrooms are being disrupted and mobile phone use when driving increases accident risk. Moreover, addiction or over dependency has also been reported, causing emotional stress, damaged relationships and falling literacy" (p. 364). This means that students are focusing on their mobile phones during class instead of paying attention to the teacher; that drivers are taking their eyes away from the road so they can see their phone; and that dependency or even addiction plays a significant role that essentially leads to these distractions and the possibility of detrimental outcomes. Especially when taking the advancement of smartphone technology into account, it is probable that the risk of distractions caused by smartphones could induce deviant behavior. For example, Seo and Torabi show that "people who were engaged in TWD missed twice as many simulated traffic signals as they would when they were not talking on their cell phones" (p. 101). With rising concerns related to cell phone use while operating a vehicle, certain laws have been enforced against it. However, despite legislation, there continues to be reported apprehension regarding whether individuals will actually abide or deviate from them. Criminological theory provides a respectable background and foundation for deviant behavior, that can be utilized to convey the severity of this issue.

Criminologists Travis Hirschi and Michael Gottfredson introduced a criminological theory called the General Theory of Crime in order to explain all acts of deviant and criminal behavior. Rejecting the traditional theories that attempt to explain the causes of crime, Hirschi and Gottfredson proposed a self-control theory that focuses on the factors that constrain crime instead. "The general theory of crime claims that self-control, which is primarily formed by the relationship children have with their parents and/or guardians, is the motivating factor for all crime" (Bachman and Schutt 2011:12). Hirschi and Gottfredson determined five characteristics for low self-control individuals: they "seek immediate gratification, look for simple ways to gratify their desires, have a need for acts that are exciting, risky, or thrilling, have low stability in their lives, [and are] self-centered, indifferent, or insensitive to the suffering and needs of others" (Reid 2006:186). Hirschi and Gottfredson argue that low self-control is not what causes crime, but it is the personality trait that differentiates which individuals will engage in criminal behavior when given the opportunity. Marcus and Schuler (2004) reiterate the term self-control as "the tendency to avoid acts whose long-term costs exceed momentary advantages" (p. 648). Along with the personality trait of self-control, Hirschi and Gottfredson hold that there is also a situational factor, opportunity, which is also necessary for deviance to occur. When opportunity, (defined as lack of situational control) is present, an individual with low-self control will have much difficulty resisting the temptation.

Understanding that the very essence of an individual stems from the behaviors and attitudes learned during childhood, Hirschi focused much of his attention on adolescents while emphasizing the importance of socialization. According to Hirschi, behavior that exists during childhood will continue throughout their lifetime. Thus, the absence of positive socialization during childhood could mean that deviant behavior is learned at a young age, and therefore the child will remain delinquent into their adulthood. Deriving from Enlightenment theorists and the classical school of thought, Hirschi developed social bond theory prior to his alliance with Gottfredson. In this view, a delinquent's behavior is related to their bond with society. Attachment is an extremely significant factor among the development of this bond and relates to one's conscience, superego, and internalization of norms. The more attached an individual is to their parents, peers, school, community, and social institutions, the more likely they are to acquire high self-control and therefore refrain from deviant behavior. A strong and positive bond with society creates stability in one's life. A stable lifestyle allows an individual to value themselves, their relationships, and their community. Without these attachments, one may lack the ability to empathize. Subsequently, it then becomes easier to succumb to the temptation of deviant opportunities with a by-product of immediate gratification.

With this in mind, the impact of smartphone technology among youth can be considered in a new context. If smartphone use is now accepted as a social norm among youth, it could be suspected that youth use their device as a function of their social bonds. Nowadays, younger generations tend to believe that communication through a smartphone is more preferred. "As current youth are the first generation to have grown up with mobile technology, they have incorporated the device into their lives" (Walsh, White, and Young 2009:225). It has been suggested that youth tend to primarily socialize through technology, as they depend on their smartphones to maintain their relationships. If social norms would dictate that younger individuals are expected to use their smartphones, it can be assumed that these individuals may be unable to be without their devices at all times. This might be a strong encourager for use reducing self-control when using their smartphones under circumstances that constitute such behavior to be deviant. Perhaps the punishment for smartphone use during such times is either nonexistent or ineffective, or the instant gratification supercedes the outcome. Kendall warned: “genuine conversation will be driven out by superficial communication, in which the act of contacting one another is all that matters, leading to a deterioration in the quality of relationships. Indeed, the very fabric of society may be threatened” (p. 2001:1).

In furtherance of social bond theory, it can be inferred that youth are at high risk of becoming deviant if their smartphones are distracting them from maintaining genuine social ties. It is possible that relationships between youth and their family members, peers, and social institutions are devalued due to their excessive use of smartphones. That is not to say that the act of using smartphones is in fact deviant behavior; but when there is excessive use of these devices with the potential to distract the user from reality, problems can arise that should not go unnoticed. Such problems include traffic accidents, issues with establishing and maintaining relationships, and distractions in the classroom, especially when involving the younger generation. With respect to the general theory of crime, the issues related to smartphone use offer the basis of a research question: Do youth lack self-control and seek immediate gratification when using their device under inappropriate circumstances, despite the consequences? To investigate the perplexity of this question, empirical studies must be reviewed and necessity for further research can be evaluated.

Due to the rising concerns regarding increased smartphone use, researchers from around the world have manifested their standpoint on youth and their exorbitant use of smartphones. Prior to discussing the primary purpose of this literature, it is important to first note one of the most dangerous consequences that occur as a result of smartphone distraction: traffic accidents. According to Seo and Torabi (2004), “[a]s the number of people who use cell phones has increased dramatically in recent years, great social concern is related to the association between talking while driving and traffic accidents” (p. 101). This claim rests upon the questionable assumption that a strong correlation exists between drivers’ frequent cell phone conversations and traffic accidents. The results of their study supported their hypothesis, showing that out of n= 1,291 students, n= 889 of the participants used their phones while driving and 21% of those students had experienced accidents and/or near-accidents that involved using a cell phone. Common sense appears to dictate that using smartphones while performing a task that one should not be distracted from is not worth the consequences. In defiance of this implication, adolescents continue to believe that the desire outweighs the risks: “Although 68% of the students driving vehicles indicated that TWD [talking while driving] interferes with driving, and 74% said it increases the risk of an accident, only 6% approved of banning drivers’ use of cell phones” (Seo and Torabi 2004:106). This research suggests that adolescents and young adults continue to use their phone while driving, regardless of its consequences.

The significance of having self-control of mobile use while driving is made apparent when Wilson and Stimpson (2010) examine their hypothesis that "increasing cell phone use and texting volume may explain recent trends in distracted driving fatalities" (p. 2213). In order to conclude whether or not a relation between distracted driving fatalities and mobile phone use exists is achieved by examining the trends from a national vehicle fatality database. The results indicate that fatalities related to distracted driving increased from 10.9% to 15.8% in 1999 to 2008. The largest number of increases in text messaging volume occurred after 2006, increasing 136% from 2006 to 2007. Multivariate regression was used to estimate the number of distracted driving fatalities that would have occurred in the US from 2002 to 2007, with estimates suggesting that "distracted driving fatalities would increase 75.6% in an average state for every 1 million additional text messages sent per month" (Wilson and Stimpson 2010:2217). The substantial research examining the detrimental consequences of smartphone distractions while driving should now bring attention to the impact of smartphone use. Digressing back to the concerns of youth using such devices, research has argued over the social impact of smartphones on youth.

With respect to youth's self-control, research has begun to make the connection between cell phone use and deviant behavior. With one study suggesting that "[smartphone] use increases over time as the benefits become more valued by the user" (Walsh et al. 2009:226), Billieux (2007) aimed to determine correlations between impulsivity and mobile phone dependence. Their research included four different factors associated with impulsive behaviors that consisted of the following: urgency (the tendency to experience strong impulses, frequently under conditions of negative affect), premeditation (the tendency to think and reflect on the consequences of an act before engaging in the act), perseverance (the ability to remain focused on a task that may be boring or difficult), and sensation seeking (a tendency to enjoy and pursue activities that are exciting, and openness for new experiences). Using the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001), with n= 108 female undergraduate psychology students, results in the study found a positive correlation between urgency and perceived dependence on a mobile phone as well as lack of perseverance with the duration of calls that were made daily. These results seem to support the argument that mobile phone dependence and the need for immediate gratification is related to deviant behavior by providing evidence for self-control theory in relevance to dependency of mobile phones. Furthermore, it might also be implied that the devices will have a great social impact on the younger generations due to the increased use of smartphones and dependency.

Other literature examines the controversial issue of whether smartphone use has a positive or negative social impact on younger generations. On the one hand, Park and Lee (2012) argue that smartphone use "contributes to strengthening social ties and improving college students' psychological well-being" (p. 495). On the other hand, Chung (2011) claims that the use of smartphones by adolescents appears to be addictive as well as excessive; in "their desire to maintaining interpersonal solidarity, that is, a feeling of closeness with others through shared sentiments, similarities, and intimate behaviors" (p. 1350). Focusing on the needs of college students that are satisfied by smartphones, Park and Lee hypothesized that social interaction through smartphone use will have an overall positive impact on college students' psychological well-being. Their study consisted of an online survey including n= 279 participants aged 18-28 years from several universities in Korea, all of whom used smartphones on a daily basis. Despite results finding smartphone use being positively correlated to social ties, data also showed that "the motives of smartphone use are positively related to bonding relations but negatively related to bridging relations" (Park and Lee 2012:494). This finding reflects the idea that smartphones may produce negative consequences in respect to creating relationships. Park and Lee (2012) also admitted that "although individuals fulfill their different needs by using smartphones, specific gratification obtained from the technology might bring different social outcomes" (p. 492).

Looking to prevent excessive use of mobile phones, Chung conducted a quasi-experimental study gathering a randomly selected sample of *n*= 188 girls from a high school aged 16-19 years in South Korea. Five factors were analyzed to determine addictive use of mobile phones; withdrawal, maladjustment, tolerance, obsession and ostentation. These were then placed into three separate groups (No problem group, Some problem group, and Probable pathology group) according to their mobile phone usage, using cluster analysis taken from the Problematic Mobile Phone Use Questionnaire. The results show "that the addictive use of mobile phones is related to maintaining interpersonal solidarity for adolescent girls" (Chung 2011:1357). In other words, according to this study, mobile phone use becomes obsessive when a girl has the desire to maintain and grow their relationship with others.

Additional research established data with factors of problem behavior corresponding with mobile phone use. When looking at these issues, the authors were concerned with certain factors that are possibly responsible for what they term, 'mobile phone problem behavior'. Bianchi and Phillips (2005) argue:

> "Problems may arise from lack of societal controls and/or from a lack of self-control on the behalf of the user...it is in light of the fact that people continue to use their mobile phones despite bans on use and knowledge of potential hazards, that researchers and psychologists need to be concerned about the behavioral and psychological mechanisms that play a role in defining problem mobile phone behavior" (P. 40).

Hirschi's theory applies to the observations made on individuals having a constant need to use their mobile device as they lack self-control as well as social controls. The research utilized a random sample of *n*= 195 individuals recruited from various universities and the general public aged 18-85 years. The methods of research involve a quasi-experimental design. The dependent variable problem behavior associated with mobile phones was compared with several independent variables, including the following factors: self-esteem, age, gender, neuroticism, and extraversion. Bianchi and Phillips expected that younger individuals would use their mobile phone more than older individuals and three factors of self-esteem, extraversion, and neuroticism would have a strong influence on problem mobile phone use. With self-esteem being an individual's self-worth, it is predicted that problem mobile phone use will be demonstrated more by individuals with low self-esteem. Extraverts are risk seeking individuals who are more susceptible to addictive behaviors. Neuroticism is used to represent anxious and worried individuals who tend to be highly emotional. Seeing commonalities between excessive phone use and addiction, Bianchi and Phillips hold concerns pertaining to a link between addiction and these three factors.

Taking into account the issue of mobile phone usage in relation to psychological factors, Bianchi and Phillips aimed to identify key determinants of why people continue to use mobile phones in defiance of legislation and problem behaviors. Using a multiple regression analysis of the three factors, as well as gender and age, the results found significance [$F(5,189) = 11.285$, $p < 0.001$], accounting for 21.5% of the variance in this variable. Results also present higher mobile phone use in young people [$\beta = -0.38$; $t(189) = -5.45$, $p < 0.001$], and extraverted people [$\beta = -0.23$; $t(189) = -3.20$, $p < 0.002$]. As predicted, extroverts show high use of mobile phones, likely as a result of their tendency to seek social contact. Bianchi and Phillips conclude by stating, “although neuroticism could not predict higher phone usage or problem use, extraversion and low self-esteem appear to be important factors” (Bianchi and Phillips 2005:49). The results not only support the hypothesis, but also encourage a demand for further research to focus on the mobile technology itself (seeing it as a hazard) and the implementation of precautions. The authors insist that regardless of whether or not excessive phone usage can be termed addictive or not, the behavior is still deemed to be problematic and is a good starting point when looking at mobile phone problem behavior. Overall, it was concluded that mobile phones propose a threat, especially for introverted individuals with low self-esteem. In this sense, it is suggested that mobile phones are distorting the quality of relationships when they are an agent of spurious communication for people with low self-esteem. Bianchi and Phillips' study determines that further research must be conducted in order to expand the data on this problem behavior as well as to implement certain features within the device to prevent this behavior.

Ishii (2006) studied mobile phone use amongst Japanese youth. Ishii hypothesized that mobile phones would be associated more with non-familial relations in comparison to landline phones. Seeing that "evidence from many studies worldwide reveals that a common reason for using mobile phones among young people is to obtain freedom from the family grip", Ishii believes that “young people use mobile phones to maintain their social networks outside of parental supervision" (p. 348). Ishii developed a longitudinal design based on a two-wave panel survey in Japan. Using a two-stage random sampling method, *n*= 1,878 participants aged 12-69 years were selected to complete the survey in 2001. In 2003, *n*= 1,245 participants with an average age of 42.6 years were selected to complete the survey. Results found a significantly negative association between the participants' social skills and their preference to use mobile phones. It seems that Japanese youth use mobile communication to maintain their social ties, but not to create new ones. “Such evidence suggests an association between the unique use of text messaging and the lowering of social skills among Japanese mobile media users” (Ishii 2006:349). Indeed, it is highly likely that mobile phones are infringing upon the reinforcement of social skills; especially among youth who use them more frequently. These conclusions presented by Ishii complement the argument that mobile phones have a negative impact on youth's ability to socialize. In Ishii's (2006) view, "An extreme form of conflict-avoiding behavior has become a serious social problem in Japan. Nowadays Japanese youth increasingly seek to avoid conflict and friendships with deep involvement.” (p. 349). These findings have important consequences for the broader domain of issues related to smartphone use.

Balakrishnan and Loo illustrate new research in accordance to how smartphone use may interfere with socializing, privacy, and relationships among the younger generation. Distributing a questionnaire, there was a total of *n*= 417 respondents (*M*=20.5 years of age, *SD*=1.31). Balakrishnan and Loo (2012) emphasize that “students are an ideal target to examine youth’s perception as they fall within the age group of 17-30, the largest segment of mobile and SMS users. In addition, the access to mobile phones and the likelihood of SMS usage among the students are high” (p. 266). The questionnaire included mobile phone usage, motivations to use mobile phone and behavior including addiction, whether or not respondents turn off their mobile phone, and how often they check for missed calls or messages. The data show compelling results in relation to factors of addiction and dependency. Balakrishnan and Loo (2012) found that the a majority of respondents were “over-dependent on their phones” as they were “found to identify with behavioral issues such as regularly checking their phones for missed calls/messages throughout the day", additionally, they also "feel distressed when they do not have their phones with them further indicating their attachment to their phones" (p. 367). A major concern in this regard pertains to just how dependent the younger generation is on their mobile phones, especially with the advancement of smartphones. Even with its unlimited uses and features, conventional wisdom argues that smartphones will only be able to provide a certain level of attachment to social ties. However, if youth depend on their smartphones so much that they are attached to them, it can be implied that they lose a sense of the attachment referred to in Hirschi's bonding theory. Since previous studies insisted the need for further research on problem mobile phone use with emphasis on addiction and attachment, Balakrishnan and Loo (2012) produced data to support this implication:

"The symptom for the addiction can...be noted when the majority of the respondents admitted to never switching off their mobile phones...similar to findings in India, where 58% of his respondents could not manage their lives without their mobile phones even for a day and 72% leave their phones on. Respondents in America, UK and New Zealand were also reported to being attached to their mobile phones" (P. 367).

Another argument presented in this study is that mobile phones can be responsible for academic interference. The results from the questionnaire showed that the respondents were not bothered when others use their mobile phone during class. "This definitely has a negative impact on the learning abilities of the students, as they are not able to concentrate fully on their lecture" (Balakrishnan and Loo 2012:367). In this view, not only are smartphones believed to be interfering with social ties, but also with an adolescent or young adult's academic status. Considering that our future is in the hands of our younger generation, this specific issue may be of utmost importance. Despite this problem being universal, Americans today tend to be primarily focused on youth and their education; most likely because education seems to provide an effective foundation for innovation and ingenuity. Therefore, future research could be studied to find whether or not there is a significant correlation between smartphone use and academic standing.

A recent study has finally focused its attention on this matter. Given that "students and faculty view the ringing of cell phones in class to be a serious problem" (Tindell and Bohlander 2012:2), cell phone use in the classroom raises several questions. Tindell and Bohlander surveyed *n*= 269 college students from a northeastern university to determine the frequency of, attitudes towards, and reasons for cell phone use in the classroom. Firstly, Tindell and Bohlander (2012) found that "over half of the students in the survey reported that they interact with their cell phone during class time in every class they attend...and this activity caused a distraction for about 85% of the students" (p. 2). Clearly, students are using their cell phones excessively in class despite the fact that it can be disruptive. It is proposed that many colleges and universities may be experiencing the same behavior when excessive cell phone use among this age group has been reported around the globe. Data also concluded that "test performance was significantly lower for the students who received two or three text messages, indicating that the ability to focus on and learn the material was negatively impacted by the texting" (Tindell and Bohlander 2012:2). Academic achievement is extremely significant for an individual's successful future, which also involves the future of our society. "Although students may admit to some of the negative impact of cell phones, they are reluctant to support a policy that completely forbids their use" (Tindell and Bohlander 2012:4-5). Perhaps students are too dependent on their phones that they do not care about the issues pertained to using them in class. Most students reported that they are aware of these issues but continue to use their phones, even behind the instructor's back. "Almost half of the respondents indicated that it is easy to text in class without the instructor being aware." One student even stated that "if college instructors only knew about text messaging in the classroom, they would be shocked" (Tindell and Bohlander 2012:4). It seems as though the immediate gratification provided by mobile phones causes students to be deviant in the classroom.

Additionally, students are using their cell phones to cheat on tests, as results also showed that "35% of students...indicated that they had cheated using a cell phone" (Tindell and Bohlander 2012:5). Though 35% is a substantial amount, it is possible that some of the students did not want to disclose that information if they felt they would get in trouble. The fact that phones are being used to cheat is yet another example of deviant behavior of mobile phones in the classroom. "Clearly the use of cell phones in the college classroom is an issue that academic institutions cannot ignore, and it demands action by faculty to ensure an effective learning environment for all students" (Tindell and Bohlander 2012:7). With findings that were not even anticipated, the results of this study perpetuate tremendous concerns with academic performance and dishonesty. If students are using their cell phones to cheat, it conveys the impression that students may be disregarding opportunities to retain important academic content. Especially when considering the expeditious advancement of smartphone technology, the potential for such devices to cause distractions in the classroom seems reputable, and that is just the induction of possible complications. Hence, with evidence inferring increased mobile phone use in academic institutions, it can also be implied that such institutions will face substantial challenges in order to prevent the progression of this issue. It will most likely be difficult to monitor and control cell phone use, given that it is typically a small device and therefore can easily be hidden. Seeing these legitimate concerns, perhaps consequences should be administered to students who misuse their cell phone in the classroom. It may even be appropriate to begin initiating strict policies forbidding the misuse of cell phones and similar technology.

Although attention has been given to texting and driving, recent studies like these shed new light on mobile phone problem behavior in an academic environment, which previous studies had not addressed. The rapid advancement of smartphone technology will most likely cause even more dependency and excessive use. It is argued that these devices are causing distractions in classrooms and while driving. They are also argued to interfere with relationships between its users and their social ties. Youth are obtaining cell phones at a young age, making these behaviors the new common norm in society. While it is not yet admitted as so, smartphones potentially pose a threat to society. Forasmuch as the factors of this technology contribute its benefits, these same factors could bring corruption to society. “From a social point of view, it is interesting to note that the status of the mobile phone may change from an instrument that supports social exchanges to an object that clearly interferes with them” (Billieux et al 2007:528). Provided that smartphone use most likely causes dependency due to immediate gratification, it seems appropriate to examine smartphone use in the classroom from this perspective.

With this in mind, after assessment of empirical work, it is important to note the legitimacy of the concerns presented by the authors above. It is clear that further empirical research is needed to test the effects of smartphone use, self-control, and attachment among college students. This study will examine these issues. It is expected that there will be a correlation between students who demonstrate low self-control and students who are less attached to social ties. More importantly, it is hypothesized that college students will resist the temptation to use their phones in the classroom after being told not to do so, and therefore demonstrate low self-control as they seek immediate gratification.

METHODOLOGY

Participants

The participants for the study include *n*= 53 Cabrini College students. The sample of consists primarily of Caucasian, female students, aged 18-24 years in the Criminology and Sociology department (see Table 1). The sample was chosen based on the availability of class periods as well as which professors were willing to cooperate in the experimental procedure and therefore, the sample was not randomly selected.

TABLE 1 *DEMOGRAPHICS*

	Value Label	*n*
Gender	Male	15
	Female	38
Age	18 or under	8
	19-20	23
	21-22	19
	23 or older	3
Class Level	Freshman	13
	Sophomore	10
	Junior	17
	Senior	13
Ethnicity	Caucasian	39
	African American	10
	Hispanic	3
	Asian	1

Materials

On behalf of the current study's objective, a questionnaire was distributed among the participants. For basic demographics of age, ethnicity, major, and class level, a corresponding poll is incorporated in the beginning of the questionnaire. To measure self-control and attachment, an impulsivity scale was used. This included questions such as: (a) "I sometimes find it exciting to do things for which I might get in trouble", (b) "I want to do well in school", and (c) "I abide by the law". The survey uses a 5-point Likert Scale, containing 32 items. 16 of the items measuring self-control were taken from the Grasmick et al. Self-Control Scale. Delisi, Hochstetler, and Murphy (2003) contest that "It is now the norm to use the Grasmick et al. scale or some variation of it to test self-control theory empirically. Self-control, operationalized by the Grasmick et al. scale, has consistently been linked to various types of deviance, including 17 forms of academic dishonesty" (p. 245). The items provided by this scale provide measurement validity when testing and measuring self-control. There were 4 questions from each of the following variables; risk seeking, impulsivity, and simple tasks. These variables were are used in the Grasmick et al. Self-Control Scale as it has been determined that people with low self-control tend to "(1) have a here-and-now orientation, so that they seek immediate, not delayed gratification; (2) prefer easy and simple endeavors and tend to dislike activities that require diligence, tenacity, and persistence; (3) engage in risky and exciting, rather than cautious and cognitive, behaviors; (4) fail to see the long-term benefits of investing in social institutions" (Delisi, Hochstetler, and Murphy 2003:242). The remaining 16 questions are appropriately fabricated based off of Hirschi's social bond theory and levels of attachment. For additional details, the full questionnaire is available in appendix C.

Procedure

The study is modeled after Mischel's Marshmallow Experiment (1960) to test mobile phone use, self-control, and attachment among college students. With full cooperation of each professor involved, a total of five different classrooms of students were surveyed and then observed. When the experimenter entered the classroom, the professor instructed the class to leave their cell phones on the table in front of them, and to not use them for the remainder of the class period. The students were first debriefed on the research, but only regarding self-control and attachment, excluding how it relates to cell-phone use. By that time professor had then asked to leave the classroom for a short period of time. The experimenter continued to distribute a questionnaire on demographics, self-control and attachment, collecting them when finished. Outside of the classroom, the professor either text-messaged or emailed the students a short message, giving the experimenter an opportunity to observe the classroom and see if anyone resisted the temptation to look at their phones. Having made a seating chart with the names of students at each seat, the experimenter check marked the seat of the person who picked up their phone, and left it blank if they did not. When the professor returned by the end of the time frame, the experimenter revealed the premise of the experiment with the students, debriefing them on the observation. After the experimenter reviewed the meaning behind the observation in regard to phone use, self-control, and attachment, the experimenter offered them candy in appreciation of the students' participation in the experiment.

To test each hypothesis, the variables measured included the independent variable of cell phone use, on two levels, "yes" (picked up) and "no" (not picked up), and the dependent variables of risk-seeking, impulsivity, simple tasks, and attachment to measure self-control via the Grasmick et al. Self-Control Scale. Various tests were run through SPSS to determine any significant correlations between the variables. The survey will be used in order to measure the dependent variables of self-control and attachment among the participants. The observation will be used in order to measure the independent variables of cell phone use. Using the results from the survey, the independent and dependent variables will be compared to determine any significance between phone use, self-control, and attachment.

RESULTS

For the first hypothesis, correlation between participants who used their cell phones and their lack of self-control or attachment to social bonds was analyzed using data from the results of the survey and observation. Also during data analysis, four one-way between-groups ANOVAs were conducted to compare the dependent variables of self-control measures when linked to the independent variable of phone use. The results found no significance among the systematic variance of risk-seeking $F(1,51) = .582$, $p = .44$, impulsivity $F(1,51) = .026$, $p = .87$, simple tasks $F(1,51) = .101$, $p = .75$, and attachment $F(1,51) = .683$, $p = .41$ between phone use and non-phone use. Therefore, these results are not sufficient in proving that students who demonstrate low self-control are less attached to social ties.

TABLE 2 *CROSS-TABS FOR PHONE USE PERCENTAGE AMONG CLASS LEVEL*

Class Level	N	Phone Use	Non-Phone Use
Freshman	13	15.4%	84.6%
Sophomore	10	70.0%	30.0%
Junior	17	52.9%	47.1%
Senior	13	61.5%	38.5%
Total	53	49.1%	50.9%

For analysis of the second hypothesis, using data from the observation results, cross-tabulation was used to determine the prevalence of phone use and non-phone use (see Table 2). On the grounds of rising concerns for the impact of excessive phone use in relation to youth, cell phone use was compared between class levels and age. Among the 49.1% of participants that picked up their phone, *n*= 2 freshman made up 15.4%, *n*= 7 sophomores made up 70.0%, *n*= 9 juniors made up 52.9%, and *n*= 8 seniors made up 61.5%. Hence, the normality of cell phone use in the classroom seems to be extremely common for seniors and most especially so for sophomores.

TABLE 3 CHI SQUARE OF PHONE USE PERCENTAGE WITHIN CLASS LEVEL

Phone Use	Class Level				
# of No Use	11	3	8	5	27
% of No Use	84.6%	30.0%	47.1%	38.5%	50.9%
# of No Use	2	7	9	8	26
% of No Use	15.4%	70.0%	52.9%	61.5%	49.1%

Primarily, it is meaningful to note that overall, results of the experiment conclude that *n*= 26 out of *n*= 53 (49.1%) participants had reached for their phones when they had received the message. Prior to observation of the final classroom for the sample, *n*= 34 of the participants from preceding classrooms of experimentation were at a rate of 67.6% to pick up their cell phones. However, the final sample was taken from a classroom full of *n*= 19 freshman, and it just so happened that only *n*= 2 of the students had picked up their phones, which impacted the results heavily. This phenomena made it apparent that there was most likely a difference in class level or age among students who had picked up their phone.

In further development of exploratory research, A follow-up chi square test was conducted to specifically compare phone use between the *n*= 13 freshman and *n*= 10 sophomores, and found a significant difference (x^2= 7.07 (1), *p*= .00). Seeing that there are an equal amount of *n*= 13 freshman (*M*= .15, *SD*= .37) and seniors (*M*= .61, *SD*= .50), their difference in phone use seems to be substantial. For measurement of comparison between participants aged 18 or under through 23 or older, an accompanying chi square test displayed significant results as well (x^2= 7.21 (1), *p*= .007). Within the group of participants who did not use their phone, seniors made up 0.0% and freshman made up 87.5% - and within the group of participants who did use their phone, seniors made up 100.0% and freshman made up 12.5%. Thus, it is distinctly evident that age could be a considerable factor in the use of phones among college students.

DISCUSSION

In accordance to social bond theory, the significant difference of cell phone use between freshman and sophomores suggests a possible change in attachment levels in the transition from the first year to the second year of college. It may even be appropriate to imply that many new college students gradually increase their attachment and social ties through social networking on their phones during the process of detaching from their parents. This implication is seen in Table 6. as the percentage of phone use increases as the participants' age increases.

Although the ANOVAs could not determine any correlation between self-control and attachment variables to phone use, the experiment proved effective in measuring the occurrence of cell phone use in the classroom. Given the fact that nearly half of the students picked up their cell phones, it is suggested that the same distractions are taking place in other academic institutions. Consequently, it may even be proposed that college students are being distracted by their cell phones in other situations, such as while operating a vehicle.

The current study presents many limitations. First, a distinguishable issue should be addressed in reference to the questionnaire used in the experiment. In its complexity, the Grasmick et al. Self-Control Scale eventuated in variables that were difficult to measure during data analysis. In hindsight, the questionnaire seemed to be an impractical tool for representation of the hypothesis as it did not seem to exhibit evidence to support the hypothesis. Incidentally, it is notable to discuss how differences in communicating to the students' device during the observation impacted the results. For the sake of this indication, emphasis should be placed on the fact that professors had used different forms of delivering a message to the students during the observation. One professor had used email, and another had used text-messaging, which could have altered the results due to one being more commonly used than the other, and/or students not having access to either on their phone. Also, complications transpired during observation as the experimenter had difficulty keeping track of the students, granted that larger classrooms made it harder to see who had picked up there phone.

In terms of causal validity, it is important to note possible issues with the following: selection bias, external events, and contamination. Since there were five different classrooms studied each at different periods of time, selection bias could present a problem if characteristics of subjects differ from subjects of other groups. The most concerning threat is contamination, when one group in the experiment is aware of the other group. In this case, it is a problem because if the college students tend to gossip, and word gets out about this experiment, it is possible that the other groups were affected, therefore disturbing the reliability of the results. Generalizability was difficult: only n= 53 students sampled caused a small effect size and observed power of less than .8, validating the necessity for a larger sample. Additionally, there are no known relative studies for this research to compare it to, making it difficult to tell if this sample can be generalized to the population of all college students.

Perhaps it would have been more effective to consider alternative questions; especially items that related more to mobile phone use and dependency. Advanced research on attachment may even apply scrutiny of college students who either live on or off campus by adding residence as a moderating factor. Such research could be applied to attachment anomaly in examining disparity among phone use and residence among college students. Conclusively, further research should be conducted, given the need for contribution toward a greater understanding in smartphone technology and its impact on youth in relation to self-control, attachment, dependency, excessive use, and deviant behavior.

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CONSENT FORM FOR SELF-CONTROL AND ATTACHMENT

Purpose: You are one in approximately 100 students being asked to participate in a research project conducted by members of the Criminology and Sociology Department at Cabrini College. The overall purpose of this research is to help us understand college student's self-control and attachment to social ties.

Procedures: If you agree to take part in this study, you will be asked to complete a survey, which will last approximately 15-20 minutes. You will be asked for your general demographic information, impulsivity, simple tasks, risk seeking, attachment, commitment, involvement, and belief. I will use this information, as well as information of which is publicly available. I will not ask you specific dates or specific places of any of your activities. The information obtained from the questionnaire will be stored in a secure, password protected file.

Risks: There are some risks to participating in this study. You may experience distress or discomfort when asked these questions or when discovered that you have been observed. Should this occur, you may choose not to answer any of those questions and if you wish, and/or you may be exempt from the study entirely.

Benefits: You will have the opportunity to participate in an important research project.

Confidentiality: Your records will be kept confidential. They will be secured and they will not be shared with anyone without your permission. Your name will not appear on any research report.

RIGHT TO QUIT THE STUDY: Participation in this research project is voluntary and you have the right to leave the study at any time.

CONSENT TO BE SURVEYED: I have read and understand this form and I agree to participate in the survey portion of this research project.

____

PARTICIPANT SIGNATURE

____

WITNESS SIGNATURE

CONSENT FORM FOR SELF-CONTROL AND ATTACHMENT
You have just been debriefed on the observation that took place to collect data on cell phone use and self-control.

During the experiment, you were asked to place your cell phones on the table in front of you and refrain from using them for the remainder of the class session.

You were told that the purpose of the study was to collect data in order to measure two factors, self-control and attachment. However, that was not the only purpose of the study. An observation took place after the survey was collected. The professor had left the room to then call and/or text the students' cell phone as the observer noted the students who touched, looked at, or used their cell phones. Although the names of each student are included in the data, the professor will not have access to thls information. Furthermore, the data will be converted into numbers and the names of students will not be used in any form of publication or written assignment.

Because you were deceived, you now have the right to refuse to allow your actions recorded to be included in the data and to ask for the record to be destroyed immediately. If you do so, there is no penalty. You will not be punished regardless, whether you chose to include your participation in the observation or not.

I give permission for my materials/data collected to be used in the analysis for this experiment. □

I do NOT give my permission for my materials/data collected to be used in the analysis for this experiment. Please withdraw them from the study and destroy them immediately. □

____

PARTICIPANT SIGNATURE

____

WITNESS SIGNATURE

You will receive a copy of this form for your records

Observation

I will need full cooperation of each professor that I am working with. I will be surveying and observing four different classes. Once entering the classroom, I will debrief the students on my research. I will then distribute a survey, and collect them when finished. Afterward, the professor will need to instruct the class to leave their cell phones on the table in front of them, and ask to please not use them for the next 5-10 minutes. The first two classes of participants will be offered a reward if they do not use their phones during this time. The next two classes of participants will be told that they will be punished if they use their phone during this time. The professor will then ask to speak to me outside, giving us the opportunity to observe the classroom and see if anyone uses their phones. If there is a public list of the class mates' phone numbers, we will call and/or text message their phones to see if they will have the self-control to ignore it. We will return by the end of the time frame and go over the experiment with the students. They will not actually be given a reward, nor will they be punished, but I will offer them candy for my appreciation of their participation.

Survey
Demographics
-Age
-Gender
-Ethnicity
-Major
-Class Level
Self-Control
Impulsivity
-I often act on the spur of the moment without stopping to think
-I don't devote much thought and effort to preparing for the future
-I often do whatever brings me pleasure here and now, even at the cost of some distant goal
-I'm more concerned with what happens to me in the short run than in the long run
Simple Tasks
-I frequently try to avoid projects that I know will be difficult
-When things get complicated, I tend to quit or withdraw
-The things in life that are easiest to do bring me the most pleasure
-I dislike really hard tasks that stretch my abilities to the limit
Risk Seeking
-I like to test myself every now and then by doing something a little risky
-Sometimes I will take a risk just for the fun of it
-I sometimes find it exciting to do things for which I might get in trouble
-Excitement and adventure are more important to me than security
Self-centeredness
-I try to look out for myself first, even if it means making things difficult for other people"
-I'm not very sympathetic to other people when they are having problems"
-If things I do upset people, it's their problem not mine"
-I will try to get things I want even when I know it's causing problems for other people."
Attachment
Attachment
-I get along very well with my parents
-I have a lot of friends that I am close to
-I care about what my family thinks of me
-I care about what my friends think of me
-My parents are law-abiding
-My friends are law-abiding
Commitment
-I care about getting an education
-I want to do well in school
-I hardly ever miss class
-I care about what my instructors think of me
Involvement
-I like when I have nothing to do
-I participate in an extra-curricular activity
Belief
-I share the same values and beliefs as my parent(s)
-I like our society's general norms
-I abide by the law
-I abide by the rules set by my parents

CONSENT FORM FOR SELF-CONTROL AND ATTACHMENT

Demographics

Please indicate which best describes you

Age	Gender	Class Level	Ethnicity
18 or under	Male	Senior	African American
19-20	Female	Junior	American Indian
21-22		Sophmore	Asian
23 or older		Freshman	Caucasion/White
			Hispanic
			Native/ Pacific Islander
			Other

Self-Control

Please answer the following questions to the best of your knowledge using the scale provided

Impulsivity

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I often act on the spur of the moment without stopping to think	☐	☐	☐	☐	☐
I don't devote much thought and effort to preparing for the future	☐	☐	☐	☐	☐
I often do whatever brings me pleasure here and now, even at the cost of some distant goal	☐	☐	☐	☐	☐
I am more concerned with what happens to me in the short run rather than the long run	☐	☐	☐	☐	☐

Tasks

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I frequently try to avoid projects that I know will be difficult	☐	☐	☐	☐	☐
When things get complicated, I tend to quit or withdraw	☐	☐	☐	☐	☐
The things in life that are easiest to do bring me the most pleasure	☐	☐	☐	☐	☐
I dislike really hard tasks that stretch my abilities to the limit	☐	☐	☐	☐	☐

Risk Seeking

	Strongly Agreee	Agree	Uncertain	Disagree	Strongly Disagree
I like to test myself every now and then by doing something a little risky	☐	☐	☐	☐	☐
Sometimes I will take a risk just for the fun of it	☐	☐	☐	☐	☐
I sometimes find it exciting to do things for which I might get in trouble	☐	☐	☐	☐	☐
Excitement and adventure are more important to me than security	☐	☐	☐	☐	☐

Attachment, Commitment, Involvement, and Belief

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I get along very will with my parents					
I have a lot of friends that I am close to					
I care about what my family thinks of me					
I care about what my friends think of me					
My parents are law-abiding					
My friends are law-abiding					
I care about getting an education					
I want to do well in school					
I hardly ever miss class					
I care about what my instructors think of me					
I like when I have nothing to do					
I participate in an extra-curricular activity					
I share the same values and beliefs as my parents					
I like our society's general norms					
I abide by the law					
I abide by the rules set by my parents					

Sex Ratio and College Student's Perceptions of their Futures

By Samantha Trumbo
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Abstract

The theory of sex ratio argues that behavior is influenced by the scarcity of one sex in the population (Kenrick, Goldstein & Braver, 2012). Accordingly, the current research compared undergraduate college students' (*N*=155) relationships, education, and career choices in an environment with a scarcity of men. Results were consistant with the hypothesis that women in such and environent focused more on their education and career as opposed to relationships.

Keywords: sex ratio, careers choices, education choices, relationship choices

Sex Ratio and College Student's Perceptions of their Futures

The theory of sex ratio states that both male and female behavior is influenced by the scarcity of one sex in the population. It was originally studied in relation to sexual reproduction. These studies ofent examined how a lower percentage of males in a population affected the females' reproductive behavior in that population. Many studies used the term opperational sex ratio, which means, the participants in the study are all reproductive aged males and females. Stone, Shackelford, and Buss (2007) define sex ratio as being the measure of men per 100 reproductive-age women within a specified mating pool. It is aruged that opperational sex ratio differences influence behavior by changing the rules of the mating market, which in turn changes the rules of courtship and intersexual competition (Durante, Griskevicius, Simpson, Cantu, & Tybur, 2012). However, others aruge that this ratio influences other factors as well such that the number of males to females within a given population can impact other choices they make in their lives, such as relationships, education and career choices. For example, studies have found that when there is a scarcity of men, women tend to focus more on their career choices (Durante, et al. 2012; Kenrick, Goldstein, & Braver, 2012). Historically, there has been an increase of women in the workforce since World War II. As of 2009, only 59% of the working-aged women in the United States were in the labor force (Bureau of Labor Statistics, 2011). This is argued to be a result of men going to war and women stepping in and taking their roles in out of the home careers (Summerfield, 1998). However, it may be also be interepeted as a result of women having more difficulty finding a suitable mate to support them financially where there may be fewer men.

Kenrick et al. (2012) also illustrated that even the *perceived* sex ratio may actually change psychology and behavior. For example, in a college enviroment, sex ratio would predict that there would be a scacrity of males and that college educated women be more directed toward higher paying jobs than a woman in a noncollege college enviroment. On the otherhand, the influence of sex ratio in a college enviroment on men would not have an effect on their perceptions or their actions. Most men would anticipate and perceive themselves as reaching a higher paying job without any affect from sex ratio.

College can be an important time to examine and determine the choices current students will be faced with in the future. The way that students perceive their future options can play a significant role in their outcome after college. In a study conducted by Cinamon (2006), results found that college women perceived that having a successful career would interfere with having a family, and vice versa. However, the men in the study expected a lower level of conflict with work and family. While this study showed that in general, college women are more vulnerable to perceptions of conflicts between work and family, it did not indicate whether or not there was a scarcity of men in the population.

Most colleges currently have more women enrolled than men. In 2003, there were 1.35 females for every male who graduated from a four-year college (Francis, 2013). This is another reason why women may be less likely to find a male partner. This could potentially lead to more women being childless, single parents, or involved in an undesirable relationship. Although sex ratio motivates women to seek higher paying careers, it may also lead them to make difficult choices later in life, portrayed by the analogy, "briefcase over baby" (Durante et. al, 2012). Sex ratio has been demonstrated to influence women's career choices. This indicates that students are likely to be affected by sex ratio when making decisions throughout college. This is an important topic because of how critical the decisions made in college are on the career choices that students will have available after graduation.

Durante, Griskevicius, Simpson, Cantu, and Tybur (2012) tested sex ratio, in particular that a larger female population with males being more scarce has an effect on more females choosing a higher-paying career versus raising a family in the traditional sense. They also tested this hypothesis, as well as the idea that just the perception of a scarcity of men alone will have the same effect, while keeping separate the effect of a labor market bias; that is, fewer men, meaning more jobs for women, but instead, fewer men meaning less of a possibility of a woman finding a suitable mate. The operational sex ratio they used was determined by for geographic region. They derived this base ratio score using United States Census data for men and women 15-44 years of age in Washington D.C. Data was then collected from female college undergraduate students ranging in age from 19 to 23 years.

Durante et al. (2012) conclude that low-mate value women are more motivated than high-mate value women to desire a higher paying career and being able to support a family with the potential of no mate. To determine self-perceived mate-value participants completed A Self-Perceived Mate Value Survey. The survey determines a person's self-perceived desirability as a mate in the eyes of similar-aged, opposite-sex people. The findings are consistent with the hypothesis that a low-mate value female, in a scarce male population will be more inclined to focus on career versus family.

There were a few limitations to Durante et al.'s studies. The most important limitation was that the population from which the samples were drawn was limited to participants who were female undergraduate students in the United States. This means they will likely have the opportunity to pursue higher-paying jobs to support their families if having children is something they will desire in their futures. Women in other settings may be less likely to have this opportunity and may rely on other options for child rearing. Future research may look at different cultures and age ranges as well as non-heterosexual samples. Although Durante et al.'s study was written in 2012, the rising rate of same sex marriages could also affect the results of a sex ratio study. A confounding variable in this study is whether or not the participants are heterosexual or non-heterosexual. The results may not be completely representative if a given percentage of the population is non-heterosexual. Sexual preference is a variable that future researchers should take into consideration.

Stone, Shackelford, and Buss (2007) discuss two hypotheses to predict how men and women would adjust their standards due to the sex ratio. The Classical Sex Ratio Mate Preference Shifts Hypothesis predicts that when a society is imbalanced, the sex that is more plentiful will lower their standards in order to obtain a partner of the lesser sex. The Alternative Sex Ratio Mate Preference Shifts Hypothesis predicts that in populations with lower sex ratio, men will lower their standards in order to have more short-term relationships and women will raise their standards to avoid deception by men seeking short-term relationships. Stone et al. (2007) studied these hypotheses by using a survey that participants would rate the importance of mate preference characteristics.

Goldberg, Kelly, Matthews, Kang, Li, and Mariya (2012) also used surveys to test views about work and family. The surveys were asked online to 955 undergraduate students, 80% of whom were female, with a mean age of 20.2 years. Questions ranged from basic demographics, to the division of household labor during childhood, to their mothers employment history, to the belief about the consequences of their mothers employment on the children. The results from this study found that female college students were significantly less likely to support traditionally gender roles than men. (Goldberg et al. 2012). Much like Goldberg’s study, Cinnamon and Rich (2002) used questionnaires to measure attributions of importance to life roles and work-family conflict. The participants included 213 workers ranging from 20 to 50 years of age and only included participants who were married. Three distinct groups were found to exist. They found that Profile A attributed high importance to family roles and low important to the work roles, Profile B attributed high importance to work roles and low importance to family roles, and Profile C attributed high importance to both work and family roles. Cinnamon and Rich (2002) concluded that the family domain is more susceptible to interference from work than is the work domain from the family.

In Oppenheimer’s study (1997), it was hypothesized that women’s rising employment levels have increased their economic independence and therefore, greatly reduced their desirability of marriage. Very little empirical evidence was found to support this hypothesis. Oppenheimer discusses the transformation in women’s employment since World War II not only with respect to the growing rate in women’s employment but also the increase of non-married women, and delay in marriage. Pettit and Hook (2005) also discuss the large arrival of women into the paid labor force. This study also examines how the WWII era has increased women’s education, later age of marriage, and lower fertility.

Individual women’s views can also impact a woman’s choice to launch a career versus a family. Summerfield (1998) discusses the relationship to of the Second World War to women’s work histories. The study collected data from interviews with forty-two women drawn from all over Britain and in these interviews the women discussed their experiences during the war. The concept of this article was to find the overall attitudes of women who were in the workforce during World War II.

Summerfield particularly discusses women who have worked in the war and their reactions and attitudes about working after the war is over. The study showed that some women were not happy about working in the war and they were happy about going back to having a “women’s job” when the war was over. Women who felt this way felt that, “marriage and the expectation of marriage, are the dominant factors in molding the pattern of a women's life" (Summerfield, 1998: 4). Others felt that women should become as educated as possible and not necessarily conform to gender roles in society. Several researchers have studied the effects that employment and mating have on women's career and family choices. As cited by Cinnamon and Rich (2002), "the more important a role is to an individual, the more time and energy he or she will invest in it, allowing less time and energy for other roles" (212). This seems to affect women often in choosing a partner as well as choosing a career.

This particular study takes operational sex ratio theory a step further from beyond how it affects just courtship behavior, to how it affects the thinking of future career and/or family choices an individual may make. It was investigated how undergraduate college students perceive and value their future relationships, education, and career choices in a sex ratio environment with a scarcity of men. The hypothesis of this study is that women will focus more on their education and career choices as opposed to their relationship choices when there is a scarcity of men. Men, on the other hand, in a male scarce enviroment, will be less impacted due to multiple options of mate choices and/or option to further their education or career.

Methods

Participants

A total of 155 undergraduate college students from a small private liberal arts school in southeastern Pennsylvania participated in this study. Participants were chosen from classes of different areas of concentration. The sample consisted of 67.1% females, and 32.9% males. The average age of participants was 20.5 and the majority of the sample was Caucasian (76.4%), but also included African American (11.6%), Hispanic (5%), Asian (1.9%), Pacific Islander (1.2%), and other (3.9%). The participant's demographics were similar to the population of students at this institution.

Materials and Procedure

The author derived a survey that included 16 questions to measure areas relating to the theoretical framework of sex ratio such as: educational choices, (e.g., "I will go to graduate school"), career choices (e.g., "Finding a high paying job is important to me"), and mate choices (e.g., "I often have anxiety about finding a mate"). These particular areas were selected because they were consistent with the theoretical framework of sex ratio such as: Basic demographics were also included in the survey. These questions were measured a using a Likert scale anchored at 1=Strongly Agree and 5=Strongly Disagree.

Permission was obtained from the Institutional Review Board to conduct the research. Faculty were then contacted and asked permission to enter classes and distribute surveys in the beginning 10 minutes of class. It was clarified to students both verbally and in the consent form that the survey was completely voluntary and confidential. The consent form and survey were then placed into two separate piles by the participants and then stored into two separate envelopes by the investigator.

Results

Central tendency and variability are shown in Table 1. Generally, women and men agree that they will be successful with their education (i.e., graduating college and going to graduate school), their careers (i.e., finding a full time job and finding a high paying job), and their relationships (i.e., being in a relationship and finding a mate). Interestingly, women tended to disagrees with the statement that men should be the sole provider in the home (M=3.6) while men were just below neutral for this item (M=2.84).

Furthermore, an independent-samples *t*-test showed this was a significant and large effect, $t(152)=-4.35$, $p<.001$, $d=1.15$.

In order to examine the hypothesis that women will be more focused on career and education than relationships a repeated measures ANOVA was run to compare average scores for questions within each of these areas and results showed a significant large effect $F(9,93)=77.01$, $p<.001$, eta squared =.88. Paired sample t-tests were run to examine specifically where there was significance. Participants had significantly higher agreement ratings for education and career items than relationship items. They agree more that they will graduate college and find a full time job than be in a relationship in the next five years ($t(103)=7.99$, $p<.001$; $t(103)=3.87$, $p<.001$). They also agree more that they will graduate college, go to graduate school, and that a high paying job is important to them than how important they feel having a family is ($t(103)=4.12$, $p<.001$; $t(103)=3.77$,$p<.001$; $t(103)=-3.21$, $p<.001$), feeling conflicted between work/school and family ($t(102)=12.93$, $p<.001$; $t(102)=5.17$, $p<.001$; $t(102)=6.94$, $p<.001$; $t(102)=9.37$, $p<.001$), and having anxiety about finding a mate ($t(102)=16.35$, $p<.001$; $t(102)=7.78$, $p<.001$; $t(102)=10.45$, $p<.001$). Figure 1 shows the most extreme difference between the groups.

Table 1.

Central Tendency and Variability for Main Outcome Variables

Gender	N	M (SD)	95% Confidence Intervals	
			Lower	*Upper*
Male				
Graduate College	50	1.14 (0.40)	1.03	1.26
Graduate School	50	2.54 (1.07)	2.24	2.85
In a Relationship	50	2.20 (0.88)	1.95	2.45
Full Time Job	50	1.58 (0.73)	1.37	1.79
High Paying Job	50	1.60 (0.64)	1.42	1.78
Family	50	1.50 (0.65)	1.32	1.68
Finding a Job	50	2.82 (1.21)	2.47	3.16
Finding a Mate	50	3.44 (1.09)	3.13	3.75
Conflicted	50	2.76 (1.06)	2.46	3.06
Man Earns Money	50	2.84 (1.13)	2.52	3.16
Female				
Graduate College	102	1.06 (0.34)	0.99	1.13
Graduate School	102	1.93 (1.02)	1.73	2.13
In a Relationship	102	1.86 (0.95)	1.68	2.05
Full Time Job	102	1.48 (0.67)	1.35	1.61
High-Paying Job	102	1.75 (0.83)	1.58	1.91
Family	102	1.41 (0.79)	1.26	1.57
Finding a Job	102	2.40 (1.06)	2.19	2.60
Finding a Mate	102	3.26 (1.24)	3.02	3.50
Conflicted	102	2.70 (1.23)	2.46	2.95
Man Earns Money	102	3.69 (1.16)	3.46	3.91

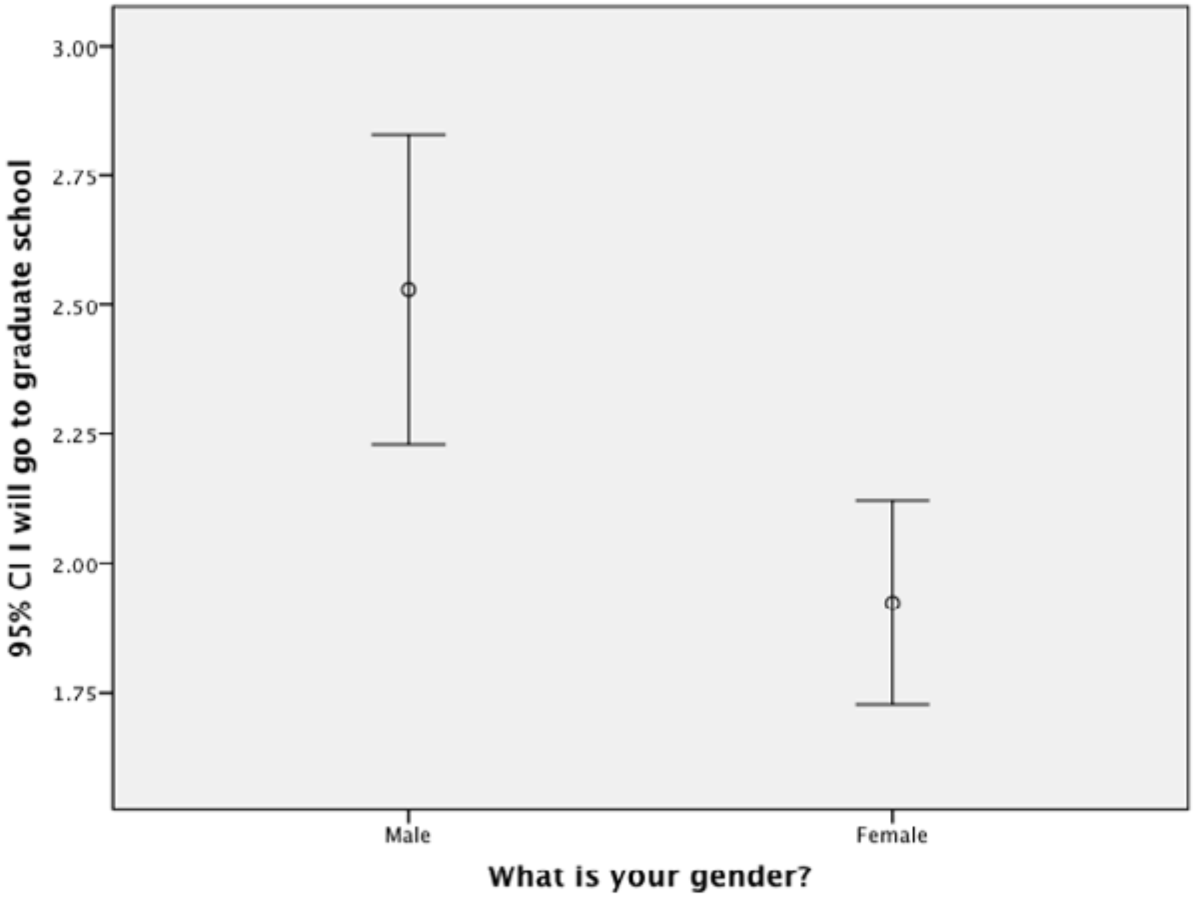

Figure 1. Error Bars of Mean Agree/Disagree Scores for Gender

An independent-sample *t*-test was conducted to explore the possibility of pattern differences between majors with high numbers of men compared to low numbers of men, students were divided into male-dominated or female-dominated areas. Those majoring in male-dominating areas consisted of the following majors; history/political science (65% male), finance (75% male), accounting (63% male), business (64% male), computer science (58% male), and marketing (52% male). This is consistent with the results when using the entire sample of students. Although the pattern showed to be similar to previous results in the study, all but one test was found to be insignificant. The question, "In the next five years, I will be in a relationship" was significant ($t(35)=3.19$, $p<.05$). This suggests that the general population sex ratio may be stronger than the sub-group that one may spend more time within that population.

Discussion

This particular study takes operational sex ratio theory a step further from beyond how it affects just courtship behavior, to how it affects the thinking of future career and/or family choices an individual may make. It was investigated how undergraduate college students perceive and value their future relationships, education, and career choices in a sex ratio environment with a scarcity of men.The results of this study tend to be consistent with the hypothesis that the women in this environment with a scarcity of men will focus more on education and career options as opposed to mate choices. This is consistent with the theory of sex ratio, that both male and female behavior is influenced by the scarcity of one or other's sex in the population (Durante, et al., 2012).

A survery was distributed to students to measure areas relating to the theoretical framework of sex ratio such as: educational choices, (e.g., "I will go to graduate school"), career choices (e.g., "Finding a high paying job is important to me"), and mate choices (e.g., "I often have anxiety about finding a mate"). These questions were measures Results indicate that when comparisons of average scores for questions within each of these areas. These questions were measured a using a Likert scale anchored at 1=Strongly Agree and 5=Strongly Disagree. Generally, women and men agree that they will be successful with their education (i.e., graduating college and going to graduate school), their careers (i.e., finding a full time job and finding a high paying job), and their relationships (i.e., being in a relationship and finding a mate). Participants had significantly higher agreement ratings for education and career items than relationship items. It was also found that there were differences in patterns between majors with high numbers of men compared to low numbers of men.

However, future research should attempt to replucate this with other groups and examine this with non-heterosexual individuals. The rising rate of same sex marriages may have a large effect on this study. Given a certain percentage of the population is non-heterosexual, the results of a sex ratio study without taking this variable into account, may not be completely accurate.

Also, given the high number of women, future analyses should examine patterns among men. For example, do men have decreased anxiety about relationships given the high percentage of women surrounding them. It may also be interesting to investigate what other potential behavior variables may change for men when there is a higher population of women. In other words, education and career choices may be replaced with competition and agression in this scenario.

Another important limitation to this study is that the population choice was very specific in that it was limited to a small private liberal arts school in southeastern Pennsylvania. If the sample had included a wider population the study may have shown very different results. Women in this environment have the option to pursue higher-paying jobs in order to support their families if having children is something they will desire in their futures. Women in other settings may not have this option and may rely on other options for child rearing.

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College Student's Futures

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This study is going to look at student's perceptions of their futures. I ask that you please take this short survey of about 20 questions. The survey should only take about 5-8 minutes.

This survey is completely confidential and there will be **no** link to any of the questions and your identity, and the consent form will be separated from your survey. If at any time the questions on the survey make you uncomfortable please feel free to not continue the survey and hand it in unfinished.

If you have any questions or concerns about anything on the consent form or the survey please feel free to contact the investigator, Samantha Trumbo, either in person or through email. Counseling services are offered as well in case of any issues or concerns.

Participants Name: ____

Participants Signature: ____

Investigator Signature: ____

Please Circle or fill in your answer as correctly as possible:

1. What is your gender?
   Male Female Indifferent
2. What is your race?
   Caucasian African American Hispanic Asian Other___________
3. What is your age?
   ____
4. What is your major?
   ____
5. What is your academic year?
   Freshman Sophomore Junior Senior
6. Do you currently have a significant other?
   Yes No

Please rate the following statements using the scale provided:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I will graduate college:	1	2	3	4	5
I will go to graduate school:	1	2	3	4	5
In the next 5 years, I will be in a relationship:	1	2	3	4	5
In the next five years, I will have a full time job:	1	2	3	4	5
Finding a high paying job is important to me:	1	2	3	4	5
Having a family is important to me:	1	2	3	4	5
I often have anxiety about finding a job:	1	2	3	4	5
I often have anxiety about finding a mate:	1	2	3	4	5
I often feel conflicted between work/school and family:	1	2	3	4	5
It is best if the man earns the money and the woman takes care of the home and children:	1	2	3	4	5