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THE INFLUENCE OF ENVIRONMENTAL NGOS IN THE GLOBAL SOCIETY

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Abstract

This paper assesses the overall impact and influence of environmental non-governmental organization (NGO) networks from the local to the global setting. Networks of various types of NGOs have developed and emerged in recent decades as significant actors in global politics. This paper looks at the impact these networks have in political and societal arenas, such as the business practices of large multinational corporations. A qualitative analysis of several cases involving NGOs is conducted, assessing what actions or strategies were most effective, particularly in promoting environmentally sustainable policies and practices and establishing a Culture of Peace. Research combines a review of existing literature along with personal observations from working with a grassroots environmental NGO in Indianapolis, Indiana.

Over recent decades, the number of nongovernmental organizations (NGOs) has increased substantially, a phenomenon which has attracted much scholarly attention, with particular focus on their participation in domestic and international political processes. At the 1972 United Nations Conference on the Human Environment, representatives from over 250 NGOs were in attendance. These representatives provided technical expertise, helped to establish the rules for NGO participation, participated in plenary sessions and committee meetings, and worked in forums to build connections between one another. Scholars identify this event as one of the major turning points in the liberalization of the NGO system that followed as the number of NGOs accredited to subsequent conferences has continued to grow. (Betsill and Corell 1-2) In regards to achieving sustainable development, the U.N. acknowledged NGOs as partners who can contribute significantly to these efforts with its Agenda 21. Point 27.3 of the non-binding action plan reads:

[n]on-governmental organizations, including those non-profit organizations representing groups addressed in the present section of Agenda 21, possess well-established and diverse experience, expertise, and

capacity in fields which will be of particular importance to the implementation and review of environmentally sound and socially responsible sustainable development, as envisaged throughout Agenda 21. The community of non-governmental organizations, therefore, offers a global network that should be tapped, enabled and strengthened in support of efforts to achieve these common goals. (UN Conference on Environ. & Devel. 282)

While NGO is a term that encompasses of a wide variety of organizations of various magnitudes that participate at all levels of society, this research is focused on the role and influence of networks of environmental NGOs (ENGOs). However, the term ENGO is still a rather general classification, as significant distinctions can be made between different organizations that fall into this category. ENGOs and other NGOs have developed extensive networks between independent organizations that work in cooperation at the international, national, regional, and local levels. The development of various NGO networks is one of the many political, economic, social, and cultural processes that are attributed by many scholars to what is called globalization, or the expanding and strengthening interconnectedness between nations around the world. (McGrew 16)

Globalization and the Global Society

While many scholars agree that globalization is indeed happening, there are a variety of perspectives used to understand globalization, some of which view it as a beneficial development and others arguing that it is contributing to an increase in global inequality. This paper adopts what Anthony McGrew calls the transformationalist perspective of world politics. Contrary to the belief that globalization has led to a weakening or deconstruction of the sovereignty of nation-states within the global system, transformationalists view this not as the nation-state's demise, but rather a globalization of politics, where "the traditional distinction between domestic and international affairs is not terribly meaningful" (McGrew 16). McGrew identifies this system of global politics as a global governance complex, describing the interplay of "states, international institutions, transnational networks and agencies [as they act to] promote, regulate, or intervene in the common affairs of humanity" (McGrew 25). Within this global governance complex, "private and non-governmental agencies have become increasingly influential in the formulation and implementation of global public policy" (McGrew 26). These organi-

zations contribute to a portion of this complex that McGrew calls the transnational/global civil society. This term encompasses actors such as NGO and advocacy networks, transnational organizations, and citizens' groups, all of whom are playing "a significant role in mobilizing, organizing, and exercising political power across national boundaries" (McGrew 27). This process has been facilitated by developments in information and communication technologies (ICTs) and a growing awareness of common interests amongst different groups in separate nations across the world.

Another important set of powerful actors within the global society are the transnational networks of corporate power, which consist of multinational corporations (MNCs) and smaller business enterprises. McGrew argues that the nature of these MNC global operations creates democratic deficits in the existing global political system due to the system's territorial roots, hindering its ability to observe and regulate the business practices of MNCs. This contributes to the existence of "distorted global politics" where "power asymmetries and global institutions more often than not enhance the interests of global elites at the expense of the wider world community" (McGrew 29-30). In the following sections, the influence of ENGO networks in reducing these distortions throughout the global society through their policy work and other sociocultural factors will be assessed. While this analysis focuses on the influence of ENGOS, it may also have implications for the influence of other transnational NGO and advocacy networks.

ENGO Networks in Indianapolis

Sustainable Indiana 2016 serves as an example of a local ENGO network for this research. It began as an initiative by a partner ENGO, Earth Charter Indiana (ECI), a group associated with but not formally tied to Earth Charter International. Statements concerning ECI in this analysis are drawn from personal observations made while working with the Sustainable Indiana 2016 initiative as a research intern. Sustainable Indiana 2016 works to raise awareness of local, bottom-up initiatives throughout the state that focus on solutions to climate change and promote environmental sustainability. Part of this awareness campaign also involves cataloging grassroots initiatives, which number over 200 in the state. Sustainable Indiana 2016 also works with Earth Charter Indiana and other associated ENGOS to exert influence over a variety of political and social actors in Indianapolis. The network is currently documenting and reporting on local Indiana residents and businesses engaged in climate solution initiatives, a comprehensive list of which

is displayed on their website. The organization also coordinates its own campaigns, including the Tree of Hope initiative, which seeks to inspire Indiana residents to plant trees throughout the state. They also support the national Meatless Monday campaign, which seeks to reduce the negative environmental impacts of the meat industry by encouraging people to refrain from eating meat at least one day per week. (“Meatless Monday”) Sustainable Indiana 2016 helps Indiana residents pledge to the campaign and signs them up to receive email updates, which include meat-free recipes and information about how going meatless promotes environmental sustainability.

Sustainable Indiana 2016, ECI, and other associated ENGOs form a local, grassroots ENGO network in the Indianapolis region. To promote environmental sustainability through influencing local politics, this local ENGO network was part of the diverse group of “agricultural, consumer, environmental, libertarian, religious, and social groups” and solar entrepreneurs who were prepared to testify against Indiana House Bill (HB) 1320 at the bill’s hearing before the House Utilities Committee on February 18th, 2015. HB 1320 was a bill that would add financial roadblocks for customers seeking to install solar and wind energy systems in their homes or businesses. State policy allows net metering, or the reimbursement of customers who feed energy back into the grid, paid by utility providers at retail rate. HB 1320 would enable utility companies to reduce net metering credits to customer-generators and impose new fees and other costs. These costs would slow the growth of Indiana’s fledgling solar and wind industry and deter clean energy manufacturers and installers from the state of Indiana.

Representatives from most of the groups seeking to testify were barred from the hearing by the Chairman of the House Utilities Committee. The Hoosier Environmental Council, associated with the Earth Charter Indiana ENGO network, was permitted to testify and ECI representatives were present in the chamber. The bill passed through the committee with a 9-4 vote, but did not make it to a House floor vote due to the widespread opposition to the bill. (Hoosier Environmental Council) This event raises the question of whether this local ENGO network managed to influence the Indiana House of Representatives’ decision to reject HB 1320. There are few consistent methodologies in the field to guide qualitative analysis of global or local ENGO networks, which makes this question difficult to answer. The following discussion seeks to find a methodology that can be applied to this and future analyses.

Evaluating NGO Influence

Despite the considerable amount of research on the influence of NGOs in global society, there are few consistent methodologies that can be effectively utilized in analyses of this influence. Literature concerning NGO influence also tends to use inconsistent definitions for influence. Authors Michele M. Betsill and Elisabeth Corell sought to reduce such inconsistencies and deficits in their book, *NGO Diplomacy: The Influence of Nongovernmental Organizations in International Environmental Negotiations*, in which they propose an analytical framework for quantitatively assessing the level of influence of NGOs. While the methodology in this book is intended for case studies within the political arena of international environmental negotiations, it offers several insights that could prove useful to more general studies of NGO influence.

The authors build their definition of influence from existing literature by distinguishing between the concepts of power, as traditionally understood in the field of international relations, and influence. In international relations, power is generally associated with the ability of one nation-state to control the behavior of other nation-states in order to achieve its desired outcomes. Betsill and Corell list “gross national product, population, military capability or prestige” as indicators of a state’s power. (21) Since the central political actors in this analysis are not states but NGOs, power must be understood through different indicators than those used for nation-states. To overcome this difference, the authors defined power for this context as all political resources an actor has at its disposal. The authors distinguish between power and influence by identifying the latter as a change in behavior of one actor due to the actions of another “from what would have occurred otherwise” (Betsill and Corell 24).

Indicators of NGO Influence

In their analytics framework, Betsill and Corell produced a set of indicators for NGO influence based on the above definition. Though developed for use in analyzing international negotiations and agreements, aspects of these indicators are applicable to ENGOs throughout the global society.

The first indicator is observable change in procedural issues attributed to the actions of NGOs in final agreements. Procedural issues impact future decision-making processes and NGOs wish to increase opportunities for participation for their organizations and others working toward similar goals.

(Bestill and Corell 36) This indicator could be applied to the global governance complex by expanding its scope to include opportunities for NGO participation in political processes at all levels of society. It could also be used as a social indicator if public constituencies perceive NGOs as legitimate actors in policy creation and implementation, creating more opportunities for NGOs to participate in global politics.

The other indicator for final agreements concerns substantive issues, or the specific demands an agreement places on member states, and whether they reflect the initial positions or ideas of participating NGOs. (Betsill and Corell 36-7) The scope of this indicator could be expanded to include demands placed on states in international environmental agreements, as well as those placed on domestic governing bodies within states. Social environmental demands placed on governments by their constituencies could also serve as an indicator for substantive issues.

For indicators concerning the negotiation process, Betsill and Corell positioned key actors throughout the stages of a negotiation amongst those listed. They identify the initial positions of these actors, any changes in their position during negotiation, and whether that change can be attributed to the actions of participating NGOs. (2008, 36) In applying this indicator outside international negotiations, the term “actors” could be broadly understood to include all significant political and social actors throughout the global society, such as politicians, prominent members of MNCs and other corporations, and activists within social movements.

The final indicator adopted in this analysis is concerned with issue framing, which relates to how an issue was understood prior to and during negotiations. This understanding involves what the driving causes of the issue are and who exactly has the responsibility to act in order to solve the issue. (Betsill and Corell 33) The authors recognize the cultural aspects of this indicator, as frames can significantly enable and constrain the ability of NGOs to influence the outcomes of negotiations. For example, NGOs find themselves to be less influential when environmental issues are tied to economic concerns that may lead decision makers to prioritize short-term economic costs over longer-term environmental ones. (Betsill and Corell 41) This recognition supports the argument that this indicator can apply to issue framing throughout the entire global society, as the ways in which the involved actors understand environmental issues affects their perceptions of what caused these issues and what actions need to be taken to solve them, as well as whether or not these actors perceive that there is an issue in the first place. In order to apply these indicators outside of international environmental ne-

gotiations, a clear way to recognize what specific changes observed should count as successes for ENGOs.

Defining Success

It is not particularly controversial to assert that a common and overarching goal of ENGO networks is to achieve environmental sustainability throughout the global society. While each ENGO's specific conceptualization of what environmental sustainability is and how to achieve it may differ from others, environmental sustainability is still the ideal. While most analyses concerning NGO influence focus on whether they have an impact on government policies, it can be argued that this goal is inherently linked to the larger and more encompassing goal of establishing a global Culture of Peace. In conceptualizing a Culture of Peace, Johan Galtung defines culture as a "representation through symbols, usually visual or acoustic, organized diachronically or synchronically." (75) Galtung defines culture as a sort of natural phenomenon; something continuously and automatically programmed and reproduced "like a virus." (76) A Culture of Peace is one with inherent mechanisms allows for the creative and nonviolent transformations of conflicts. (75-77) Use of the word creative implies that such a culture is constantly readjusting its visions of the future. Lisa Reber-Rider echoes the important role imagination plays in promoting peace, describing images of the future as a sort of "temporary scaffolding" that is "inherently flexible." (83) She also describes extensive and deliberate awareness raising as a tool that can be effective in promoting peaceableness within cultures. (Reber-Rider 80)

While many view peace as simply the absence of violence, Linda Groff presents a more extensive vision for peace that includes promoting environmental sustainability. She presents seven aspects of peace grouped in to three broad categories. first category is titled War Prevention and involves aspects of peace such as the absence of war and violence (Galtung's negative peace) and balancing forces within the international system. The second category is named Structural Conditions for Peace, and involves the "social-structural dimensions of peace" with true social justice throughout all of the Micro and Macro levels of society (Galtung's positive peace). The third category of peace is called Holistic: Complex Systems Models and Views of Peace. Groff includes the Holistic Gaia Peace model within this category, which recognizes that human exist within their environment. This views all life on Earth as valuable, and asserts that sustainable development is necessary in order to achieve a lasting Culture of Peace. (Groff 2-10)

With this vision of peace in mind, the goals of ENGOs can be seen as promoting not only government policies that allow for sustainable development, but also promoting sustainability throughout the entire global society through educational awareness-raising campaigns and other activities. The goals of ENGOs often coincide with those of other NGOs who are also working to move the global society towards a Culture of Peace, so instances where ENGOs successfully promoted such changes through working in solidarity with other NGOs should not be viewed as irrelevant or as failures. This vision of peace as well as the definition of influence and the indicators for NGO success provided by Betsill and Corell allow for a better understanding with which to assess the overall influence of ENGOs and other NGOs in promoting environmental sustainability. In addition to policymakers and delegates of member states in intergovernmental bodies, NGOs and actors involved in an analysis can include but are not limited to “environmental, social, scientific, and business/industry organizations.” Focusing on these actors and applying the relevant aspects of Betsill and Corell’s methodology proves useful in producing a general understanding the role of NGOs in promoting sustainable development and the conditions under which they matter. (3-9) In the following sections, a modified version of this framework will be presented that will then be applied to cases throughout all levels of the global society.

Methods for Assessing NGO Influence

In order to overcome the difficulties in drawing general conclusions from cross-case analysis of the role of NGOs, Betsill and Corell apply a tactic called triangulation, or the “use of multiple data types, sources and methodologies to analyze NGO influence.” (25) This tactic improves the qualitative value of analysis through correcting for researcher bias, as indicators developed through this technique allow for the identification of cases in which NGOs not only succeeded in achieving their goals, but of the cases in which they failed as well. (Betsill and Correll 25-26) The indicators discussed previously that will be targeted in this analysis are changes concerning: the procedural and substantive issues within final outcomes and agreements, the positions of key political and social actors, and those concerning the ways in which the issue is framed by policymakers and constituencies. Utilizing aspects of Betsill and Corell’s framework, the data used in this analysis concerning NGOs focuses on the actions they have taken, their level of political and social access, and the resources they applied. The data used concerns changes in the behavior of other actors, which displays the outcomes of each specific case, as

well as changes in the procedure of negotiations or ways of dealing with issues of environmental sustainability. The data in this analysis comes from a variety of sources. The primary documents consist of official decisions and statements from government bodies, intergovernmental institutions, businesses, NGOs, and related organizations and institutions. Primary documents also include scholarly articles and case studies concerning the influence of NGOs. Secondary documents utilized come from various publications and other media sources. (Betsill and Correll 26-30) Additionally, first-hand observations made by the author while working for Earth Charter Indiana, a grassroots ENGO not directly linked but associated with Earth Charter International, will be applied in this analysis.

The methods for finding causal linkages that display NGO influence applied from Betsill and Corell's framework are process tracing and counterfactual analysis. Process tracing involves building logical chains of evidence that link the actions of NGOs to the responses (or lack thereof) of involved actors. Counterfactual analysis involves considering what might have happened in a particular case if the NGOs or other actors that participated had been absent. As this is an imaginative construct, it is used as merely one component within a more general analysis. (Betsill and Correll 28-32) These authors also distinguished three general levels with which NGO influence can be assessed. Low influence is characterized by NGO participation with no affects on the process or the outcome. Moderate influence consists in participation resulting in changes in the process but not the outcome. High influence applies to cases in which NGOs participated and experienced some success in shaping the processes and the outcome in regards to how environmental issues are handled within the global society. (Betsill and Correll 37-38) Eight useful conditioning factors that can be useful for cross-case analysis identified by the authors are variances in NGO coordination, the rules of access for NGOs, the specific stage of negotiations or debates, the political stakes of the case, the institutional overlap between involved bodies, competition from other NGOs, alliances with key actors, and the levels of contention the observed NGOs experienced. These factors deal with the actions of actors and differing structural factors that may empower or limit NGO influence. The authors assert that structural factors can be used to identify what social movement scholars call political opportunity structure. Building from the wide range of literature concerning political opportunity structures, they assert that they are generally concerned with formal organizational/legal structures as well as power relations within a political system at a certain time. Although there is debate over whether political opportunity structures apply to the international political arena due to the fact that they were developed within the domestic con-

text, Betsill and Correll assert that such structures exist within international institutions that may have an effect on NGO influence. (37-41) Considering the connections drawn throughout the previous discussion that argue for significant linkages between the global governance complex and the global society, it is tenable that similar opportunity structures may exist throughout the global society outside of the governance complex.

Determining the Levels of Observation and Time Frames

Due to the fact that the methodology adopted was originally developed for analysis of international environmental negotiations that have clearly identifiable actors and time frames allowing them to be traced relatively easily from beginning to end, modifications to the framework are needed for observing NGO influence throughout the global society. In order to do this, this analysis will apply insights found within John Paul Lederach's book *Building Peace: Sustainable Reconciliation in Divided Societies*. As the title suggests, the societies Lederach discusses experience deep divisions from protracted conflicts. Nonetheless, the insights from this book can be applied within this analysis due to the fact that the book identifies various actors involved in peace-building efforts, and provides a framework for suggesting time frames for specific actions to be taken in efforts to establish Cultures of Peace.

Lederach places key actors into three categories for differing levels of leadership throughout the society. For conceptualization, Lederach presents a pyramid model for observing societies, with a very small number of actors at its peak and a large range of different actors at its base. Top-level leadership consists highly visible political, military, and religious leaders who hold a significant amount of power and influence, but are often locked into the positions they have taken on various issues due to their high public profiles. Certain NGOs are placed in the Middle-range category alongside other respected leaders within societal sectors such as ethnic, religious, or intellectual leaders. These leaders can be considered to be individuals with formal positions within their respective societal sectors or the networks of groups and institutions present within that sector. Middle-range leaders are likely to know or have existing relationship with leaders at both the top and bottom categories of the period, and it is from these relationships that they gain their status and influence. The bottom, or grassroots level of leadership are found within the masses. These leaders are involved in their local communities and include those who work with grassroots NGOs. While they do not hold the power or influence enjoyed by the other categories of leadership, they have a bet-

ter understanding of the local conditions specific to their respective communities. (Lederach 38-43)

In this analysis, grassroots NGOs are placed within the grassroots level of leadership. National and international NGOs as well as the networks through which they operate are understood as actors within the middle-range level. Lederach then advocates certain approaches to peace-building that can be utilized by leadership within each category. Lederach asserts that grassroots leaders have the ability to generate significant political and social pressure for change through programmatic initiatives at the local level, which he calls the bottom-up approach to peace-building. The effectiveness of this approach can then be enhanced if middle-range leaders are simultaneously applying the middle-out approach to peace-building. This involves working towards greater levels of integration through use of access that the actors at this level have to both the top and grassroots levels of leaderships. (Lederach 46-53) This conceptualization applied to the global society shows that even though they are a multitude of separate organizations, coordinated efforts between grassroots NGOs and larger NGOs with access to NGO networks hold potential for promoting environmental sustainability and a Culture of Peace.

Lederach also presents a nested paradigm for time frames with which to consider peace-building efforts as a part of his Integrated Framework for Peace-building. The shared cultural visions of a certain society's future discussed in a previous section are named here as the society's "desired future" or the "generational vision." Actions taken to alter a society's desired future are placed within a time frame of twenty years or more. Actions concerned with designing social change are placed within the time frame titled "decade thinking" which occurs within five to ten years. In order to improve the effectiveness of their responses, the concerned actors engage in preparation and training actions in order to prepare themselves, actions that occur within a time frame of one to two years called "short-range planning." The "immediate action" timeframe involves the emergency relief provided by humanitarian aid and development agencies spans over two to six months. Lederach states that all of the peace-building efforts taken within the shorter time frames should be guided by the desired future of a culture of peace. (Lederach 74-78) In his integrated framework, Lederach asserts that the actions of the middle-range guided by the decade thinking time frame of five to ten years hold the most potential for the peaceful transformation of a society. (Lederach 79-85)

In the following section, this time frame will be incorporated into the methodology of this analysis, observing the effectiveness of NGOs at the mid-

dle-range and grassroots level of the global society as they coordinate their efforts to cover both short-range planning and decade thinking time frames, engaging in actions involving preparation and training as well as designing societal change in order to work towards the desired future of a Culture of Peace that is environmentally sustainable. The following cases observe the influence of ENGOs at various levels of societal leadership, starting at the local level and then zooming out to the global level. The following analysis is by no means exhaustive due to the sheer scope associated with analyzing the global society, but is meant to identify general trends that warrant further research.

ENGO Networks in the Local Arena

In a previous section of this analysis, networks of grassroots ENGOs in Indianapolis were discussed who, quite similarly to the networks of their larger counterparts, attempt to influence the arenas of state policies, business practices, and public awareness. This section introduced the grassroots ENGO network containing organizations including Earth Charter Indiana (ECI) and Sustainable Indiana 2016 and discussed Indiana House Bill (HB) 1320's hearing before the House Utilities Committee. Since a useful methodology for observing the influence of ENGO networks has now been introduced in the preceding discussion of this analysis, it will be applied to this particular event in order to find out whether or not Indianapolis' ENGO network was influential in this political event.

HB 1320 sought to reduce benefits of net metering available to small-scale solar and wind energy producers throughout the state, reducing the incentives for people and businesses to invest in solar energy. ECI and Sustainable Indiana 2016, along with a multitude of other ENGOs who collectively form a grassroots ENGO network, were present at the hearing. Despite their large presence, only a few representatives from the ENGO network were allowed to attend the hearing. Even though HB 1320 passed through the committee with a 9-4 vote, it was not put to a vote before the house due to widespread opposition. The Hoosier Environmental Council, one of the only ENGOs allowed to attend the committee hearing, stressed in one of its Bill Watch 2015 reports that although HB 1320 was not put to a vote, utility lobbies are seeking opportunities to reintroduce HB 1320's language into other legislative bills. The ENGO is providing continuous updates on this bill in order oppose any similar legislation that may be introduced to the house. (HEC 2015)

Media coverage over HB 1320 was scarce, however a recent report states that the Citizen Action Coalition, Common Cause of Indiana, and the Energy and Policy Institute filed a lawsuit against the House GOP in Marion Superior Court. The plaintiffs have accused the defendants of violating the Indiana Access to Public Records when they refused to release correspondence between the bill's author and utility companies earlier this year. (Russell) Given the relatively scarce amount of media attention given to HB 1320, it can be argued that the bill would have been put to a vote had the wide array of NGOs and other social groups been absent during the committee hearing. Where one individual NGO may not have been very influential, networks of NGOs acting in cooperation can, under the right conditions, hold moderate or high levels of influence in certain cases even when they have low levels of access to political negotiations. Although their influence is not great enough to see the implementation of a wide array of policies throughout Indiana that explicitly promote environmental sustainability, grassroots ENGO networks are able to band together and build coalitions with other types of NGO networks when possible to block policies that could hold negative environmental impacts. Outside of the political arena, grassroots ENGOs are continuously working to promote environmental sustainability and a Culture of Peace through engaging with social leaders and raising public awareness.

There are similar grassroots ENGOs throughout the entire state of Indiana that launch their own bottom-up campaigns and other activities to raise public awareness over environmental issues and climate solutions. These actions, although it is difficult to show within the limited scope of this qualitative analysis, has the potential to alter Indiana's desired future to one that emphasizes environmental sustainability over time. Overall, local ENGO networks are able to coordinate their efforts in order to overcome the structural limitations placed against them and influence the political and social arenas surrounding them in order to promote environmental sustainability and a Culture of Peace. This work occurs on a continuous basis in combination with the initiatives taken by each individual ENGO that occur within a much shorter time frame in order to directly push for more environmentally and socially peaceful government policies and practices of local businesses. With continued attention to this phenomenon and additional analyses, our understanding of the level of influence these ENGO networks hold could be more effectively and articulately explained.

ENGO Networks in the Global Arena

The global arena is quite arguably the most difficult of the global society to effectively analyze due to the vast quantities of information available and the prevalence of multiple issues that experience a nonlinear development. Keeping the aforementioned methodology and time frame in mind, this section is looking for general trends concerning NGO networks as part of the emerging transnational civil society described by McGrew as part of the global governance complex. The process being traced here is the increasing involvement of ENGO and other NGO networks throughout global politics. Most of the existing literature is focused on NGO influence impacting inter-governmental bodies and international environmental agreements, and it is for this reason that the focus of this analysis is on the influence ENGO networks exert on societal actors in addition to that exerted on political actors. Kal Raustalia provides some useful insights with which this process can be traced in this arena using a very broad time frame for international environmental treaties and institutions.

A multitude of examples of international environmental treaties and institutions that allow for NGO participation are provided in order to trace the increasing prevalence of NGOs, such as the International Covenant for the Regulation of Whaling (established in 1946), the Antarctic Treaty (1959), the Ramsar Convention on Wetlands (1971), the Convention on International Trade in Endangered Species (1973), the Convention for the Preservation of Marine Pollution from Land-based Sources (1974), the Convention on the Conservation of Migratory Species of Wild Animals (1979), the Montreal Protocol (1987), Agenda 21 (1992), and the environmental side of the North American Free Trade Agreement known as the North American Agreement on Environmental Cooperation (1994). Although not all of these treaties and agreements included formal rules for NGO participation at the time they were established, such rules were implemented later, as the International Covenant for the Regulation of Whaling did in 1977. Although formal rules for NGO participation are present in all of these cases, the degrees of NGO involvement vary nonlinearly, with more recent agreements providing less access to NGOs to others that were previously established. (Raustalia 719-724)

Raustalia argues that formal rules for the participation of NGOs occurs when member states of international environmental institutions are seeking to utilize the various resources or abilities these NGOs have at their disposal. These abilities and resources vary between different NGOs. Member states

allowed NGO participation in the field of policy research and development due to the difficulty of conducting research on the global environment due to the uncertainties and complexities that it entails. NGOs well suited for policy research are utilized by states in “maximizing policy information and research while minimizing expenditures,” as these states have usually familiarized themselves with the biases of major NGOs and can therefore use the entire body of NGO-produced research to check for exaggerations and poor data. NGO networks also produce information that is useful in monitoring state commitments, as the information produced by these states tends to be inadequate, even from states that are complying fully. International bodies encounter barriers when attempting to gather such information from member states due to issues of sovereignty, but states are less able to produce barriers against NGO networks due to their decentralized nature. States can then identify other states that are not fulfilling treaty commitments.

In working to ensure that agreements are ratified domestically, NGO networks allow for ways in which important societal actors can be brought into negotiation processes. This is not limited to the involvement of ENGO networks, but networks of NGOs representing business interests as well, helping to bridge the gap between international and domestic arenas, and allowing for supporters to be made out of potential opponents. Even in cases where NGO participation is formally permitted, participation may be limited to certain stages of negotiations. Additionally, while NGOs may be allowed to participate in formal meetings, they can still be excluded from informal meetings between state actors. (Raustalia 726-733) Raustalia concludes by stating that although it cannot yet be said for certain, the limited NGO participation initially allowed by states could eventually transform the global political landscape, diminishing the autonomy and power of individual and corporate actors that states and international environmental agreements are seeking to regulate. (736-737)

An analysis conducted over NGO influence on the Kyoto Protocol’s implementation echoes such sentiments, stating that although NGO networks were not successful in establishing legally binding consequences for states that fail to comply, NGOs can work to increase compliance throughout the private sector through raising awareness of businesses choosing not to adhere to international environmental standards, an action referred to here as NGO shaming. Steinar Andresen and Lars Gulbrandsen argue that NGO shaming can be effective in preventing investors from engaging in bad business projects. (69-73) This analysis also provides four global arenas within which ENGOs seek to exert their influence and promote environmental sustainabil-

ity. These arenas are international negotiations and processes, domestic climate policy and ratification, industry's climate policy and behavior, and finally public opinion. (Andresen and Gulbrandsen 57-58) The simultaneous actions of ENGOs throughout their entire respective networks in all of these arenas can arguably allow ENGOs to have a constant influence in promoting environmental sustainability and a Culture of Peace.

While all ENGOs are not inherently identical and do not always share the same specific goals, they can often be unified under the overarching goal of sustainable development. Therefore, where specific ENGOs may find their influence limited in certain political arenas, other ENGOs may be acting in certain social arenas where they can successfully exert their influence over specific actors. In cases where various NGO networks appear to have taken unified efforts to alter the behavior of societal actors through direct communication and raising public awareness, it appears that they hold higher degrees of influence.

Although international agreements over deforestation exist, it is difficult for them to be effective in regulating the behavior of MNCs that operate transnationally, creating issues over which actors should be ensuring that MNCs are complying with international agreements. However, various ENGOs acting alongside with other peace-oriented NGOs have been placing pressure on MNCs, including but not limited to global fast-food corporations, to make commitments not to contribute to deforestation.

McDonalds is generally understood to be a global leader in the fast-food industry, and has therefore been a primary target of NGOs seeking to end deforestation practices. Examples of NGOs communicating directly to these MNCs and raising public awareness of these practices by McDonalds and other fast-food corporations can be seen as early as 2006. The international ENGO Greenpeace launched a public awareness campaign explaining the role that McDonalds and various other corporations are playing in the destruction of the Amazon, which began with the releasing of a report titled *Eating Up The Amazon*. (Greenpeace) Greenpeace additionally sent four of its environmental activists to the Amazon to accompany four of McDonald's corporate leaders in order to show them the deforestation first-hand that goes into their global supply chain. (Kaufman) A Greenpeace news article states that, as a result of this campaign and direct communications from Greenpeace, McDonalds officially stated that it would begin working with their suppliers, Greenpeace, and other NGOs in order to develop zero deforestation plans. ("McVictory") This indicates that large ENGOs such as Greenpeace

have a considerable amount of access to societal actors such as MNC leadership.

The official statement in 2006, however, was not the end of the story. NGOs continued to monitor the corporation in order to pressure it to uphold this commitment. One such NGO was the Union of Concerned Scientists, (UCS) which continued to cover issues such as palm oil deforestation from the fast-food industry. (May-Tobin) UCS has a large array of professional researchers, and utilized them in creating the Palm Oil Scorecard for American corporations. The 2014 edition of this scorecard listed McDonalds as having taken “little commitment” to using sustainably sourced palm oil, which showed that the corporation had not successfully committed to its pledge to cut deforestation. (May-Tobin and Goodman 14)

Other international ENGOs like the World Wildlife Fund (WWF), provided assistance to McDonald’s in developing a plan to find responsible and sustainable sources for aspects of its supply chain such as beef, soy, coffee, packaging made of wood fibers, and palm oil. (Mims) The WWF also worked more generally with various other leaders of the beef industry to advance sustainable beef production. (World Wildlife Fund) On April 21, 2015 McDonald’s released an eight-point commitment to stop deforestation throughout its entire supply chain. (McDonald’s) Although the fast-food corporation stated that this policy would be effective immediately, some speculate that it will take up to 15 years to reach its zero deforestation targets. (Srinivas)

In order to ensure that such commitments are met, ENGOs like the Sierra Club work to maintain continuous public pressure on McDonalds through creating petitions found on its website that could be easily signed by members and visitors which are sent to McDonald’s Director for Sustainability. (Sierra Club) This case supports the argument that ENGO and other NGO networks, working in a decentralized fashion, are able to exert a considerable degree of influence over MNCs and perhaps other significant actors throughout the global society. These networks have been continuously applying pressure on, monitoring and raising awareness of the actions of fast-food corporations like McDonalds for at least 10 years in order to pressure them to adopt environmentally sustainable business policies.

This is consistent with findings in international business research over the ways in which NGOs can place checks on MNC behavior as while promoting social welfare and engaging in economic value creation. (Teegen et al. 472-473) Whether ENGOs will be ultimately successful in these efforts is yet to be determined, but the fact that McDonald’s has made multiple commit-

ments to environmental sustainability shows that these efforts have not resulted in failure. In the global arena, national and international ENGO networks are able to utilize their connections and relationships with significant political and social actors to enact Lederach's middle-out approach in order to promote environmental sustainability in the global society.

Conclusion

Although it was initially intended for application within the specific context of international environmental negotiations, Betsill and Corell's analytical framework for qualitative analysis can be modified for application in other political and social arenas. In order for the framework to maintain its qualitative value, modifications must be made to the observed actors, what qualifies as a success or failure for the observed NGOs, the social or political arena of analysis, and the time frame if cases do not have clearly identifiable start and end points. Lederach's framework for peace-building was a valid and effective tool for making such modifications, as promoting environmental sustainability is understood to be one of the actions that falls under the category of peace-building activities. Lederach's framework is valuable, because it allows for peace-building to be understood as a continuous process that occurs simultaneously at multiple levels and in multiple timeframes. Through further research and analyses involving cases throughout the global society, the modified framework applied in this project could be further improved and modified to improve its qualitative value.

Despite the fact that the cases observed here did not involve those at the national level, this framework seems quite useful for analyses at all levels of the global society, as it was applied within global and local arenas. The indicators used in this framework are not limited to identifying under what conditions NGOs can successfully exert influence, as they can be used to explain cases in which NGOs failed to achieve their objectives as well. The cases observed showed NGOs exerting significant influence in the global arena in the cases of implementing the Kyoto protocol and pressuring MNCs like McDonald's to adopt more environmentally responsible business practices. In the local arena, grassroots ENGOS like Earth Charter Indiana and Sustainable Indiana 2016 and their associated ENGO networks can exert influence in specific cases such as blocking policies like HB 1320, while simultaneously working in the social arena in a continuous fashion to raise public awareness of environmental issues and promote a Culture of Peace within their communities.

The fact that ENGO networks are present throughout all levels of the global society displays the importance in understanding their influence. This understanding would also contribute to improving the overall understanding of the current role of the transnational civil society within the global governance complex as well as the overarching global society, and understanding the potential for expanding this role in order to assist state actors in developing and implementing policies at all political levels. It is for this reason that the framework applied in this project, as well as other modifications of Betsill and Corell's framework, warrant application in future research of the role and influence of NGOs in the global society.

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“THE BARBARIANS OF HOLLYWOOD”: THE EXPLOITATION OF AURORA MARDIGANIAN BY THE AMERICAN FILM INDUSTRY¹

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Abstract

As the first genocide of the 20th century tore through Ottoman Turkey, advances within the film industry opened new doors for humanitarian aid. The story of Aurora Mardiganian, a teenage Armenian survivor, provided Americans with a visual representation of what mass atrocity looked like through the film *Ravished Armenia*. However, the means to which the film and accompanying autobiography were created exemplify a violation of ethics. Anthony Slide’s edited edition of *Ravished Armenia and the Story of Aurora Mardiganian* offers an insightful account of Mardiganian’s plight, and gives evidence to the claim that she was exploited physically, psychologically, and financially in order to yield the maximum profit. Mardiganian’s legacy highlights the need for remembrance over apathy, and active awareness over indifference.

Technological advances in media during the 20th century have impacted and helped shape American culture. Print media has always been an integral part of society, however, the appearance of visual media in the form of moving picture is a fairly recent development. One of film’s first subjects was Aurora Mardiganian, an Armenian Genocide survivor. Her autobiography entitled *Ravished Armenia: The Story of Aurora Mardiganian, the Christian Girl, Who Survived the Great Massacres* caught the attention of American filmmakers and inspired the film *Ravished Armenia* (also known as *Auction of Souls*). The film and memoir introduced Americans to an intense visual representation unlike newspaper articles and travel diaries. However, the means by which the film and its accompanying narrative were created show the intersection of ethics and humanitarian aid with its most undesirable outcome.

¹ “The Barbarians of Hollywood”: Aurora Mardiganian, *Ravished Armenia and the Story of Aurora Mardiganian* (Jackson: University of Mississippi Press, 2014), 63.

Filmmakers' presentation of Mardiganian's story overshadowed Mardiganian's humanity and sensationalized the suffering of the Armenian victims.

Born in the ancient city of Chmshkadzag in the Ottoman Empire in 1901, Mardiganian grew up with her parents and siblings in a comfortable and wealthy lifestyle until the genocide of 1915. When Mardiganian was 14, Husein Pasha—a prominent Turkish commandant—came to her home and demanded that she join his harem in exchange for her family's safety. Her father refused. A few days later, her father and brother along with 3,000 other men and boys were assembled in the city square and ordered to march into the unknown.² Mardiganian never saw her brother or father again. With her father and brother gone, Husein Pasha seized Mardiganian and began her exploitation in the harems of wealthy pashas and her brutal journey through the deserts of the Ottoman Empire.

Mardiganian's autobiography may be the account of one girl's experience, but it is representative of some of the ways in which many Armenians were brutalized. Theft, rape, massacre, and torture were prevalent throughout the memoir. The women were regularly subject to violence from Turkish *zaptiehs*, kidnapping by nomadic groups of Kurds and Chetchens, starvation, and rape. In *The Burning Tigris*, Peter Balakian discussed the treatments of the women who converted to Islam. "The gendarmes robbed them all, stripped the women and raped them in front of their husbands, who were tied up and forced to watch before they were killed."³ They were offered the chance to renounce their Christian faith and take the Oath of Mohammed. Many refused and were tortured and killed. Some did take the oath, but continued to adhere to their faith in secret. Mardiganian's chances of survival were improved by this strategy, leading the gendarmes to believe she was a converted Muslim girl. She was able to stay alive through the marches and was picked to be taken to different harems. At the last harem, that of Ahmed Bey, she witnessed the murder of her mother and siblings. Shortly after being reunited, she was made to watch as they were whipped and stabbed to death under the orders of Ahmed Bey and his son.⁴

² Death marches were used as the primary form of torture and annihilation of the victim groups. In most cases, men were murdered outright while the women and children were marched across the desert without adequate food, clothing, water, and shelter.

³ Peter Balakian, *The Burning Tigris: The Armenian Genocide and America's Response* (New York: HarperCollins Publishers, 2003), 253.

⁴ Mardiganian, 179.

The murder of her family inspired Mardiganian to risk her life and attempt an escape. She embarked on a journey across the Dersim (a region of deserts, home to the Dersim Kurds) in hopes of reaching the city of Erzeroum near the Russian front. She was met with acts of kindness from the Dersim Kurds, a people “without the lust of killing human beings...” and to this “she owed her life.”⁵ After months of wandering, Mardiganian finally reached the city of Erzeroum in 1917. In her memoir, she recalled her arrival and being greeted by a “beautiful sight—the American flag.”⁶ By this point, she had walked approximately 1400 miles.⁷ Under the protection and funding of the American Committee for Armenian and Syrian Relief (commonly known as the Near East Relief) she travelled through Tiflis, Petrograd, Sweden, and finally America.⁸ Before she left for America, she was visited by General Andranik Ozanian.⁹ “When you reach the beloved land,” he said, “tell its people that Armenia is prostrate, torn and bleeding, but that it will rise again—if America will only help us—send food for the starving, and money to take them back to their homes when the war is over.”¹⁰ It is perhaps this message that inspired Mardiganian to tell her story and spread awareness once she reached the United States.

At the time of Mardiganian’s travel to the United States, she was entering a country where there was some degree of public knowledge of the atrocities. For over two years, the world had learned of the horror experienced by Armenians through firsthand accounts and visual evidence.¹¹ In December of

⁵ Mardiganian, 185.

⁶ Ibid, 188.

⁷ Ibid, 88.

⁸ Near East Relief was an organization formed in direct response to the massacres, and which worked to aid in humanitarian relief.

⁹ Ibid, 189. General Ozarian (1865-1927), throughout his life, remained a symbol of nationalism and strength among the Armenian people.

¹⁰ Ibid, 190. In 1916, shortly before Ozarian made this remark to Mardiganian, the persecuted Armenians were in a particularly delicate position, as Ottoman authorities were attempting to halt any and all aid to them.

¹¹ Visual evidence was provided in 1915 most famously by Armin T. Wegner, a German nurse and second lieutenant who witnessed the state of survivors in numerous refugee camps. He defied orders and took hundreds of photographs that today are invaluable in our study of the Armenian Genocide. A few of these photos may be seen in Balakian’s *The Burning Tigris*.

1917, there was even talk of engaging in war with the Ottoman Empire. Balakian notes, “With more than two decades of American anger against Turks for their treatment of the Armenians, public opinion favored war with the Ottoman Empire.”¹² An intense debate ensued, but in the end, America would not go to war with the Ottoman Empire.

When Mardiganian landed at Ellis Island in 1917, she was sixteen, an orphan, ignorant of American culture, and desperate to locate one of her brothers who was rumored to have survived the genocide and sought refuge in the United States. An Armenian couple took her in and helped her post newspaper advertisements to find her brother. These advertisements led to public interviews and soon caught the attention of Harvey Gates, a famed screenwriter with a special interest in Mardiganian’s plight.

Although Gates and his wife Eleanor claimed to want to take care of Mardiganian, they ultimately steered her down a path of exploitation.¹³ Mardiganian shared her story (through a translator) with Gates who published it in 1918 under the title *Ravished Armenia: The Story of Aurora Mardiganian, the Christian Girl, Who Survived the Great Massacres*. The writing of this autobiography deserves closer scrutiny. At the time, Mardiganian knew very little English and Gates could have altered her story without her knowledge. General Andranik’s message mentioned above may have been altered by Gates to foster a reaction from the public and spur higher book sales.

Gates’ urging Mardiganian to recreate her plight suggests that Harvey and Eleanor Gates (then her legal guardians) did not have her best interests at heart. She was told if she signed a set of papers, she would be able to travel to Los Angeles to have her “picture taken.” However, she believed this meant taking a still photograph, not filming a movie in which she would play the leading role.¹⁴ Some argue that the Gates’ simply wanted Mardiganian to have a solid income and that they were unaware she had misunderstood the terms. At the time, however, she was a traumatized and vulnerable adolescent who knew little to no English. It is difficult to imagine that an orphaned genocide survivor would have willingly signed up to reenact her repeated rape, exploitation, and the murder of her family. However Mardiganian came to sign the legal papers, it was decided that she would make \$15 a week

¹² Ibid, 305.

¹³ Slide, 12.

¹⁴ Ibid, 12

to star in the film *Ravished Armenia*. Colonel William N. Selig acquired the film rights and Near East Relief (NER) co-produced the film.¹⁵

Mardiganian made her way to Los Angeles, unknowing of what she had agreed to. She faced numerous psychological and physical challenges during filming, many of which could have been avoided. “The first time I came out of my dressing room,” she recalled, “I saw all the people with the red fezzes and tassels. I got a shock. I thought, they fooled me. I thought they were going to give me to these Turks to finish my life. So I cry very bitterly. And Mrs. Gates say, ‘Honey they are not the Turks. They are taking the part of those barbarics. They are Americans.’”¹⁶ While shooting a scene that required her to jump from roof to roof, she fell and broke her ankle. She was not allowed to rest and heal her injury and was made to continue shooting with bandages in full view. Film historian Anthony Slide remarks: “Audiences were presumably expected to believe the bandages covered wounds inflicted by the Turks rather than the barbarians of Hollywood.”¹⁷

These instances of neglect represent a process of retraumatization, where Mardiganian had to relive the horrifying experiences of the genocide. She was not offered psychiatric care to help her heal. To put this concept in perspective, draw a hypothetical example from the Holocaust. It is highly unlikely to think of a Holocaust survivor acting in their own semi-biographical film a year after they arrived in the United States. The process of healing for a genocide survivor is intense and arduous; having to act out the scenes that haunt one’s memories would complicate it further.

The plot of the film *Ravished Armenia* did not accurately represent Mardiganian’s experience. Indeed, many aspects were altered or fabricated for Hollywood. Anthony Slide, editor of Mardiganian’s autobiography, *Ravished Armenia and the Story of Aurora Mardiganian*, provided a forward, introduction, narrative, and full script of the film highlighting the discrepancies between her story and the version created for Hollywood. Scenes of naked Armenian women crucified in the Ottoman desert look like a western Christian’s visualization of the traditional upright cross. Only years later would Mardiganian admit that this was a false depiction. “The Turks did not make their crosses like that,” she explained, “The Turks made little pointed crosses. They took the clothes off the girls, they made them bend down. And after rap-

¹⁵ Ibid, 13.

¹⁶ Ibid, 15.

¹⁷ Ibid, 15.

ing them, they made them sit on the pointed wood, through the vagina. That's the way they killed—the Turks. Americans have made it a more civilized way. They can't show such terrible things.”¹⁸ The filmmakers also inserted the character Andranik to create a love interest for Mardiganian. In reality, Andranik was romantically involved with her sister Lusanne until his death in 1915. Miss Graham, a Christian schoolteacher from England, was given an expanded role in the film, heroically following the Armenian girls on death marches and into harems. In Mardiganian's autobiography, Miss Graham disappears early on, but the audience is led to believe that she was taken away and killed by Turkish *zaptiehs*. These inauthentic characters and situations add an inappropriate Hollywood flare. The average contemporary viewer would not have noticed such historical alterations. In the end, the film is a shadow of reality—a truth that Mardiganian exhausted herself trying to communicate to Americans.

While Mardiganian's exploitation was hidden behind closed doors, sensationalist studio promotions for *Ravished Armenia* were in full swing. By the time the film was released in 1919, Selig Studios and NER had created and distributed numerous film posters. These posters indicate that the filmmakers attempted to create shock value to improve monetary outcomes. One poster, for example, depicted a brutish man—a Turk—wielding a bloody sword in one arm and carrying away a terrified Armenian victim looking delicate and helpless. The poster depicted the Turks as savages and a danger to Christian girls, racking up a death toll around 4 million. The filmmakers had no way of acquiring such a number. In a promotional review published in 1919, key words and phrases include “tragic,” “tender romance,” and “the drama of Armenia,” intended to spark emotional responses from viewers or readers. For the film, they add an inappropriate theatrical component to a hellish narrative of survival. Other advertisements sexualize Mardiganian in a way that showed “Hollywood's concept of a pin-up.”¹⁹ In the case of *Ravished Armenia*, the NER's advertisements masked the woman behind the story.

Although the film industry's advertising methods for *Ravished Armenia* were distasteful, they were effective. This is particularly significant because the NER claimed that all proceeds would go to support relief efforts for Armenians. The amount of money that actually made it to Armenians is unknown. *Ravished Armenia* was a commercial success. Ticket prices were \$10

¹⁸ Ibid, 10.

¹⁹ Mardiganian, 41.

—more than ten times the average ticket price.²⁰ Film screenings were almost always accompanied by distinguished speakers, luncheons, and other special events.²¹ Box office records were broken in a number of cities, including Detroit, and Dayton, Ohio.²² Outside of its notable financial success, the film received many positive reviews. Hanford C. Judson of *Moving Picture World* wrote, “This picture is too big and too affecting for words to tell much of the impression it makes on the spectator. It is so reverently done and so wonderfully true to humanity in all that it shows... Nothing could be more affecting than this vivid picture of the greatest tragedy of the world.”²³ The list of positive reviews for the book and the film ranged from sources such as the National Board of Review of Motion Pictures, *Motion Picture News*, and the *Exhibitor’s Trade Review*.²⁴

Publicists emphasized that the film was made to support NER’s effort in raising \$30 million to aid the victims of the atrocities. Before Mardiganian and her survival story, America was in a state of heightened awareness of the Armenian genocide. This was largely due to Ambassador Henry Morgenthau, whose pleas for action brought the atrocities in the Ottoman Empire to light. Compared to other instances of powerful hidden agendas behind calls for humanitarian aid (whether political or military), American calls for relief were fairly honest. As a neutral party, the United States formed numerous relief organizations including the NER (formerly the American Committee on Armenian Atrocities).²⁵ This particular organization was highly successful in making fundraising for relief a priority for Americans even before they began to use film in fundraising campaigns.²⁶ When the organization ended its operations in 1929, it had raised more than \$116 million.²⁷ In today’s terms,

²⁰ Leshu Torchin, *Creating the Witness: Documenting Genocide on Film, Video, and the Internet* (Minneapolis: University of Minnesota Press, 2012), 38.

²¹ Torchin, 38.

²² Mardiganian, 24.

²³ Mardiganian, 21.

²⁴ Mardiganian, 19-21.

²⁵ Balakian, 280.

²⁶ Torchin, 31.

²⁷ Balakian, 280.

this sum would be in the billions.²⁸ Americans appeared to rally around NER's cause. Some claimed that "the special appeal of the Near East Relief transcended anything in the way of a nationalizing movement of charity and brotherhood that we have ever known."²⁹ With the addition of film to the fundraising effort, the NER became pioneers in spreading awareness of genocide through the cinematic medium.

The tactic to use film to raise public awareness had never been utilized and yielded noteworthy results. However, one must always ask: at what cost? In this case, Mardiganian suffered during and after the filming of *Ravished Armenia*. After her injury exploitation on set, she was thrown into the unfamiliar chaos of Hollywood. Burdened by countless special appearances, she was forced to complete a national promotional tour and held to unreasonable expectations of behavior. Mardiganian was expected to behave as "a normal American girl," despite her background. In the March 1919 issue of *New York American*, a journalist reported: "Miss Aurora seemed to be annoyed; she avoided answering the questions put to her... When the meal was finished and she had retired to her apartments with her guardian, Miss Aurora was gently chided."³⁰ Mardiganian viewed talking during a meal as something that interfered with her need to pray to God for her "poor starving Armenia."³¹ Following this incident and the tour, Mardiganian's condition declined even further. After making an appearance at a film screening in Buffalo, New York in May of 1920, she suffered a complete mental breakdown in public.³² Eleanor Gates sent her to a convent, while Harvey Gates hired seven look-alikes to handle publicity and screenings in her place. However, the damage was done and Mardiganian threatened suicide. After this, she left New York to stay with Mrs. Oliver Harriman, whom she had met shortly after her arrival in America.

The exploitation of Mardiganian extended to her compensation—or lack thereof—for the film. According to Anthony Slide, she earned \$15 a week (about \$213 today). Upon completion of the film, she received \$7,000 (about \$86,967 today), but the Gates deducted a total of \$6,805 for "personal ser-

²⁸ Balakian, 280.

²⁹ Balakian, 280.

³⁰ Mardiganian, 25.

³¹ *Ibid*, 25.

³² *Ibid*, 25.

vices,” a chauffeur, a nurse, and the seven look-alikes. This left her with \$195 (about \$2,422 today). After a later payment and effort to help a surviving family member, Mardiganian ultimately made \$4,745 (about \$58,976 today).

Ultimately, the fame and popularity of *Ravished Armenia* was short-lived. By the late 1920s, it began to slip from the public radar and eventually disappeared altogether. Today, all that is left is twenty minutes of film. The political climate of the time, particularly the rise of Nazi Germany and the alliance between Germany and Turkey, may have caused screenings to be cancelled.³³ For years, Turkey, Germany, and the United States were bound by appeasement. In 1934, the film rights to Franz Werfel’s *The Forty Days of Musa Dagh* were sold to MGM. The film was adapted from Werfel’s best-selling novel and depicted the true story of the Armenians of Musa Dagh during the genocide. The Turkish Ambassador informed the United States that they would view the project as a hostile act unless it was dropped by MGM immediately.³⁴ Under the leadership of the Kemalists, denial of the genocide was integrated into the post-war narrative in Turkey: “In their efforts to create a monolithic, homogenous Turkish state after the war the Kemalists created a totalistic nationalism that was built on several foundation myths.”³⁵ The formation of a new Turkey required more divisions between groups. At the same time, the United States pursued an open door policy for oil in Mesopotamia.³⁶ These factors contributed to the Armenian genocide’s “disappearance into the black hole of historical amnesia in the United States.”³⁷

Mardiganian continued to live in America even as the country forgot about her and her story.³⁸ She settled in California, married a fellow sur-

³³ Within Mardiganian’s narrative, there is an incident of rape committed by German soldiers.

³⁴ Balakian, 377.

³⁵ Taner Akcam qtd. in *The Burning Tigris*, pg. 375.

³⁶ As Balakian describes, oil would play a considerable role in genocide recognition in the U.S. Oil was, and still is, a highly valued resource—one that Turkey had and the U.S. needed.

³⁷ *Ibid*, 377.

³⁸ It was not until the vocal and turbulent culture of the 1960s in the U.S. that a conversation about the genocide started to emerge. In Turkey, denial was an integral part of the national narrative when it came to the Armenian Genocide. Such hateful sentiment may point to why Mardiganian and other survivors would have remained quiet about their experiences.

vivor, and had children. In 1994, she was moved to a residential care facility where her experience in the Ottoman Empire was recorded by the Zoryan Institute of Canada.³⁹ She passed away on February 6, 1994 at age 92, estranged from her only living son.⁴⁰ Like *Ravished Armenia*, Mardiganian was forgotten for the majority of the 20th century.

Even as *Ravished Armenia* was nearly forgotten, it may have achieved Mardiganian's initial goal. She wanted to raise awareness of the ongoing violence in the Ottoman Empire to elicit aid for Armenian victims. Because of her account, Americans had (and have) a visual of mass atrocities in the Ottoman Empire. Although some aspects of the film were fabricated or altered, there were a number of accurate elements. In one scene, a woman holds her daughter, who was brutally raped. She then dies in her mother's arms. Mardiganian and other survivors' preserve the memory of the countless women who were raped and murdered during this period. Mrs. Oliver Harri-man of the National Motion Picture Committee commented on the purpose of the film beyond its commercial value. "The whole purpose of the picture," she explained, "is to acquaint America with ravished Armenia... to visualize conditions so that there will be no misunderstanding in the mind of any one about the terrible things that have transpired."⁴¹

From the early days of her arrival in the United States, Mardiganian was taken advantage of in nearly every way. She was misled, misinformed, underpaid, neglected in her unique and sensitive psychological needs, and pushed beyond her mental and physical limits. American modes of advertisement sensationalized her horrific story for financial gain and created inaccurate images of the genocide. Despite these morally questionable methods, the money raised for the NER was considerable. In *Creating the Witness*, Leschu Torchin remarks: "the work of NER yields considerable insight into the strategies and processes necessary in using media to produce witness publics who can understand and act upon the information presented."⁴² One cannot overlook the groundbreaking strategies they employed, including using a moving picture to visualize genocide.

³⁹ Mardiganian, 27.

⁴⁰ Ibid, 27.

⁴¹ Torchin, 38.

⁴² Torchin, 60.

In recent years, Mardiginian's account and sacrifices have received attention as the Armenian genocide is remembered and acknowledged. The Armenian diaspora has honored Mardiganian's memory with the Aurora Prize for Awakening Humanity.⁴³ Backed by 100 Lives (an initiative aimed at keeping the spirit of Armenian remembrance alive), the prize is given annually to a recipient whose effort helps preserve human life. It consists of a \$100,000 award and a million dollar grant.⁴⁴ Director of the Armenian Genocide Museum-Institute in Yerevan, Dr. Hayk Demoyan, is publishing a book with new information about Mardiganian and creating a traveling exhibit of her story.⁴⁵ It is because of these efforts that her story has been reawakened and used to better understand and commemorate the Armenian Genocide. Some may question the relevancy of this historical event, but to this day, the Turkish government has not recognized the massacre of 1.5 million Armenians as genocide. The Armenian Genocide occurred one hundred years ago and Mardiganian passed away 21 years ago. However, the events of the past are crucial to our understanding of the world today. Holocaust survivor and author Elie Wiesel said that "without memory, hope would be empty of meaning, and above all, empty of gratitude."⁴⁶ We remember Aurora Mardiganian with gratitude for her courage in telling her story.

⁴³ Rick Gladstone, "Armenian Leaders Establish Rights Award to Commemorate Centenary of Genocide," *New York Times*, Mar. 10, 2015. <http://nyti.ms/1BlnAuH>

⁴⁴ For more information on the Aurora Prize for Awakening Humanity, or the 100 Lives initiative, visit <https://100lives.com/en/>.

⁴⁵ Alin K. Gregorian, "Scholar Captures Tragedy, Miracle of Aurora Mardiganian's Life Story," *Armenian Mirror-Spectator* (Watertown, MA), Mar. 24, 2014. <http://www.mirrorspectator.com/2014/03/24/scholar-captures-tragedy-miracle-of-aurora-mardigianians-life-story/>

⁴⁶ Elie Wiesel, "Elie Wiesel: Days of Remembrance Excerpts," *United States Holocaust Memorial Museum Holocaust Encyclopedia*, last modified June 20, 2014, <http://www.ushmm.org/wlc/en/article.php?ModuleId=10007199>.

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WHY DO BOYS LOVE *FROZEN*?

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Abstract

Frozen holds box office records for both Disney Princess films and animated features as a genre. The key to its success was capturing not only girls, but the whole child market of both girls and boys. How did “a princess movie” come to capture the heart and mind of the stereotypical American boy? Through analytical review of the film, as well as previous research on boys and their media preferences, I identify four factors that contribute to *Frozen*’s success: focused advertising, exciting action scenes, appealing humor, and a higher ratio of male to female characters. These factors have enabled boys to declare their love for *Frozen* without feeling the pressure of society telling them they were straying from gender appropriateness. My research demonstrates how certain features of a film can be influential, as well as the solidified nature of gender constancy in young boys, since the aspects that were meant to appeal to them did.

Introduction

For many months in 2013 and 2014, the lyrics from “Let it Go,” “Do You Want to Build a Snowman,” and “Love Is an Open Door” could be heard in grocery store aisles, the halls of schools, pediatricians’ waiting rooms, and in all corners of America where children were found. Boys and girls of all ages (and many adults who know and love the songs better than the children do) have caught *Frozen* fever. And America’s rough-and-tumble boys love the all-time best-selling Disney Princess film just as well as anyone else. *Frozen* is no typical princess movie; it is a bonafide action packed film, filled with humor and classic stories of bravery, good-vs-evil, and love. So what exactly has allowed *Frozen* to be so well-received by young male audiences?

Literature Review

Before exploring *Frozen* in further context, it's important to establish that Disney movies have been criticized and analyzed at both the scholarly and popular level and have been shown to be highly influential in developing gender constancy in boys. Gender constancy reflects a child's growing and evolving understanding of the attributes that make them a girl or a boy. Though Faherty (2001) states that "it is apparent that there remains much skepticism some moderate, some intense concerning Disney's impact on children, families, and society itself" (p.4), Towbin (2003) identified five male stereotypes created by Disney:

"(a) Men primarily use physical means to express their emotions or show no emotions; (b) Men are not in control of their sexuality; (c) Men are naturally strong and heroic; (d) Men have non-domestic jobs; and (e) Overweight men have negative characteristics" (p. 28)

Not only do young boys and girls see these movies in the theater, they watch them repeatedly once they own them (Lin, 2001). This repeated viewing helps explain why Disney films are so influential over youth and how they serve as secondary socialization agents.

Previous research has identified a number of factors that spark a boy's interest when it comes to advertising, television shows, movies, or other media. As Bem (1983) noted, these factors don't spark interest because of nature or some biologically determined "boys will be boys" characteristics, but rather as the result of primary and secondary socialization agents such as a child's relationships with real people, fictional characters, and play things. Factors that appeal to boys and girls appeal to them because their gender identity is socially constructed; their preferences can be seen an expression of that identity. For example, Kline (1993) found that non-stop action and seeing male lead figures are important to young male audiences when determining if what they are watching is appropriate to their gender. Drawing on marketing studies of children's heroes and character preference, Kline (1993) believes market research magnified differences between boys and girls by describing boys as predisposed to pick up on heroic acts and preferring "rough and tumble characters who are on the right side of cataclysmic struggles between good and evil and win" (p. 195). These kinds of recommendations became the basis for the development of the Teenage Mutant Ninja Turtles and Power Rangers. Hoffman & Cantor (1991) suggest that the appeal and enjoyment of action-packed and mildly frightening programs stems from children's sense of relief when the good guys win,

noting specifically that "3-11 year olds frequently mentioned relief from threat or danger as a reason that movies or television shows make him feel happy" (p. 42). Similarly, Thompson's (2001) analysis of Harry Potter contends:

"Harry exhibits those masculine traits American males so love to call their own: he is self-reliant, a risk taker, athletic, a leader, independent, defends his beliefs, protects the underdog" (p. 48).

Together, these studies indicate that a need for action, bravery, and comedy are ingrained masculine traits in American boys. It is also important for boys to see other boys in whatever they are watching. In his analysis of toy advertising, Kline (1993) reports that "peer play" is a dominant feature of ads aimed at children and that the kind of peer play depicted in ads is highly gendered (e.g, fewer than 23 % of children's commercials show boys and girls together). As Kline (1993) notes:

"The marketing logic behind this decision is clear. Children not only identify with kids they like but they often have a negative response to the child actors in the ads, those whom they find 'unrealistic,' 'inappropriate,' or simply not someone they would 'like to play with' . . . when producers use children who are too young or the wrong sex for the target group playing with the toy, kids complain" (p. 249).

It is reasonable to assume that they respond similarly when they see movies or television programs and won't hesitate to tell you "that's for babies!" or "that's for girls!"

It is also important to review the recent history of Disney Princess films to understand why have Disney has taken them in a gender-neutral direction. There have been four modern Disney Princess movies introduced since 2009: *The Princess and the Frog* (2009), *Tangled* (2010), *Brave* (2012), and *Frozen* (2013). *Princess and the Frog* underperformed at the box office, bringing in 222 million dollars of revenue (Orenstein, 2011). Though controversy was expected with Disney's first black princess character, low sales could not continue. By marketing to only girls, Disney Princess films were excluding half the child market (Orenstein, 2011). Notice the change of movie titles: *Tangled*, *Brave*, and *Frozen* are more gender-neutral and help make the films marketable to boys. The content of the films is also more gender neutral, focusing on action, bravery, and comedy, which are known to appeal to boys. With *Frozen*, Disney seems to have come up with the ideal formula to appeal to both boys and girls in a single film.

Methods / Results

To further investigate why boys love *Frozen*, I have conducted a content analysis to identify aspects of the movie that have specifically drawn such a wide male audience. Through watching the film, reviewing advertisements for the movie, researching scholarly articles on how boys and girls establish gender appropriateness, I identified a number of factors that made it so appealing to the young male audience. These factors include: gender-neutral advertising, action-packed scenes, including humor appealing to boys, and including a high ratio of male to female characters.

Analysis

ADVERTISING

In making *Frozen* marketable to boys, they had to be made to feel that it would be socially acceptable for them to see and like the film. This is crucial to *Frozen's* success because in commercial advertising, boys only respond to advertisements that fit into what they have come to understand as male attributes once they have developed gender constancy (Smith, 1994). Gender constancy is a forerunner to gender identity formation — the understanding that gender is a stable or permanent thing that can't be changed like a hairstyle or clothing.

Disney had to exclude titles with a feminine feel, so *Ice Queen* or *Snow Queen* would not have been considered. *Frozen*, however, is a gender-neutral term. Bem (1983) explains that children develop a readiness to organize information based on the gender schema theory concept that humans learn to cognitively categorize terms, items, and activities. Children are able to identify and discard sex-inappropriate words quickly and acquire terms that are sex-appropriate. However, when given an object that is neither, they are much slower to decide. Since there is no predetermined psychological association with the word “frozen” to link the child's mind to the boy category or the girl category, children will predetermine, based on the title, that the movie is for both genders.

Trailers are a very significant part of movie advertising, offering children the opportunity to decide whether the movie is for girls, boys, or both. The most-viewed trailer featured an unnamed snowman and reindeer across an ice pond from one another. The snowman sneezes, causing his carrot nose to skid across the pond. The reindeer sees the carrot as a snack

and both characters race for the treat/appendage. The reindeer wins their “race,” but instead of eating it, tosses it back to the snowman to play catch. The reindeer’s fur sends fluffs into the air causing the snowman to plug his carrot nose and sneeze, which causes his snowball head to blow off (Del Vecho, 2013). This trailer isn’t associated with princess or people at all, for that matter. It showed sport-like activity, friendship, and humor, all of which a boy would identify as acceptable to watch. In an interview between a father and son, when the boy was asked what he thought the movie would be about, he replied: “ I just thought it would be about the snowman and the reindeer, and they’d just be walking around *la de la de la*” (Rowels, 2013).

ACTION-PACKED

Advertising alone cannot make a movie the best-selling animated movie of all time. Boys, girls, and their parents had to have loved it after its theatrical run for it to become the best-selling home-owned movie of all time. Boys particularly appreciate the numerous action scenes that in the film. A scene in an ice castle is an excellent example. Prince Hans, Ana’s romantic interest, and his men, including a contingent of villains, journey to find Ana and Elsa, the sister protagonists, to end a curse of eternal winter. Once the group arrives at Elsa’s ice castle, the villains try to destroy the her. She uses her powers to defend herself and the ensuing battle puts the villains in serious peril (Del Vecho, 2013). The scene is family-friendly and not overly violent and it is one of many in the movie, including a wolf attack, a monster snowman attack, a perilous moment for one of the protagonists, and a climactic blizzard featuring close calls and heroic acts (Del Vecho, 2013).

This concept of non-stop thrill and action helps filmmakers capture boys’ attention. Kline's (1993) examination of toy advertisements highlights the importance of the action and excitement in attracting the young male audiences because “boys are inclined to prefer masculine, invulnerable, invincible, strong-arm dominate action figures” (p. 195). Though Kline is describing character toys, this offers an evidential basis for the young male mind and his inclination for action-oriented scenes. As mentioned earlier in the literature review, American boys are often self-reliant and risk-takers, which lead them to being predisposed to enjoying action-packed scenes in media (Thompson, 2001).

BOY HUMOR

Frozen is chockfull of humor of the sort often enjoyed by boys. When male lead Kristoff is riding in a sleigh with Ana, he asks her how well she knows her love interest:

Kristoff: Have you had a meal with him yet? What if you hate the way he eats? What if you hate the way he picks his nose?

Anna: [disgusted] Picks his nose?

Kristoff: And eats it.

Anna: [annoyed] Excuse me, sir, he's a prince.

Kristoff: All men do it.

(Del Vecho, 2013)

This use of “boy humor” engages boys in the film and indicates a certain earthy sense of humor calibrated for the male audience. Aubrey & Harrison (2004) demonstrate that humor is considered a male attribute and hypothesized that a television program would need to feature a joke-telling character to please young male viewers. Through their study, they found that boys thought it was very important for a television show to have a humorous male character. Similarly Thompson (2001) deconstruction of the characters in the *Harry Potter* series revealed that Ron and Harry would rather have fun and be humorous (stereotypical boy attributes) than be studious (stereotypical girl attributes). This isn't to say that girls can't and don't enjoy these parts of the movie, but traditionally in our gender-stereotyped society, cruder jokes are reserved for the pleasure of the male audience.

BOY V. GIRL RATIO

The significant number of leading male figures in the film also help endear *Frozen* to boys. For children to determine whether or not something is for their gender, it is important for them to see their gender presented in it (Kline, 1993). While *Frozen* has been praised by feminists for featuring strong female protagonists in Elsa and Ana who are able to save themselves, the film also features at least four major male characters (Kristoff, Olaf the Snowman, Sven the Reindeer, and Prince Hans) who act bravely and heroically. Smith (1994) states a “that when gender-constant children saw advertisements showing models from only one sex, their subsequent behavior dramatically changed. Children either shunned or played with a toy depending on the sex of the models in the advertisement” (p. 4). Ultimately,

the appearance of an equal or greater number of male to female characters would be an important aspect for a boy, who has just developed gender constancy, to determine if they were allowed, or supposed to like the movie or not. In contrast to previous Disney Princess films, there was a 5:2 male to female ratio in *Frozen*.

Limitations and Future Research

An important caveat relative to the identification of gender-typed preferences in this analysis is that these preferences are not considered to be “natural” or inevitably tied to a child's biological sex, but socially constructed through children's relationships and experiences with primary and secondary socialization agents. Further, focusing on aspects of the film that specifically appealed to boys may obscure the story elements and aspects of the film that appeal to both boys and girls. Gender scholars generally recognize as Bem (1983) notes: “there is remarkable variability of individuals within groups as compared to the small mean differences between groups” (p. 613). Therefore, it is possible that relief from being scared and active heroines and heroes are gender-shared rather than gender-specific enjoyable elements. Teasing apart these differences could be a fruitful avenue for future research.

Another related issue for future research is to see how children's gendered preferences maybe changing and even be converging. For example, movies released since *Frozen* (e.g., *Star Wars: The Force Awakens*, *Home*, *Inside Out*) have strong, active female lead characters and seem to appeal to both boys and girls. Additional research is needed to analyze non-Disney Princess films based on the qualities identified in *Frozen*, as well as Disney films featuring non-human heroes.

Conclusion

By producing *Frozen* for male and female audiences, Disney doubled the size of the princess movie market and reaped substantial financial rewards. Moreover, these gains weren't just in the theater, but with merchandise as well. The success of the movie represents how solidified gender development has been in young boys, since what should have captured their attention and affection most certainly did, and contributed to the success of the film. Whether this deep-rooted form of gender development is a good thing will be determined by the ever-evolving culture in the United States. In the 1950's,

allowing a boy to play with baby dolls and questioning what made a man a man was not permissible within traditionally accepted gender norms. However, today, many parents are trying to let their children decide for themselves what it means to be a boy or girl. This research also demonstrates the impact of adding or removing certain features in a film. If the movie had a different title or avoided battle scenes, it seems unlikely that *Frozen* would have been as appealing to both boys and girls. Even at the time of this article's publication, three years after the movie's release, *Frozen* is everywhere. With an inevitable sequel due in 2018, Disney has the formula down for another hit designed to entice a new age group of girls and boys alike.

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"SEE OURSELVES AS OTHERS SEE US": EMPATHY ACROSS GENDER BOUNDARIES IN JAMES JOYCE'S *ULYSSES*

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Abstract

Many critics originally attacked James Joyce's *Ulysses* for its dark representation of gender relations. Today, many scholars consider this criticism prematurely formed and recognize that these early critics responded more to Stephen Dedalus's antagonistic, misogynistic views in the novel's opinion chapters than to the rest of the epic and the views of the novel's main protagonist, Leopold Bloom, who displays a much more receptive, appreciative attitude toward women. These scholars now believe that gender relations as portrayed in *Ulysses* actually undermine preconceived notions of a gendered hierarchy. However, this difference in character perspective is not the only or even the most important way that the novel challenges gender hierarchies. In addition to the shift in character perspective, Joyce's epic also includes a narrative arc that uses sexuality as a metaphor, transforming Bloom's various sexual encounters—namely those with Gerty McDowell, Bella Cohen, and Molly Bloom—into a commentary on how intimate sexual interactions between genders can not only potentially help men and women transcend structures and preconceived notions of separation but can also enable greater depth of perception, both empathetically and artistically.

The bifurcation of the hitherto single order of sensed-experience into the two orders of thought-existence and real-existence matches precisely that emergence of dual agencies, opposite but related, which supervened upon the organic world in the principle of propagation of organic species by the joint action of male and female...Both create their antithetically related differences out of powers which basically are homogenous and one. (Dora Marsden, "Our Philosophy of the 'Real'" (1918), qtd. in Stearns 469)

This statement by early twentieth-century feminist and magazine editor Dora Marsden first appeared in the May 1918 edition of her periodical *The Egoist* (1914-1919) as part of her article "Our Philosophy of the 'Real.'" This

article was directed against James Joyce, whose *A Portrait of the Artist as a Young Man* she had published serially in the same periodical from 1914-1915. In “Our Philosophy,” Marsden accused Joyce of failing to provide an appropriate perspective on gender relations in the opening chapters of *Ulysses*, which had been published serially in *The Little Review* in the winter and spring of 1918. In Marsden’s view, the fictional reality presented in these early chapters was one in which material and social reality was composed of irreconcilably antagonistic forces, from abstract concepts such as subject and object to more biologically based concepts such as male and female. Joyce’s portrayal of men and women as opposing forces with seemingly little inclination toward “homogeneity” or “oneness” especially irked Marsden. She found Stephen Dedalus’s dark, resentful perception of the world around him—particularly his deeply anxious ambivalence regarding gender—to be grossly skewed, as it casts women in the highly unfavorable light of an inimical force that hinders men like Stephen from achieving their true potential as masculine subjects and artists. “Our Philosophy,” then, was written not only to address this perceived fault in Joyce’s narrative but also to elucidate Marsden’s own philosophy on the matter of gender—that, like so many other binaries, men and women are complements to each other and are not intended to be opposing forces or segregated ranks of a gendered hierarchy.

However, as Thaine Stearns argues, Marsden, like many other critics who cast judgments after reading only the first few chapters of *Ulysses*, was mistaken in her opinion of Joyce. The emergence of Leopold Bloom as the central protagonist of *Ulysses* presents a philosophical outlook on reality quite different from that expressed by Stephen, one that is less disparaging and more enthusiastically appreciative of women. As Stearns notes, Joyce actually shared many of Marsden’s views regarding gender relations, both from a literary and a philosophical standpoint, and “the idea of existence as divided into two opposing realms as a persisting construction to be undermined” (470). The evidence of their shared beliefs, Stearns claims, is evident in the irony of Joyce’s portrayal of Stephen in the opening three chapters—an irony that, Stearns suspects, Marsden either missed or chose to ignore for the sake of her own argument (470)—and also in the gradual turn of the novel’s focus from Stephen and his perception of a gender-segregated reality to Bloom’s all-encompassing view of and immersion in the world.

Yet, while Stearns’s argument holds value in clarifying Joyce’s literary stance on gender relations, Stearns does not carry his defense of Joyce beyond the sheer juxtaposition of Stephen’s and Bloom’s respective attitudes toward women. On a deeper level of narrative structure, Joyce “undermines”

gender binaries through the use of sexuality as a pervading metaphor. While sex, the most intimate interaction between genders, may appear to be little more than a part of the novel's realistic depiction of Dublin life in 1904, sexuality as a central reoccurring metaphor in *Ulysses* actually evolves into a greater psychological commentary on gender relations through the narrative arc of Bloom's various sexual encounters with the feminine, namely Gerty MacDowell, Bella Cohen, and his own wife, Molly. On the subject of gender relations, then, *Ulysses* ultimately explores and presents a case on how intimate interactions between genders can potentially not only help men and women transcend gender conventions and preconceived notions of separation and antagonism between the sexes but can also enable greater depth and scope of perception, both as empathetic human beings and as artists.

In her examination of literary translation, Joyce scholar Francine Masiello acknowledges that sex is often used in Joyce's work to evoke comprehensions beyond the immediate and the literal. As a famously taboo subject with a long (and continuing) history of controversy and moral sensitivity, sex naturally serves a fitting role in drawing attention to situations of "disclosure and misrepresentation" in literature, particularly situations in which "binary units are kept in long-range suspension without any real claim in truth" (57). Masiello references Leo Bersani and his analysis of sex as a metaphor to note how physical love, in the way she earlier observed about binaries, is often "a form of self-shattering, a way to practice nonviolent disruption of categories of identity and the authority of institutional power" (57). By virtue of the destruction of self and our own perceived sense of identity in the act of lovemaking, new identities—or at least new understandings of identity—are able to form. The way to overcome such rigidly established binaries as hierarchized social roles based upon gender, then, in terms of Marsden's (and Joyce's) philosophy on perception, is to break the perceived barrier that defines people as strictly masculine or feminine.

In this way, the act of sex, as Masiello interprets it in examining various Spanish translations of *Ulysses*, becomes a possible means to overcoming difference and achieving unity by effecting a state of gender (and identity) fluidity: "One's fixed position in the world is overturned in sexual surrender, just as one loses a sense of self when one crosses national borders...when one surrenders repeatedly to what is foreign. This also occurs when gender assignments change and when roles flow freely without restriction" (57). To overcome opposition as established through rigidly defined understandings of what is masculine and what is feminine, then, is to alleviate tensions that

allow one gender (usually male) to dominate aggressively the other (usually female). Sex, or at least the “unnamable quality of sexuality” (57) that diminishes awareness of distinct physical entities, potentially permits this sundering of gender boundaries through the elimination of distance and through mutual participation in intimate interaction, when whether one is male or female no longer matters, only that two beings are meeting in a union of time and space.

In *Ulysses*, “Circe” is the chapter in which switches of gender appear to take place between Bloom and Bella Cohen. Consequently, this chapter is the ultimate crux where the question of Joyce’s treatment of the so-called gender binary is truly put to the test. Long before “Circe,” though, Joyce prepares the metaphorical ground and argument for the deconstruction of gender binary through the juxtaposition of Stephen’s hardened misogynistic perception of women and Leopold Bloom’s ready appreciation of and sympathy for women. The focal point about which Joyce constructs this dichotomy is the complete liberal enjoyment of sexuality on Bloom’s part and the utterly repressive, desperate avoidance of sex on Stephen’s part.

As established in the preceding novel, *A Portrait of the Artist as a Young Man*, Stephen’s sole experience of sexuality is through prostitution, a transaction that, while enabling the physical intimacy of sexual intercourse, is fundamentally lacking in empathy because the participants are locked within strictly defined gender roles and are engaging in an economic exchange. In exploring Joyce’s dramatic craft in the “Circe” chapter, Austin Briggs draws a connection between playhouses and brothels, arguing that both actors and prostitutes are entertainers paid to assume personalities and effect scenarios for the audience’s/client’s gratification: “To varying degrees, sexual relationships involve role playing, the fantasy that is central to the stage and the brothel alike” (56). Although role play or performance may arguably be an inescapable, natural component of gender construction and sexuality, prostitution runs a particularly high risk of disabled empathy across gender boundaries because sex is manipulated to meet the demands of an industry in which “prostitutes perforce *act* the role of whore in compliance with the desires of others” (50). Under these circumstances, then, Stephen’s engagement with prostitutes cannot achieve any level of real intimacy, spiritual awakening, and artistic inspiration because the entire interaction is a paid performance in which conventional gender binaries are rigidly maintained.

As his overall retreat from sexuality demonstrates, Stephen finds his experience with prostitutes unfulfilling and, more importantly, shaming.

Part of his shame is linked with his overall inability to mature past the restricted mother-son connection to develop emotional, physical relationships with other women. However, a larger part of his shame is due to the fact that Stephen's perception of the world is restricted to the cold lens of intellect, a perception first promoted through his religiously strict tutelage and his mother's Catholic-abiding influence. Desiring to shake off all controlling influences yet unable to escape the guilt and shame that those influences have inflicted upon his sexuality, Stephen conditions himself to consider the world strictly by limited abstract, *oppositional* concepts—correct and incorrect, fair and unfair, moral and immoral, *male and female*—and in order to embrace one, he rejects the other entirely.

The effects of such a cruelly narrowed, starkly segregated perception of life start to manifest themselves at the end of *Portrait of the Artist* with Stephen's confusion and distance from all women, including his own mother. With the start of *Ulysses*, though, Stephen's ambiguity regarding sex and the feminine turns into hardened chauvinism. In the opening three chapters of the epic, Stephen expresses a deep mistrust and resentment of the feminine. Women for him are either sources of temptation and self-degradation, as with the prostitutes, or coldly imperial despots, ruling from afar, as with his now deceased mother and the Blessed Virgin Mary. Mrs. Dedalus, in particular, becomes an oppressive, punitive force for Stephen throughout the novel. She continually surfaces in Stephen's mind, reaching beyond the grave to guilt him back into a state of, as Stephen perceives it, cowed obedience, "[h]er eyes on [him] to strike [him] down" for refusing to pray at her deathbed (9). As a means to combat what, in his rebellious mind, should be an unnecessary guilt, Stephen's wariness of women develops into a conviction that women are morally corrosive to man's spirit. They are man's very opponent by the difference of gender and are "unclean" by virtue of being "man's flesh made not in God's likeness" (12).

Such wording, embedded in religious argument, establishes a hierarchy that readily reflects the viewpoint of many people in the midst of predominantly Catholic, masculine Dublin. What Stephen's thought elucidates is that men, by virtue of being crafted "in God's likeness," are conceivably elevated to a state of innate grandeur and superiority, at least in the eyes of Dublin society. Women, then, being different in form than man, counter God and are naturally more susceptible to evil and its snares. Their only purpose (or, in a cruder sense, function) is then the necessary evil of reproduction. But even this indispensable function proves to be regarded only as a greater evil, as women, in Stephen's extremism, are portrayed as

contagions of the same moral sickness by fault of the original sin: “But it was the original sin that darkened his [Shakespeare’s] understanding, weakened his will and left in him a strong inclination to evil...An original sin and, like original sin, committed by another in whose sin he too has sinned” (174). By this reasoning, woman, as the “another” who committed the first sin, not only condemns man as her husband to sin by offering him the same temptation the serpent offered Eve but also condemns man, as being born of her flesh, to a sin that becomes an inescapable, innate part of him. Women, then, are to be avoided and shunned, as they have already burdened mankind with a terrible moral struggle, and Stephen readily does so by devoting himself wholly to a company of likeness in cold-reasoning masculinity, accomplishing his own ideal of paradise as expressed in his Hamlet arguments: “[I]n the economy of heaven,...there are no more marriages, glorified man, an androgynous angel, being a wife unto himself” (175).

This last statement, vehement though it is in its express disregard for women in paradise, proves, in fact, to be a subtle turning point in Stephen’s argument, a ghostly trace to the true argument that Joyce will ultimately present and defend in the “Circe” chapter. While appearing to advocate for masculine superiority and feminine inferiority, this statement of Stephen’s actually proves the counterpoint—that women are not excised from the “economy of heaven” but are incorporated into it, being a necessary part of paradise and the completion of man’s androgynously angelic soul. By nulling women, Stephen nulls the one thing that leads to the true appreciation and manifestation of art: contrast. Having limited himself to the familiar, the uniform, and the same by aggrandizing what resembles himself and uplifting only that which is himself—his masculinity, his intellect, his ideals, his grandeur—Stephen unwittingly represses his artistic potential to a narrow plane that inevitably reverts back to himself. Without contrast, he has nothing by which he may reflect upon himself in order to verify or correct his perception. He is shut off from greater sensation and inspiration that may lead him to artistic truth. As a result, while he has ambition to create and has attempted to create, he has yet to succeed in producing what might be considered art. The only way by which he may possibly cure himself, both in sex and in art, as Elliott B. Gose, Jr. argues in *The Transformation Process in Joyce’s Ulysses*, is “to give himself more to life and other human beings” (113), i.e., to open himself up to women, man’s complementary contrast.

The ultimate trial and proof of this supposed solution is Joyce’s introduction of *Ulysses*’s contrasting protagonist, Leopold Bloom. Compared

to Stephen's thoughts, Bloom's are less judgmental and more sympathetic concerning women. In fact, while the majority of Stephen's thoughts are driven by self-analyses and critical self-comparisons with other men, Bloom's inner contemplations are shaped predominantly by women, a fact that reflects a subsequent depth and richness of narrative in Bloom's chapters versus Stephen's. Indeed, Bloom exhibits a greater interest in women than he does in fellow male company, case and point in his encounter with Mr. M'Coy, whom Bloom finds more a bothersome distraction compared to a woman flashing her silk stocking while climbing into the carriage across the street (60-61).

More importantly, though, Bloom's mental contemplations of women detail not only a ready appreciation of physical beauty but also a certain level of compassion for women. Juxtaposed to Stephen's cold consideration of his mother as an antagonist, Bloom exhibits a certain understanding for Mrs. Dedalus's plight as a wife and devout Catholic while he observes Stephen's malnourished sister: "Home always breaks up when the mother goes. Fifteen children he [Mr. Dedalus] had. Birth every year almost. That's in their theology or the priest won't give the poor woman the confession, the absolution. Increase and multiply...Eat you out of house and home" (124). Though his consideration of Mrs. Dedalus is only a momentary focus of his inner monologue, Bloom's thoughts portray Mrs. Dedalus in a manner which Stephen has refused to see her—that of victim to a male-dominated society and religion. The same contemplation applies in Bloom's consideration of pregnant Mrs. Purefoy:

Poor Mrs [sic] Purefoy!...Poor thing!...Three days imagine groaning on a bed with a vinegared handkerchief round her forehead, her belly swollen out. Phew! Dreadful simply! Child's head too big: forceps. Doubled up inside her trying to butt its way out blindly, groping for the way out. Kill me that would...They ought to invent something to stop that. Life with hard labour. (132)

While Stephen expresses little consideration for the feelings of a woman, Bloom demonstrates a shocking ability to understand, or at least to imagine, the incredible pain and difficulty women endure when bound to men for the sole purpose of childbearing and childrearing, as society has defined appropriate for their gender.

In tandem with Bloom's consideration of women, then, men become a wild combination of the ridiculous, the crude, the gruesome, and the monstrous. Stopping into a local eatery, Bloom perceives men "shovel[ing]

gurgling soup down [their] gullet[s]...spitting... halfmasticated gristle” (138), the imagery violent and animalistic with ripping bites, spilling fluids, and raw stench. Bloom, disgusted, leaves the establishment in search of another, firmly convinced the philosophy of men is to “[e]at or be eaten. Kill! Kill!” (139). This glimpse into Bloom’s impression of his own gender, immediately following a romanticized image of sexually receptive women, strikes a starkly negative image compared to Stephen’s glorified idea of male artists as androgynous angels. However, what is most striking about this scene in its sharp opposition to Stephen’s own views is the fact that, by virtue of Bloom’s romantic feminine vision contrasting with the gross masculine reality, Bloom finds himself reflecting upon his own self and his own gender in a new light. “Am I like that?” he ponders. “See ourselves as others see us” (139).

Bloom’s recognition of otherness, combined with his willingness to embrace that difference, enables a broader, more universal perspective than what Stephen and all his intellect and repressed sexuality can conjure. Bloom’s ability to imagine otherness indicates an ability to accept and to empathize, a freedom to engage with life and others in life. Stephen, having reduced himself to pure, cold intellect, cannot tap into his soul and can create little more than sheer wordplay, as he makes no extension beyond his immediate egoist self to discover new perspectives that could awaken his inspiration, challenge his character into new developments, and aid in his artistic inclinations by broadening the scope of his artistic perception. Bloom, on the other hand, can tap into his soul, and he is able to do so because he reaches willingly beyond himself to find the beauty in what is theoretically opposite of him: woman, the feminine. Indeed, this distinction between the characters in terms of their views of opposites is a more fundamental way to define their ultimate differences regarding sexuality. As Gose asserts, “It is contradictions that are destroying Stephen, while Bloom is spending all his time trying to resolve them” (169). In that respect, Bloom’s thoughts and observations of the world are more vivid, more inventive, more encompassing, and more alive. His is the perception of a true artist and the aesthetic foundation of the entire novel.

Of the numerous sexual experiences elucidated throughout *Ulysses*, Bloom’s transformational adventure in “Circe” demonstrates most vividly this ability to embrace and reconcile opposites and Bloom’s more encompassing artistic outlook. Rooted in the highly sexualized scene of the brothel, “Circe” becomes, in many ways, the climax of *Ulysses*. Bloom and Stephen finally meet, and each character arguably reaches his lowest point, encountering

women in a conceivably antagonistic way. However, “Circe” is also the one point in the novel where, by virtue of the very role play that renders prostitution inefficient to inspire artistic spirit, “all opposites collapse” and genders are exposed as a matter of “pure difference, signifiers without any substance behind them” (Masiello 58). In this episode, Joyce demonstrates through fantasy how each man imagines women as antagonistic forces. (The longest of *Ulysses*’s eighteen chapters, “Circe” carries Bloom through a range of fantasized transformations, from the elevated stature of a powerful political figure to the degraded level of an animalistic *female* slave.)

Now, the fact that so much of this episode is rooted in Bloom’s fantasy may, at first, appear to undermine any sexual/artistic argument Joyce may be attempting to make, especially one that subverts gender conventions. However, Michael Sinding proposes the opposite in his consideration of how Joyce wrote the text in not only dramatic format but also with the intention of a fantastical imagination:

[T]he frame [dream or hallucination] is used not to supply content, exactly, nor to supply form, exactly, but rather to provide a basis for accessing, selecting, and expressing a certain content. That is, Joyce mines the subconscious minds of Bloom and Stephen and works their deep-seated desires and fears into hyperbolic fantasies. (602)

By rooting parts of the “Circe” episode in the subconscious, Joyce implies an innate quality to the hallucinations, drawn-out characteristics embedded so deeply within Bloom’s mind that they are beyond his immediate conscious control and must be provoked. In this way, then, “Circe” may be evaluated as a legitimate and, indeed, intentional point of argument in questioning gender, as it relates to identity.

In this episode, a number of revelations concerning Bloom’s various manifestations of sexuality come to light through confessions and various imagined transformations: the full extent of his epistolary relations with Martha (Joyce 379-81), an attempt to solicit sexual favors from a domestic employee (375-76), and experiments in cross-dressing, including impersonating women in his high school play (438) and trying on his wife’s clothes (437). Chief among these confessions that leads to his immersion in the brothel scene, though, is his outcry of “O, I so want to be a mother” and subsequent fantasy of birthing eight children (403). This first transformation into the feminine ties directly back to his aforementioned sympathy for Mrs. Purefoy in painful child labor. Where before his imagination was contained to the privacy of his thoughts, Bloom’s thoughts are explicitly revealed in the

brothel. He suddenly becomes exposed through a number of evolving fantastical scenarios that become frightening, shocking, even humiliating, as he falls from being powerful to being powerless, from being a well-respected man to being a woman auctioned off much like an animal would be (440).

Bloom's transformation into and subsequent abuse as a woman at masculinized Bello's hands may appear to be anything but a sympathetic gesture toward women. If anything, this dark setting of "Circe" may strike a horrifying note of degradation and abuse for women, as if Bloom's fantastical self-envisagement as a prostitute subjected to masochism may be considered more an indication of what he as a man would like to do to a woman. However, regarding the psychological framework of "Circe" as a whole, this latter part of Bloom's fantastical journey may actually prove his empathy for women and his subsequent creative potential on a profoundly personal level, for his ability to imagine himself as a woman indicates a potential release from self-repression, as opposed to Stephen. As Gose notes:

Bloom in 'Circe' drops his pride altogether and plays all parts: father and son, hero and victim, reformer and dictator, authority and buffoon, idealist and carnalist, exhibitionist and voyeur, sadist and masochist, man and woman. Unlike Ulysses, who remained a man throughout his sojourn with Circe, Bloom becomes an animal (several animals, in fact). But like all his other transformations, this one is only in passing, and he emerges from his various metamorphoses more of a whole human being than he began. (151)

What Gose suggests in this comment is that Bloom's various transformations and diverse array of self-conceptions are actually innate, *natural* parts of himself. By recognizing them and, in a way, embracing them, he is able to triumph over them and emerge from the brothel in stronger command of himself. He does not succumb to the temptation of marketable sex, thus preserving his marriage while maintaining an appreciation of the feminine and his own sexuality.

Stephen, on the other hand, keeps the diverse facets of himself segregated and never acknowledges them as a part of his whole, having continuously buried his sexuality as an *unnatural* part of himself. Hence, when confronted by his mother's ghost, his ultimate reaction is to strike out at her, to sunder her tormenting spirit. Thus unable to accept his sexuality without frightful self-repression, Stephen undoes himself as an artist. The cruel censorship of his body and his mind represses his appreciation for contrast, an element natural and necessary for truly compelling art. The

exploration of contrast is what ultimately enables sympathy and potentially empathy to develop, as comprehension of the “other” occurs through a transformation of perception such as art strives to achieve. Having suppressed an appreciation for contrast in himself, then, Stephen cannot possibly appreciate contrast in the world around him and, therefore, cannot possibly create art. He has limited his scope of the world to the shallow realm of his own ego, which reflects in his inability to sympathize with others, as previously mentioned with Mrs. Purefoy in her labor and his own dead mother. Indeed, throughout *Ulysses*, Stephen unwittingly isolates himself further and further, not only from women through his sexual repression but also from his own male artists and former schoolmates, most of whom grow to regard him as an arrogant, outlandishly pedagogic fool with little viable success to his name.

Bloom, by comparison, ultimately discovers the key to his artistic spirit in his fierce inner conflict and triumph in “Circe,” being able, as Mark Shechner phrases it, to “hermaphrodize” himself and bring the fragments of his personality into a unified whole (123). In this manner, Joyce’s whole construction of “Circe” becomes an elaborate “construct of opposites,” in which identity is formed from multiple parts into one: “Joyce’s splitting of Bloom’s personality is in the cause of a more authentic unity. He subjects Bloom to a grotesque purging of those ‘inferior’ parts of his nature that, though unconscious, have been dominating Bloom’s behavior. Bloom emerges as a more integrated and authoritative person precisely after experiencing his worst transformations” (Gose 162).

Now, an objection might be raised on this front. Like the majority of Bloom’s previous romantic excursions, the transformations and subsequent unity of identity occur largely within the safety of Bloom’s private thoughts. As such, the encounters in “Circe” are little different than Bloom’s written correspondence with Martha or his beach voyeurism with Gerty. However, what must be noted is how Bloom’s imagination is galvanized to unleash his subconscious in the context of the brothel, a highly physical scene where sexuality is much more immediately present than in his previously distant encounters. As such, his imaginative sojourn in “Circe” may be viewed as pivotal, for he comes to embrace his own sense of self in all its diverse dimensions.

With this understanding of “Circe” established, the contextual framework of Bloom’s relations with Gerty MacDowell in “Nausicaa” and Molly in “Penelope” for Joyce’s rhetorical use of sex in *Ulysses* may gain greater clarity. Bloom encounters many women throughout the novel, but

Gerty and Molly are singular as, firstly, they are the only women in *Ulysses* for whom Joyce crafts vibrant inner monologues and, secondly, they are the only women with whom Bloom has direct interactions, exempting the prostitute in “Circe.” Between the two women, though, Joyce establishes a dichotomy of failed versus successful connection based on Bloom’s physical distance with one woman and his intimate proximity and lovemaking with the other. Admittedly, in “Nausicaa,” both Gerty’s and Bloom’s thoughts are elucidated, allowing for a clear analysis as to their failure of connection. In “Penelope,” only Molly’s thoughts are divulged, resulting in a potentially biased assumption as to the exact level of success regarding Bloom and Molly’s final relationship. However, a certain reference to one of Bloom’s memories revealed earlier in *Ulysses*, in addition to the end of the “Ithaca” episode preceding “Penelope,” reveals telling information about Bloom’s own thoughts and sentiments toward Molly that will ultimately align with hers and prove the validity of intimate connection through Molly’s concluding, resounding “Yes.” But first, an elucidation of this connection must be established through juxtaposition with its failed opposite: Gerty MacDowell.

While possessing a highly sentimental narrative voice in “Nausicaa,” Gerty expresses a clear ideal as to what she desires from a relationship—a true romance of tender love and passion, in which the heart prevails: “Heart of mine! She would follow, her dream of love, the dictates of her heart that told her he [Bloom] was her all in all, the only man in all the world for her for love was the master guide. Nothing else mattered. Come what might she would be wild, untrammelled, free” (Joyce 299). In Gerty’s mind, love and married life are to be her avenues to sexual freedom. She imagines she will find bliss in a sanctioned union, as she believes she will be free to express and manifest her love without fear of shame or repercussions. During her encounter with Bloom, though, Gerty maintains a teasingly respectful distance, engaging with him through subtle glances and various glimpses of her feminine figure. This carefully controlled interaction concurs with her belief that, so long as she does not do “the other thing,” she may freely indulge in sexual tension and trust absolutism to clear her of any true blame (300).

The fatal misconception of Gerty’s romantic fantasies, unlike Bloom’s in “Circe,” is that her fantasies are not so much a means to self-assessment and self-acceptance as they are to self-evasion. In her comparative analysis of Joyce’s play on Homer’s Nausicaa in *The Odyssey* and Samuel Butler’s own take of Nausicaa as the imagined narrator of *The Odyssey*, Timo Müller notes how Gerty’s thoughts construct her own image, much like how Butler’s

Nausicaa creates a masked portrayal of herself in *The Odyssey* behind which she as the narrator hides and operates. In this way, Gerty's thoughts, rather than exposing a deeper subconscious, mask her true nature:

Gerty appears...unrealistic in her insistence on the idealized Victorian image of marriage as a blissful partnership of a caring husband and a pure, self-sacrificing wife...Barred as she is from the pleasures of real-life wealth, harmony, and lovemaking, she resorts to the fictional mode of mental self-fashioning as a substitute. (387)

This "escapism," as Müller goes on to phrase Gerty's "self-fashioning," readily places the voyeuristic connection between Gerty and Bloom at a disadvantage. Gerty conceals herself and deflects deeper insight into her being by a show of idealism, rather than allowing Bloom as the onlooker a deeper comprehension of her nature. Her fantasies do not descend into the dark, chaotic, torturous aspects or potential of herself as Bloom's do in "Circe" but remain in the light, romantic field of admiration and glory.

Part of this fantasy may be influenced by Gerty's obsession with societal standards. Müller notes how, like Butler's Nausicaa, Gerty exhibits a keen awareness of social propriety, particularly as crafted by religion. Yet she is eager to partake in a sexual transaction of sorts. This, Müller argues, shows that Gerty, while she may not actually be afraid to bend the rules, is preoccupied with the need not to be perceived as breaking those rules: "She disapproves not of the action itself (going about with a stranger) but of the scandal it might cause...not of being 'familiar' with a man but of showing it 'in the face of all the world'" (383). An adherence to societal standards that subverts a consummation of love (or at least what Gerty imagines and professes to be love) then brings to question the true validity of this supposed love. Indeed, one must question whether Gerty's ideal of love is even a genuine idea—one occurring to her—or one implanted through the rigid indoctrination of society and church.¹

Her preference to maintain distance while physically tantalizing Bloom lends a certain amount of credence to her confessed belief that, by not actually having sex, she is breaking no rules. However, Gerty's concept of

¹ Though his article focuses predominantly on Molly Bloom and the additional Greek-Roman parallel of Gaea-Tellus, Erwin R. Steinberg does devote a good portion of his commentary to how the Catholic church in Ireland "misdirected" Irish women's perception of sexuality and cites a number of textual examples concerning the practice of confession (124) that demonstrate the church's perversely "sterilizing" and "contraceptive" influence (123).

sexuality proves to be founded on a quaint image that diverts away from sex entirely and focuses solely on the allure of distant attraction. She expresses clearly that she does not desire “soldiers and coarse men with no respect for a girl’s honour,” but what she then confesses to desiring is the sort of man with whom she and he would be “just good friends like a big brother and sister without all the other in spite of the conventions of Society with a capital ess” (299). This mentality almost equates Gerty’s thoughts with the psychology of a child. She has not yet learned how to separate and differentiate the platonic love of siblings or even parents [as her desire for an older man over a young “prince charming” suggests a paternal equivalence (288)] from the sexual love of a partner of her own. Her imagination of sexuality is limited to tight embraces and deep kisses, and her sexual expression is limited to sheer voyeurism, when she allows Bloom, still sitting off at a safe distance, a glimpse up her skirt (300).

In this way, Gerty cannot possibly have any true concept of sexuality other than what is fed to her through society’s cultural and religious instruction. Her sexual image, then, despite its relative success in stimulating Bloom, is pure imitation.² By her distance from Bloom sexually, Gerty is unable to inspire anything truly artistic within him because she herself “achieves nothing original or even remotely interesting” and only succeeds in “expos[ing] her vanity and mediocrity” (Müller 384). In short, unlike Briggs’ earlier referenced descriptions of well-trained prostitutes, Gerty amounts to little more than a cheap show of flesh, whose image can be (and is) readily destroyed and forgotten by her limp.

Bloom, as the latter half of “Nausicaa” reveals, is not at all the man whom Gerty believes “could be trusted to the death, steadfast, a sterling man, a man of inflexible honour to his fingertips” (Joyce 299). Firstly, Bloom is a married man, an important detail of which Gerty is unaware and to which David M. Schaps draws particular attention when pointing out the irony of the original Nausicaa-Odysseus interaction—that Odysseus, like Bloom, is driven more by need of relief than a shared romantic interest (225-26). Secondly, upon perceiving that Gerty is, to put it crudely, physically defective, Bloom’s previous admiration converts to what seems to be a certain

² Sam Slote examines an artistic rivalry between James Joyce’s *Ulysses* and Virginia Woolf’s *Orlando* in terms of genre as a reflection of narrative style and how women as writers were either confined to what was deemed an appropriately feminine genre or, if they were to step outside that perceived genre, were accused of “imitating” more masculine genres. See “Gillet lit le Joyce dans la Woolf: Genre in *Orlando* and *Ulysses*” in *Journal of Modern Literature*, volume 27.4 (Summer 2004), pages 27-36.

degree of repulsion and relief for not having pursued a more intimate relationship with her: “Poor girl! That’s why she’s left on the shelf and the others did a sprint. Thought something was wrong by the cut of her jib. Jilted beauty. A defect is ten times worse in a woman...Glad I didn’t know it when she was on show. Hot little devil all the same” (301).

This immediate reaction on Bloom’s part alone, a reaction that sharply contradicts Gerty’s imagined, wholehearted attraction to him, reveals a telling lack of connection. Without true physical consummation, only the false stimulation of voyeurism and masturbation, Bloom’s brief relationship with Gerty MacDowell amounts to the purely physical with little inspiration mentally or spiritually. Her perfected beauty is quickly marred by the realization of her limp, and he leaves the beach soon afterwards. In fact, as Sam Slote points out, both characters are crippled physically: Gerty with her actual limping and Bloom with his limp erection (36). This detail lends itself to suggest on a deeper, subtler level the brokenness of their connection in that Gerty’s illusion of beauty only lasts until she must rise and walk and Bloom must aid his own excitement in order for Gerty’s exhibition to affect him. In the end, Gerty is unable to elevate Bloom’s condition to that of a true artist, as there is no intimate interaction, no openness or vulnerability, and, therefore, no true comprehension of one or the other.

Thus, from the failed connection with Gerty and through the transformative experience in “Circe,” Bloom, whose ability to empathize hints at a potential ability to rejuvenate his marriage, achieves a long-sought sense of union with his own wife, Molly. As in “Nausicaa,” Joyce crafts the relationship from two points of perspective: Bloom’s in “Ithaca” and Molly’s in “Penelope.” By splitting the perspectives into their own chapters, rather than meshing them together as he did in “Nausicaa,” Joyce permits the distinction of two individuals with their own private thoughts and viewpoints. This method permits each character considerable authenticity while uniting them as a couple, for husband and wife each has his or her own narrative voice—noticeably without inclination to achieve an artificial likeness as with Gerty’s manipulation and imitation—yet both voices maintain a sense of connection, as both divulge the shared memory of Molly and Bloom’s physical union.

From Bloom’s perspective in “Ithaca,” the chief indicator of achieved empathy is the process of “antagonistic sentiments” he undergoes, knowing that Molly has had an affair: “[e]nvy, jealousy, abnegation, equanimity” (602). The progression of these emotions suggests an outward direction, outward from the self and toward the cause of said emotions. Envy starts the process

as the seed within Bloom, the pitted self that riles in faint anger, knowing Blazes Boylan has enjoyed Molly's sexual favors. The conversion from envy to jealousy, though, implies a steady shedding of that pure self-focus. This shedding leads to abnegation, the conscious decision to ignore the self-righteous anger in favor of restoring balance to the marriage, then to self-confidence by reconnecting with the other via equanimity.

Bloom's ability to undergo this emotional progression that leads to his reunion with Molly may be a direct result of his experiences in "Circe." As Gose notes, "The opportunity [to connect with Molly] comes because he can love and help another, because he has allowed his voyage to carry him to a confrontation with his own weaknesses and then to the discovery of a hidden self" (184). By confronting his own faults and weaknesses, then, Bloom is able to regard Molly and empathize with, if not wholly forgive, her dissatisfaction with their physically estranged marriage. Bloom's sense of outrage is still present at the core, yet by choosing to quell it as an explosive, detrimental reaction, Bloom converts his outrage from a destructive to a productive medium in its application, so that, of the four emotions Bloom undergoes, he develops "more abnegation than jealousy, less envy than equanimity." Bloom can then recognize Molly's infidelity with Boylan as an empty and meaningless act that, while injurious to Bloom's pride as a husband, ultimately does not usurp the love he and Molly share in marriage, the love they are able to express to each other in their sex: "From outrage (matrimony) to outrage (adultery) there arose nought but outrage (copulation)" (Joyce 603).

From Molly's purely subconscious perspective in "Penelope," the sense of empathy resounds through the string of "yesses" pervading the narrative. "Yes," as employed by Joyce in this episode, becomes the embodiment of the Blooms' reunion, the symbol of "acquiescence, self-abandonment, relaxation, the end of all resistance" (Henderson 521). The fact Molly lists a various string of lovers she has had in her youth while Bloom is lying beside her may initially appear to suggest that, with a mind seemingly thousands of miles away, she does not possess the same level of equanimity or understanding of their union. However, the rambling nature of Molly's thoughts may actually be a much more profound narrative argument concerning gender and identity, the tremendous effect of which may be witnessed at the chapter's conclusion, the one place where Molly and Bloom's reunion gains clearest definition.

In her examination of the "Penelope" episode, Alyssa J. O'Brien notes how Joyce ultimately sets Molly Bloom as a female character apart from

other characters by gifting her with a wildly vacillating subconscious narrative style that “refus[es] to capitulate to any cultural representation of gendered subjectivity” (8):

...the continually changing passages produce not simply one kind of woman, but a plethora of kinds. By creating not one, contrary yet singular Molly Bloom, but instead creating multiple Molly Blooms through textual mobility, Joyce put on paper his vision of identity as mutable, free from social constraints and conventions...The text of “Penelope” does not favor any particular representation and thus undermines the conceptualization of gender as a fixed attribute that determines social identity. (22-23)

Where Gerty MacDowell failed as a woman too bound and restricted by social appearances to inspire in Bloom an elevation of the physical, mental, and spiritual, Molly, in all her wild complexity and extreme depth of character (a depth that almost parallels Bloom’s subconscious depth in “Circe”), is able to satisfy Bloom in his need for release. More importantly, though, she is able to match him in that release, as her final resounding “Yes”—her ultimate “acquiescence” to a potential renewed relationship with him—implicates. There is no hiding of her thoughts, no censoring of the potentially shocking or shaming truth, no elevating herself to a pristine image of self-sacrificing wife or Virgin Mary. Molly is Molly, and her adherence to herself as an authentic uncontrived character in “Penelope” enables her to commit to and engage in a true fulfilling imaginative reconnection with Bloom, a reconnection that implies a ready recognition of the other and a ready willingness to accept that other, as Molly’s emphatic concluding “yesses” suggest.

One could argue that, rather than testifying to any level of empathy or artistic perception, Molly’s numerous “yesses” while considering a possible reconnection with Bloom are more a matter of pure physicality. Erwin R. Steinberg, in particular, compares Molly to the Greek-Roman figure of Gaea-Tellus, drawing from Joyce’s physical descriptions of Molly in bed when Bloom comes home, to fault Molly as a wife due to her infidelity with Blazes Boylan. Steinberg objects to seeing her as an “all-producing and all-nourishing mother, nourisher of children, receiver and nourisher of seeds, sanctuary of the dead, prophetess” (121), as she has produced few children, has maintained physical distance from her husband (resulting in a “dead” marriage), and has sought physical satisfaction from another man.

However, Steinberg’s error in his consideration of Molly is his limited scope of analysis. He has observed purely the act of infidelity and has leapt to

make assumptions about Bloom's and Molly's respective inner reflections regarding the matter. Indeed, Steinberg completely ignores any textual reference to Bloom's or Molly's thoughts at all. He narrows his analysis solely to physical description and physical action that demonstrates the animosity of Molly's infidelity, thus satisfying his argument that Molly draws a closer parallel to Pasiphaë, King Minos's wife, who has intercourse with a bull and subsequently produces the monstrous Minotaur. Therefore, Steinberg asserts, Molly cannot possibly satisfy Bloom, either by achieving a true reunion or by inspiring anything greater than physical satisfaction in their marriage.

Yet, as Michael Wainwright demonstrates in his article concerning the history of women's suffrage in Ireland, Molly demonstrates a "sexual/artistic potency"³ that reflects a keen awareness of wants and needs beyond the purely physical in her comparison of Boylan and Bloom as lovers. This awareness mirrors Bloom's own aforementioned contemplations of Molly's infidelity in "Ithaca":

Molly considers the modalities of both mind and body in contradistinction to the Dedalean image of the woman's body as a surface or 'taut vellum' for exploitation by male writers (U 3.42)... Molly's activist potential has a prospective mate in Leopold, and her awareness of Boylan's lack of conversation promotes this complementarity. Rather than Boylan, she muses, "you might as well be in bed with...a lion God Im sure hed have something better to say for himself an old Lion would" (U 18.1376-78). The lion Leo is asleep beside her...Molly's ultimate comparison between Boylan and Leopold, which lies at the crux of her monologue, leads her to conflate the 'yes' of jouissance with the acceptance of Leo as her complement. (673-74)

Boylan's "lack of conversation" implies a possible deeper interest in the company Molly seeks. As Wainwright indicates, what Molly searches and fails to discover in Boylan but finds in her marriage with Bloom is not exploitation and sheer gratification as may be assumed by her socially defined role as a woman. Rather, she seeks acceptance,⁴ a state of equality where two bodies meet and achieve an elevated status of soul through their union as complementary halves—husband and wife, man and woman.

³ Quoted in Wainwright 673. See the quote in its original context in Vincent J. Cheng's "Stephen Dedalus and the Black Panther Vampire" in *James Joyce Quarterly*, volume 24.2 (1987), page 161.

⁴ See Gose 170: As Voelker suggests, it is Bloom's "acceptance, not his knowledge, of Molly as Nature, which brings him to the state of equanimity...in 'Ithaca'" (p 44).

Their state of union potentially gains ultimate clarity through their shared recollection of the day Bloom proposed to Molly. Molly, her thoughts turning more and more toward contemplations of Bloom as the chapter and book come to a soundly joyous close, recalls the following:

the sun shines for you he said the day we were lying among the rhododendrons on Howth head in the grey tweed suit and his straw hat the day I got him to propose to me yes first I gave him the bit of seedcake out of my mouth... he said I was a flower of the mountain yes so we are flowers all a womans body yes that was one true thing he said in his life and the sun shines for you today yes that was why I liked him because I saw he understood or felt what a woman is and I knew I could always get round him and I gave him all the pleasure I could leading him on till he asked me to say yes...then I asked him with my eyes to ask again yes and then he asked me would I yes to say yes my mountain flower...yes I said yes I will Yes. (Joyce 643-44)

This recollection from Molly's perspective, with deeper insight into the words exchanged and also into why the first "yes" that ultimately culminated in her matrimonial union with Bloom came forth, mirrors the recollection Bloom has of the same incident much earlier in *Ulysses*:

Hidden under wild ferns on Howth below us bay sleeping: sky. No sound. The sky...Coolsoft with ointments her hand touched me, caressed: her eyes upon me did not turn away. Ravished over her I lay, full lips full open, kissed her mouth. Yum. Softly she gave me in my mouth the seedcake warm and chewed. Mawkish pulp her mouth had mumbled sweetsour of her spittle. Joy: I ate it: joy." (144)

The differences between the two perspectives are subtly made—the absence of sound from Bloom's recollection, the rapid train of thought that runs loudly with increasing speed through Molly's head as she recalls that day—yet both ultimately share the same essence established through the same moment: the feeling of joy while partaking in the exchange of the seedcake.

This act of sharing both body and nourishment becomes deeply symbolic in the narrative of *Ulysses*, as such intimate exchanges across gender boundaries establish a potential transcendence of separation, of gendered hierarchy, through a shared experience in which two people give and receive pleasure. Bloom and Molly may not recall the experience in the same way, but the same sense of beauty and joy pervade their respective memories. While Boylan's "lovemaking" is an animalistic slapping and coming from behind, as though Molly were some beast of burden to be mounted, this

mutual image of lovemaking, with tender caresses and the gift-like exchange of food between Molly and Bloom, amounts to a greater depiction of love and unity through their free interaction as opposite genders. The love expressed in their physicality is not selfish, with one participant gaining a greater advantage from the other, thereby reflecting a form of hierarchy as with Molly and Boylan. Rather, the love created in the Blooms' marriage is symbiotic. Both participants give of themselves and receive from the other in this mutually reciprocating union, the lasting impact of which is evidenced in this shared memory that has continued to remain dear to them years into their marriage and, in these final two chapters of *Ulysses*, offers potential hope in holding them together, even despite their individual shortcomings. In this way, then, Bloom and Molly's lovemaking and exchanging of the seedcake may be viewed as evidence of a transcendent state of mind that enables them not only to overcome obstacles—such as the feelings of separation and opposition in a gender hierarchy—but also to achieve empathy with each other and true artistic perception.

The metaphor of sex is an elaborate construction that spans not only the chapters of “Nausicaa,” “Circe,” and “Penelope” but also the whole of *Ulysses* and the entirety of Joyce's written work. From *Portrait of the Artist* and Stephen's poisoned view of women as the damnable opposition to man's creative endeavors, Joyce creates a redeeming perspective of women in *Ulysses* that dissolves gender boundaries and elevates women as a natural, necessary component to man's artistic being. Through Bloom's sexual journey in *Ulysses*, Joyce offers a possible means to correct a misguided understanding of gender relations as a ruinous dichotomy through an artistic lens: to embrace difference—to explore and to celebrate contrast—in order to recognize and to experience true beauty as a union, of men and women and of body, mind, and soul. As Jean Cocteau exquisitely (and quite appropriately) concludes:

Art is born of the coitus between the masculine element and the feminine element of which we are all composed, in finer balance in the artist than in other men. The result is a sort of incest, a union of one's self with one's self, a parthenogenesis. That is what makes marriage so dangerous for artists, for whom it represents a pleonasm, a monster's attempt to approach the norm. (Qtd. in Shechner 15)

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MODERATE ETHANOL CONSUMPTION RESULTS IN COGNITIVE PROTECTION FROM ALZHEIMER'S DISEASE, DEMENTIA, AND RELATED COGNITIVE DECLINE: A CRITICAL REVIEW

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Abstract

Moderate ethanol preconditioning, a result of prolonged moderate alcohol intake, serves as a protective process by staving off cognitive decline while providing neuronal protection through several mechanisms. These individual mechanisms are relatively well known, however a comprehensive and integrated conversation of ethanol's protective tendencies is lacking from literature and the field of neuroscience. First, a review of the leading theories behind moderate ethanol preconditioning's biological and cognitive benefits is presented, including overviews of neuroprotective, antioxidant, and neurotropic mechanisms responsible for neurological benefit. Secondly, an integrative model is presented, incorporating all research into a novel collaborative model. An additional discussion regarding the efficacy of ethanol treatments follow the comprehensive and integrated model.

Introduction

Current Alzheimer's disease (AD) projections estimate prevalence rates to quadruple by 2047, inevitably resulting in the diagnosis of nearly 1 in 45 Americans over the next three decades (Herbert *et al.*, 2003). AD is the sixth leading cause of death in the United States, and will soon establish itself as an even greater social and economic burden. In attempt to mitigate this impending affliction, extensive research has been conducted in identifying potential risk factors and protectants for the AD pathology and associated cognitive decline. Some prominent risk factors have been identified as obesity (Whitmer *et al.*, 2008), elevated cholesterol levels (Soloman *et al.*, 2009), vascular conditions such as diabetes and hypertension (Richard *et al.*, 2012), family history of the pathology (Lautenschlager *et al.*, 1996), and traumatic brain injury (Giunta *et al.*, 2012). Additionally, cardiovascular exercise (Agevaren *et al.*, 2008) and healthy diet containing proper nutrients (Gu *et*

al., 2010) can serve as effect promoters of cognitive functioning and protect individuals from cognitive decline and dementia. One possible protective factor, in particular interest to this paper, has raised much debate within the aging and mental health research community: Alcohol consumption.

Numerous studies have shown a protective effect of alcohol intake on cognitive decline and AD related dementia (Peters *et al.*, 2008; Piazza-Garner *et al.*, 2013; Anstey *et al.*, 2009). In this critical review, we will examine alcohol's effects on AD and cognitive function starting from the cellular level before expanding our search for broader implications. Additionally, this paper will be focusing exclusively on ethanol's effects in aging and cognitive decline. All consumable alcohol contains ethanol, which must be investigated independently in order to control for the wide variety of beverages consumed (e.g. wine or beer). For example, wine inherently contains components such as polyphenols that could enhance its protective effects (Wang *et al.*, 2006). Polyphenols and other proposed beneficial components of alcoholic beverages will not be discussed further, and the interaction between ethanol and the AD pathology will be exclusively investigated. Furthermore, some proponents suggest that ethanol is the sole contributor to alcohol's protective effects, even in wines (Klatsky *et al.*, 1997). This established, this paper has three main goals: (1) investigate ethanol's protective effects at the cellular level and suggest a new integrated biological model scheme, (2) identify additional methods in which ethanol could serve as a protectant, and (3) determine if ethanol could be used as an appropriate intervention for cognitive decline associated with AD related dementia.

Moderate Ethanol Preconditioning

The biological response to ethanol consumption must be examined in order to understand the cognitive benefits of alcohol ingestion. Therefore, we must first investigate ethanol's neurobiological impact. It is known that subjecting a biological construct to repeated subtoxic injury over time can result in a phenomenon known as *Preconditioning* (Kalev-Zylinska *et al.*, 2007). Preconditioning is the leading theory of how ethanol helps preserve our cognitive functioning and serves as an active neuroprotective agent. Ethanol conditions a particular glutamate receptor, the N-methyl-D-aspartate receptor (NMDAR), by acting as an antagonist. When individuals consume alcohol at a moderate/low-level over a long period of time, NMDAR is conditioned to this constant suppression, ultimately resulting in upregulation and increased activation of the receptor (Kalev-Zylinska *et al.*, 2007). This

paradoxical process is called *Moderate Ethanol Preconditioning* (MEP). Once the NMDAR establishes a chronic increase in activation, a direct result of MEP, several downstream processes begin that result in the production of multiple protective factors that combat AD pathology, dementia, and cognitive decline. This established, we will now review the specific mechanisms downstream from MEP and determine the particular biological consequences of chronic low-level ethanol intake.

MEP: NEUROPROTECTIVE MECHANISM

Moderate ethanol consumption may combat emerging cognitive decline during aging and AD by targeting neuroinflammation related to amyloidogenic protein accumulation. This accumulation of β -amyloid ($A\beta$) is responsible for the plaques seen in AD, neurodegeneration caused by increases in Ca^{2+} , and proinflammatory mediators (Collins *et al.*, 2010). In order to effectively combat $A\beta$ toxicity through MEP, NMDAR activity must create a downstream byproduct that directly affects neurodegeneration caused by this protein aggregation. In Vitro studies targeting hippocampal-entorhinal cortical (HEC) slices have discovered one method of neuroprotection via increases in NMDAR activity, resulting in the production of heat shock protein 70 (HSP70) (Collins *et al.*, 2010). HSP70 levels highly correlate with protection against various cell-damaging outcomes, including ischemia, glutamate excitotoxicity, and reactive oxygen species (Belmandani *et al.*, 2004). Furthermore, it is suggested that HSP70 directly inhibits apoptosis by diminishing $A\beta$'s neurotoxicity (Belmandani *et al.*, 2004). Although they are correlated, the downstream process from NMDAR activity to upregulation of HSP70 is not direct, and requires the involvement of mediators. These mediating factors must be established in order to sufficiently understand ethanol's part in HSP70 production.

After successfully preconditioning HEC slices (subjecting cultures to 20-30 mM ethanol for 6 days), immunoblot analyses showed significant upregulation of all NDMAR subunits (NR1, NR2B, NR2C) (Collins *et al.*, 2010). After inducing MEP, several possible mediators where measured at days 2, 4, and 6. One protein in particular, Protein Kinase C epsilon type (PKC ϵ), highly correlated with the up regulation of the NMDAR and showed increases of 15% (at day 2), 40% (at day 4), and 200% (at day 6) (Collins *et al.*, 2010). This large increase suggests that PKC ϵ is directly downstream from NMDAR and is further established by a NR1 knockdown using memantine, which simultaneously antagonized both the NMDAR and PKC ϵ expressions. Additionally, the use of a pan-PKC inhibitor significantly suppressed both

PKC ϵ and HSP70, further restoring toxicity and establishing PKC ϵ as an upstream mediator of HSP70 (Collins *et al.*, 2010). However, the link between PKC ϵ and HSP70 still requires upregulation of one more mediator, focal adhesion kinase (FAK). Western blot analyses of FAK in HEC cultures showed a significantly increase that correlated flawlessly with PKC ϵ upregulation (Collins *et al.*, 2010). Additionally, using PKC isoforms, Collins *et al.*, (2010) were able to show that PKC ϵ was at least indirectly responsible for the increases in FAK (Collins *et al.*, 2010). Furthermore, the use of the dominant negative FAK (FRNK) was used to establish the link between FAK and HSP70. FRNK expression greatly reduced MEP-mediated increases in HSP70 (Collins *et al.*, 2010). These findings result in the neuroprotective upregulation of HSP70 that began with the increased activation of NMDAR, which in turn initialized the increased production of PKC ϵ and FAK, respectively.

MEP: ANTIOXIDANT MECHANISM

In addition to A β burden, oxidative stress accumulates in aging and is involved in the pathogenesis of AD. Antioxidants that protect cells from stressors (e.g peroxides) may serve as important protective factors of cognition and neuronal longevity. Papadia *et al.*, (2008) investigated the antioxidants that are boosted in result of NMDAR activity. Mice injected with dizocilpine (MK-801), an uncompetitive antagonist of NMDAR, experienced widespread neuronal death due to oxidative damage (Papadia *et al.*, 2008). Additionally, upregulation of NMDAR resulted in increased protection from oxidative stressors such as peroxides (Papadia *et al.*, 2008). This establishes that NMDAR, and in turn MEP, initiate a downstream process resulting in antioxidative properties.

NMDAR activity protects neuronal damage from oxidative stress by directly targeting the thioredoxin-Prx system. Periaxins (Prxs) serve as cytoprotective and antioxidative proteins, in particular PrxII, PrxIII, and PrxIV (Rhee *et al.*, 2007). Prxs contain a peroxidatic cysteine residue, which in turn oxidize harmful peroxides to form cysteine sulfenic acid (-SOH). This cysteine sulfenic acid then forms a disulfide bond with the resolving cysteine, which is in turn reduced by thioredoxin (Wood *et al.*, 2003). However, during pathogenesis, oxidative stress can increase and over-oxidization of the Prxs result in sulfinic (-SO²H) or sulfonic (-SO³H) acid formation (Papadia *et al.*, 2008). This creates an over-burdened system rendering the peroxidase ineffective, allowing for oxidative damage. Typically, thioredoxin facilitates the effectiveness of the Prxs, but when sulfenic or sulfonic acid is formed by

increased levels of peroxides, thioredoxin's effectiveness is rendered useless (Papadia *et al.*, 2008). In order to protect from neuronal oxidative stress associated with AD and cognitive decline, the reduction of over-oxidized Prxs as well as the increase of thioredoxin activity must be established.

First, we investigate how NMDAR activity reduces the over-oxidization of PrxII, PrxIII and PrxIV. Over-oxidization resulting in peroxiredoxin sulfenic/sulfonic acid (Prx-SO₂H) has traditionally thought to have been irreversible, however recent studies have suggested that it can be reduced back to the catalytically active thiol form by two ATP-dependent reductases, sestrin 2 (Sesn2) and sulfiredoxin (Srxn1). Papadia *et al.*, (2008) tested this hypothesis, and found positive results. After establishing bicuculline, a GABA_A receptor antagonist, and 4-aminopyriding, a K⁺ channel antagonist (BiC/4-AP) as an inducer of NMDAR activity, downstream effects could be observed. Cortical rat neurons were subjected to a brief, high (200μM) dose of hydrogen peroxide in order to induce Prx over-oxidation (Papadia *et al.*, 2008). BiC/4-AP treated neurons showed a significant increase in both Sesn2 and Srxn1. Additionally, induced Sesn2 and Srxn1 protein and mRNA expressions reduced cell death following hydrogen peroxide insult and significantly lowered Prx-SO₂H (Papadia *et al.*, 2008). It should be noted that additional knock down tests showed that independent increases of Sesn2 and Srxn1 did not find any significant results, however the two together showed reliably significant effects.

Sesn2 was found to have a multiple binding sites for the transcription factor CCAAT enhancer binding protein (C/EBP) (Papadia *et al.*, 2008). After several tests using mutations of C/EBP, it was established that Sesn2 is largely mediated by C/EBP. Alternatively, Srxn1 is induced by AP-1. BiC/4-AP stimulation activates the AP-1 sites, and additional knock down studies confirmed that Srxn1 is activated via AP-1 sites (Papadia *et al.*, 2008). Therefore, Sesn2 is a C/EBP target gene, and Srxn1 is an AP-1 target gene. Furthermore, both are upregulated by NMDAR activity and MEP.

Furthermore, another important byproduct of increased NMDAR activation is the significant decrease in thioredoxin-interacting proteins (Txnip). Txnip binds with thioredoxin and inhibits its activity, thus promoting vulnerability to oxidative stress (Schulze *et al.*, 2004). Cortical rat cultures treated with BiC/4-AP showed a downregulation of Txnip by 60% (P=0.01) and displayed successful suppression of this pro-oxidative gene expression (Papadia *et al.*, 2008). Investigation of the activity-dependent regulation of Txnip revealed that Forkhead Box O (FOXO) is the responsible promoter. FOXO phosphorylation turns off Txnip transcription when it is

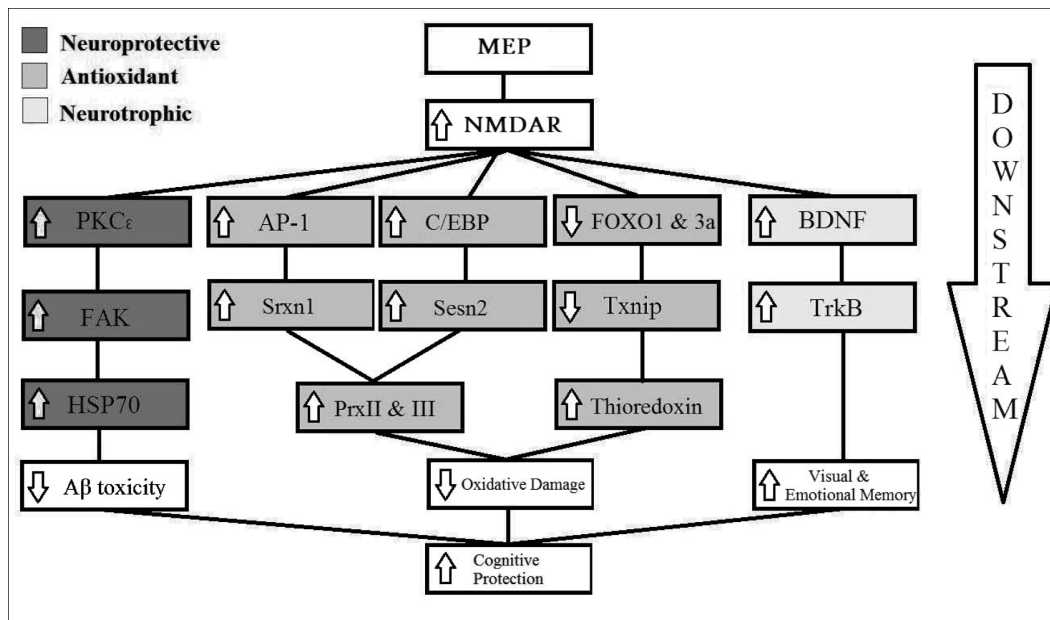


Figure 1. Proposed Integrated Model of Moderate Ethanol Preconditioning Resulting in Cognitive Protection

activated by protein kinase B (Pkb), which is activated by synaptic NMDAR activity (Papadia *et al.*, 2008). Therefore, it is not surprising that BiC/4-AP treated cultures showed less FOXO1 and FOXO3a expression, resulting in lower Txnip. In conclusion, Txnip is a FOXO target gene that is suppressed by NMDAR activity, resulting in an influx of thioredoxin activity and protection from oxidative insult.

MEP: NEUROTROPHIC MECHANISM

MEP may result in enhanced memory functions. This phenomenon has been shown In Vivo in rats fed liquid diets containing no, moderate, or high amounts of ethanol (Kalev-Zylinska *et al.*, 2007). This unique animal model study exemplifies the paradoxical facilitatory effect of low-dose alcohol intake on memory via NMDAR. The abstinent rats (0% ethanol diet), the moderate-intake rats (2.5% ethanol diet, <17.4 mM BAC) and the high-intake rates (5% ethanol diet, 21.8-55.8 mM BAC) proportionally modeled human drinking behaviors (Kalev-Zylinska *et al.*, 2007). Subjects were exposed to the novel object recognition task (NOR) to examine visual recognition memory and the inhibitory avoidance test (IA) to examine associative emotional memory. Results showed that memory was enhanced for the 2.5% moderate-intake

rats compared to the high-intake and abstinent groups (Kalev-Zylinska *et al.*, 2007). This observation is reinforced by the knock down of the NR1 subunit of NMDAR. All positive effects were negated by NR1 knockdown except for emotional memory, and over-intoxication negated all effects in every condition (Kalev-Zylinska *et al.*, 2007). The exact mechanism behind this phenomenon is unknown, however Kalev-Zylinska *et al.*, (2007) suggest facilitation could be due to increases in brain-derived neurotrophic factor (BDNF) expression in the moderate-intake rats (Kalev-Zylinska *et al.*, 2007). Immunohistochemistry proved difficult, but increases of both BDNF and neurotrophic tyrosine kinase (TrkB) protein expressions showed slight but significant increases, especially in the NR1 subunit (Kalev-Zylinska *et al.*, 2007). Both BDNF and TrkB have neurotrophic implications that may result in memory facilitation, an observable downstream byproduct of MEP.

Combining the neuroprotective, antioxidative, and neurotrophic mechanisms downstream from MEP has never been suggested, and the resulting model is the first of its kind to integrate various methods resulting in cognitive protection. The proposed multi-pronged model of MEP results in the suppression of A β toxicity, enhanced protection from oxidative damage, and improved memory (visual recognition and emotional). In conjuncture, these mechanisms could provide protection from cognitive decline associated with the AD pathology and actively delay the onset of the disease.

The first prong exhibits the decrease in A β toxicity, suppressed via HSP70 by directly inhibiting neuronal apoptosis. Therefore, HSP70 levels can effectively delay negative effects of A β plaques, which are implicated in AD. Additionally, many studies of aging and cognition regarding AD attribute A β burden as the primary cause of the pathology and related cognitive decline (Peters *et al.*, 2008; Anstey *et al.*, 2009). Staving off accumulation and progression of AD and associated decline could enhance cognitive functioning and increase functional longevity. In the integrated model, HSP70 is increased by the mediators PKC ϵ and FAK, and upregulation in each respectively are a direct result of increased NMDAR activity.

The second mechanism addressed in the model is the reduction of oxidative damage through MEP mediated effects on the thioredoxin-Prx system. NMDAR activity facilitates antioxidant mechanisms in the thioredoxin-Prx system by boosting the effectiveness of thioredoxin while increasing unoxidized Prxs. Thioredoxin's effectiveness is directly inhibited by Txnip, resulting in cells being sensitized to H₂O₂ induced death (Schulze *et al.*, 2004). Additionally, Txnip was found to be a FOXO target gene. This is exacerbated in the AD pathological process, where FOXO1 & FOXO3a mRNA

levels are further elevated, activating increased levels of Txnip (Blalack *et al.*, 2004). Therefore our model displays the NMDAR related reduction of FOXO1 & 3a activity resulting in a downstream process increasing Thioredoxin's efficiency and aiding in the battle against harmful oxidation. Furthermore, our model shows MEP mediated decreases in the level of over-oxidized Prxs. Two reactivating genes have the unique capability of reversing over-oxidized Prxs, resulting in an influx of available antioxidants: Srxn1 and Sesn2. The upregulation of both proteins directly influence the level of available PrxII, PrxIII, and PrxIV. However, the integrated model is only concerned with PrxII and III. Only these two Prxs show cytoprotective effects in cortical neurons: PrxII protects neurons against A β toxicity and oxygen-glucose deprivation, and PrxIII protects hippocampal neurons against excitotoxicity (Papadia *et al.*, 2008). These thiol-based antioxidants are increased by Srxn1 and Sesn2, which are targeted by AP-1 and C/EBP respectively. In turn, we display AP-1 and C/EBP upregulation initiated by increased activity in NMDAR, resulting in the downstream production of PrxII & III. Together, Prx II & III and thioredoxin could provide protection to neurons from oxidative damage and preserve cognition by protecting the vital function and integrity of cortical neurons.

The final branch of our cognitive protection model was observed utilizing *in vivo* studies, whereas the neuroprotective and antioxidant mechanisms were investigated primarily using *in vitro* studies. As discussed above, rats that were fed liquid diets with various ethanol-intake levels were subjected to emotional and visual memory tasks. It was observed that moderate-intake rats performed better than both high-intake and abstinent rats on visual and emotional memory tasks. The mediator, proposed in Kalev-Zylinska *et al.*, (2007), is the increase of the neurotrophin BDNF causing the activation of Trk-B. BDNF has been shown to be vital for long-term memory, the survival of existing neurons, and the growth of new neurons and synapses (Acheson *et al.*, 2004). Additionally, AD is associated with lowered levels of BDNF and several studies suggest that neurotrophic factors such as BDNF protect against A β toxicity and hippocampal damage (Mattson *et al.*, 2008). In particular interest to this paper, Trk-B was found to be most elevated by MEP (Kalev-Zylinska *et al.*, 2007). BDNF activates Trk-B, increasing protein growth factors that may facilitate memory. This memory facilitation, along with other important neurotrophic implications brought on by increases of BDNF, constructs our final proposed branch of MEP mediated cognitive benefits.

In conclusion, there is no single downstream factor established by the MEP phenomenon that completely protects cognition, especially when pathology like AD is present. Therefore, the integrated model combines neuroprotective, antioxidative, and neurotrophic mechanisms in order to suggest a more multifaceted approach. By no means does this model propose a complete picture, but it does move us one step closer to further understanding MEP's vast array of biologic implications resulting in cognitive protection.

Discussion

OTHER POSSIBLE PROTECTIVE FACTORS MEDIATED BY MODERATE ETHANOL INTAKE

Moderate ethanol intake initiates many biological processes separate from NMDAR activation that may serve as cognitive protectants. The leading alternate argument to direct neuronal MEP facilitation is the proven effect of moderate ethanol consumption on the vascular system. Many AD risk factors in particular, as discussed earlier, are highly associated with vascular diseases and conditions. Ischemia, hypertension and obesity are all highly correlated with AD related dementia (Peters *et al.*, 2008). This established, moderate ethanol intake improves certain vascular processes, thus protecting individuals from cognitive decline by lowering AD and dementia incidence.

Alcohol's positive effect on the cardiovascular system is debated; however several studies suggest moderate amounts to be protective. Kondo (2004), as well as Ecker and Klatsky (2002), exemplify the widely accepted fact that moderate alcohol consumption increases high-density cholesterol, benefiting the cardiovascular system (Kondo *et al.*, 2004; Ecker *et al.*, 2002). Alcohol has also been shown to increase cerebral blood flow and decrease blood coagulation (Volkow *et al.*, 2006). Additionally, ethanol has been shown to be associated with an anti-inflammatory effect, which would help protect against cardiovascular disease, associated AD, and dementia (Wright *et al.*, 2006). In Vivo studies of canine ethanol intake also show reliably significant moderate-ethanol induced protection of the myocardium, relieving heart tissue from ischemic injury (Pagel *et al.*, 2002). These studies show that moderate alcohol intake may be associated with decreasing AD and dementia risk by promoting cerebrovascular benefits. However, in many of these studies, ethanol was not considered the sole variable in mediating risk factors

and future research should be conducted to determine ethanol's exclusive and direct role in cerebrovascular protection.

Moderate ethanol consumption is not limited to possible biological protective factors and may also serve as a cognitive protectant through more social means. Drinking socially could enhance cognitive functions by promoting healthy social facilitation. Additionally, studies have found that being more social may be protective. Bennett *et al.*, (2006) found that social network size and risk of cognitive impairment were inversely correlated, suggesting the beneficial effect of friends and family (Bennett *et al.*, 2006). Of course this possible protective factor is completely dependent on whether individuals find ethanol socially facilitating. Further research must be conducted to establish ethanol's effect on group situations and social networks.

Another theory of alcohol consumption's mediating effects include the possible facilitation of sleep. Alcohol is widely considered a sleep aid, and could possibly promote healthy sleep habits and help maintain a functional circadian rhythm, possibly lowering A β accumulation in the brain (Ashley *et al.*, 2000). Excessive periods of wakefulness increase levels of orexin, which is necessary for A β production. Additionally, chronic sleep deprivation is associated with early onset AD (Kang *et al.*, 2009). However, alcohol-induced effects on sleep vary greatly from individual to individual, and can induce arousal rather than sedation. Future studies must further investigate alcohol's effects on sleep cycles, circadian rhythm maintenance and A β accumulation.

PRESCRIBING ETHANOL: POSSIBLE INTERVENTION

Through our integrated model of MEP and our discussion of additional cognitive benefits derived from moderate ethanol consumption, it can be argued that low level intake of ethanol over a long period of time can result in significant cognitive protection. This establishes ethanol as a viable medicinal protectant to stave off AD, dementia, and related cognitive decline. Utilized at appropriate levels in conjunction with exercise and diet, ethanol may one day be a staple in the fight against cognitive aging and decline.

In addition to pre-symptomatic intake, ethanol may have a role in fighting the AD pathology once it is present. As the pathology sets in, the brain experiences an influx of glutamate metabolic damage. This excess glutamate over excites NMDAR, which causes excitotoxicity by allowing high levels of Ca²⁺ to enter neurons. This may seem counterintuitive to the

protective effect of NMDAR activity proposed earlier, but too much Ca^{2+} results in the activation of damaging enzymes rather than initiating protective factors. However, ethanol is an NMDAR antagonist, and potentially could be used to suppress over-activation. Another NMDAR antagonist, memantine, is widely used and accepted as a treatment for advanced AD (Papadia *et al.*, 2008). Memantine suppresses Ca^{2+} production while sparing synaptic NMDAR activity. This sparing is essential because continued synaptic NMDAR activity allows for the antioxidative mechanism (displayed in model) to continue functioning (Papadia *et al.*, 2008). Future research should investigate ethanol's specific antagonistic capabilities. If ethanol is found to be effective as currently prescribed drugs, it could not only be utilized in the prevention of AD and dementia, but also during the treatment of the pathology as well.

PRESCRIBING ETHANOL: ISSUES

Although ethanol could serve as a viable protective agent and possible intervention compound, it is not at this time seriously considered as a suggested method for protection or intervention. Ethanol related benefits do not outweigh the potential dangers, costs, and issues implicated with suggesting ethanol intake.

The first and most obvious concern is that ethanol is an intoxicant that possesses some harmful properties. Consumed at high levels, alcohol is associated with higher rates of cancer, neurological damage, and mental disorders (Bennett *et al.*, 2006). Furthermore, the brain is not the most sensitive organ to ethanol, and harmful liver damage can occur even at chronic low-level intake (Anstey *et al.*, 2009). Likewise, chronic alcohol abuse has been shown to facilitate progressive neurodegenerative diseases, creating a fine line between harmful and helpful effects in regards to ethanol intake (Piazza-Gardner *et al.*, 2013). Future studies must weigh the risks and benefits associated with moderate ethanol consumption before seriously considering ethanol as a suggested protective factor.

Ethanol's protective and destructive effects brings us to our second issue: calibrating and defining moderate ethanol consumption. The studies presented in this paper show great variability in their operational definition of "moderate ethanol consumption". Some measure by number of drinks over a certain amount of time, some measure by BAC, and some attempt to quantify using various self-reported measures. Even within these methods there is great variability in what constitutes as "one drink" or "high vs.

moderate” intake. This exemplifies a great inconsistency between studies, making it difficult to compare data and results. Additionally, individual variability must be taken into account. The amount of ethanol in “one drink” may impair one individual greatly while sparing another from any intoxicating effects whatsoever. Body weight, alcohol tolerance, drinking experience, and genetic disposition are only a few of many variables that must be controlled in order to accurately measure beneficial effects. The quality of the drink and the speed in which it is consumed need also to be considered. Additionally, individual variability in socialness, socioeconomic class, race, gender, ethnicity and culture may also serve as contributing factors. Future studies must account for and control these variables in order to accurately determine the benefit of MEP.

Conclusion

We have thoroughly investigated the means by which ethanol consumption could enhance cognitive protection and have constructed a model in which moderate ethanol consumption could potentially stave off neurodegeneration. Due to the great degrees of variability and harmful physiological effects present throughout this review, ethanol consumption may never be a suggested practice to stave off AD and dementia. Although ethanol itself is unlikely to be utilized in practice, we have outlined its protective effects through various mechanisms that may assist in the discovery of more selective interventions in the future. The integrated model suggested within this paper serves as such an outline.

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TO BE OR NOT TO BE...GREEK: A STUDY OF THEORY OF MIND, MORAL REASONING, AND MORAL DEVELOPMENT IN AFFILIATED AND NON-AFFILIATED STUDENTS

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Abstract

Understanding factors that affect theory of mind and morality (such as participation in Greek organizations) are particularly important during college, a time of emotional and moral development. While past studies have investigated theory of mind and moral development in Greek and non-affiliated college students, the research is limited. Thus, in this study, we explored theory of mind (ToM), moral development (MD), and moral reasoning (MR) in Greek members ($n = 54$) and their non-affiliated peers ($n = 50$) across their college years. Results indicated that Greek and non-affiliated students differed in theory of mind and moral reasoning, but not in moral development. Greek men and women demonstrated equivalent theory of mind abilities across class years, whereas non-affiliated students' theory of mind abilities differed depending on their gender and class year. Specifically, non-affiliated men showed a pattern of decreased theory of mind across their college years, whereas non-affiliated women's theory of mind improved across the same period. Additionally, non-affiliated students tended to consider the feelings of others more than themselves when reaching moral decisions, whereas Greek students' moral reasoning focused more on following rules and social norms. Taken together, these results suggest that involvement in Greek life during college may impact both theory of mind and moral reasoning without directly affecting the levels of moral development reached by students.

Theory of mind, the acknowledgement that others' viewpoints and feelings differ from one's own (Winner, Brownell, Happé, Blum & Pincus, 1998; Gaudreau, *et al.*, 2013), plays a critical role in interpersonal interactions. Previous research suggests a link between the awareness of our own emotions and the recognition of emotions in others (Brabec, Gfeller & Ross,

2012). Previous research has also found a positive correlation between theory of mind and verbal irony comprehension, suggesting that higher cognitive functioning is associated with the ability to identify others' emotions (Gaudreau *et al.*, 2013). Furthermore, research has found that theory of mind and morality are linked (Rosen, Brand, Polzer, Ebersbach & Kalbe, 2013). For example, theory of mind helps us determine whether others' moral transgressions are purposeful or accidental (Rosen, Brand, Polzer, Ebersbach & Kalbe, 2013).

In the traditional sense, morality is often thought of as right and wrong. More specifically, conventional morality is often associated with welfare, justice, laws, and norms (Graham *et al.*, 2011; Rest, Narvaez, Thoma & Bebeau, 1999). However, recent research has shifted from a traditional content-based approach to a functionalist approach (Graham *et al.*, 2011). The functionalist approach investigates the integration and connection between multiple moral systems, such as blending norms with personal values and identities, and recognizes that individuals incorporate personal, familial, and societal morality into their character. This led to the development of the moral foundations theory (Haidt and Graham, 2007) which asserts that moral values are common across cultures and share the essential foundations of: harm/care, fairness/reciprocity, ingroup/loyalty, authority/respect, and purity/sanctity (Graham *et al.*, 2011).

Paralleling the advancement in modified theories exploring moral reasoning, researchers have also recently progressed in their understanding of moral development, or how morality changes with age. Past research largely focused on Kohlberg's three moral stages, each comprised of two sublevels. According to Kohlberg, in level one of the preconventional stage, individual morality is based on the belief that the quality of an act depends on the consequences that follow it. In level two of the preconventional stage, rules are obeyed in order to receive rewards and derive personal satisfaction. As individuals achieve conventional moral reasoning, in level three, moral behavior is determined by the reactions of others, and in level four, moral behavior is that which avoids criticism by authorities. Finally, as moral reasoning reaches a postconventional stage in level 5, individuals utilize moral actions to maximize social welfare. Level six marks the optimal level of moral reasoning in which right and wrong are determined by individual conscience and ethics (Shaffer, 1989). Thus, as individuals progress through each stage, their moral reasoning takes into account how their actions influence larger groups of people – themselves, close friends and family, and then communities, respectively (Mayhew, Seifert, & Pascarella, 2012).

Mayhew and colleagues (2012) conceptualized Kohlberg's stages of moral development as occurring in two phases: consolidation and transition. Individuals in the consolidation phase consider right and wrong to be independent of context whereas transitional moral reasoners are sensitive to change and use a variety of methods to process external stimuli.

Results of past studies exploring Kohlberg's moral stages have found that moral development is positively correlated with age and education (Rest, Cooper, Coder, Masanz, & Anderson, 1974; Rest, Davison, & Robbins, 1978; Rest, Narvaez, Thoma, & Bebeau, 1999). Most adults are found to be in the third or fourth level of moral development; adult subjects who have graduated college and those in post-graduate or professional programs are more likely to reach the fourth, and in rare cases, the fifth level of development (Cohen, 1982). Research shows that moral development slows down and eventually plateaus after college (Rest, Davison, & Robbins, 1978). Since college represents such an important time for individual moral development, understanding factors that affect morality during these years is critical.

One possible influence on college students' moral development is involvement in Greek organizations. In one of the few past studies that has investigated how Greek affiliation impacts morality, Martin, Hevel, Asel, and Pascarella (2011) found that fraternity and sorority members did not differ from their unaffiliated counterparts in moral reasoning. Furthermore, in a study conducted by Cohen (1982), there were no significant differences in the level of moral development achieved by Greek-affiliated men and women. In contrast to these studies that suggest Greek affiliation does not influence moral development, two studies have documented differences between Greek and non-Greek college students' moral reasoning. In a study involving only male college freshman, those who were Greek-affiliated exhibited less sophisticated moral reasoning than those who were not (Sanders, 1990). In addition, Kilgannon and Erwin (1992) found that non-Greek women demonstrated better moral reasoning than Greek women, non-Greek men, and Greek men. Thus, both of these studies suggest that Greek affiliation may be detrimental to the moral development of college students.

With both of these studies being more than 20 years old, many universities and Greek organizations now promoting positive moral development in their students, and the number of students interested in and joining Greek organizations rising, it is more imperative than ever that empirical research focus on moral reasoning and moral development in this population. The small number of past studies addressing this issue largely

focused on college freshmen, failing to examine differences in morality across the college years. Additionally, some of these studies failed to include unaffiliated students as a comparison. Even less research has been done on theory of mind in Greek-affiliated and non-Greek-affiliated students. Thus, the purpose of the current study was to investigate theory of mind, moral development, and moral reasoning in sorority and fraternity members and their non-affiliated peers across their college years using more modern measures of these constructs.

Method

PARTICIPANTS

This study included 104 sophomore, junior, and senior students from Butler University. Freshmen were excluded since students do not affiliate with Butler's Greek system until second semester of their freshman year. Participants were primarily recruited from psychology courses and received extra credit for their participation. We recruited additional students through word-of-mouth, and these participants received a \$5 Starbucks gift card at the conclusion of the study. In addition to being classified as affiliated ($n = 54$) or non-affiliated ($n = 50$), participants were also grouped by gender and class year (see **Table 1**). A 2 (Greek status: affiliated vs non-affiliated) \times 3 (class year: sophomore, junior, senior) \times 2 (gender: male vs. female) ANOVA showed that participants increased in age with class year, $F(2, 92) = 124.84$, $p < .001$. However, age did not systematically differ across male versus female students ($F(1, 92) < 1$) or between affiliated and non-affiliated students ($F(1, 92) = 3.35$, $p = .07$), nor did any interaction effects reach significance (all $ps > .20$). Furthermore, a Chi-square analysis ensured that participant groups were similar in their racial distributions, $X^2(6, n = 95) = 43.70$, $p = .48$.

MATERIALS

Demographic questionnaire. The demographic form asked participants to provide basic information about themselves such as gender, age, race, year in school, and Greek affiliation.

Reading the Mind in the Eyes. To measure participants' theory of mind, a modified version of the Reading the Mind in the Eyes test, created by Baron-

Cohen et al. (2001) was used. This test required participants to identify the emotion associated with a picture of a face showing only the eyes. The score

	Sophomore		Junior		Senior	
	M (<i>n</i> = 10)	F (<i>n</i> = 19)	M (<i>n</i> = 20)	F (<i>n</i> = 21)	M (<i>n</i> = 13)	F (<i>n</i> = 21)
	Greek (<i>n</i> = 54)					
Age	19.43 (0.53)	19.56 (0.53)	20.45 (0.52)	20.40 (0.52)	21.67 (0.52)	21.09 (0.30)
Ethnicity (% White)	100%	78%	91%	100%	100%	100%
	Non-Greek (<i>n</i> = 50)					
Age	19.00 (0.00)	19.30 (0.48)	20.33 (0.50)	20.18 (0.40)	21.29 (0.49)	21.40 (0.52)
Ethnicity (% White)	100%	90%	89%	91%	71%	90%

Table 1. Mean (SD) demographic characteristics for the twelve participant groups.

for the total correct out of thirty-six indicated how well each participant understood another person’s mental state based upon their facial cues.

Short story theory of mind task. Participants also completed a theory of mind task created by Winner *et al.* (1998) that involved reading several short stories. Half of the short stories were “lie stories” in which the wrongdoer did not know that the listener knew the truth and tried to hide a moral transgression with a lie. The other half were “joke stories” in which the wrongdoer knew the listener was aware of the truth, but tried to lighten the situation by making a joking statement that both knew was not true. Interspersed within each story was a series of six questions investigating whether the participants comprehended story details accurately and whether they correctly interpreted the speaker’s intentional falsehood as a lie or a joke. Drawing the correct conclusion required the participant to deduce what the speaker did and didn’t believe to be true about the situation. This task was scored by dividing the questions into three categories: fact questions, second-order belief questions, and theory of mind questions. The first two questions embedded in each scenario were fact questions that were rated on a scale from 0-1, indicating whether or not participants correctly comprehended

material from the scenario. The third and fourth questions embedded in each scenario were second-order belief questions rated on a scale of 0-2. The second-order belief questions indicated whether or not participants understood the speaker's beliefs about what the listener in the scenarios knew. Finally, the fifth and sixth questions within each scenario were theory of mind questions that assessed whether or not participants could correctly discriminate between when the person in the story was telling a lie or a joke.

Moral Foundations Theory Questionnaire (MFQ). Designed by Graham *et al.* (2011), this questionnaire measures the degree to which participants favor each of the five moral foundations systems when they are making moral decisions. These systems include: harm / care, fairness / reciprocity, ingroup / loyalty, authority / respect, and purity / sanctity. This questionnaire included two types of items – relevance and judgments. The moral relevance questions determined which systems participants viewed as most relevant when defining morality whereas the judgments questions evaluated which systems participants believe they use when making moral decisions. The questionnaire was scored by totaling the relevance scores and the judgment scores for each of the systems resulting in five subscales representing the five moral foundations. Additionally, as recommended by Graham *et al.* (2011), a progressivism score was calculated by adding scores for harm / care and reciprocity / fairness and subtracting the scores for the other three subsystems (ingroup / loyalty, authority / respect, purity / sanctity). The progressivism score thus indicated the extent to which participants were more liberal when making their moral decisions.

Defining Issues Test, Version 2 (DIT2). Rest, Narvaez, Thoma, and Bebeau (1999) created the DIT2 to examine moral judgment by presenting participants with five moral dilemmas. Each scenario is followed by 12 factors that participants might consider when deciding how to resolve the dilemma. Participants rank each factor in terms of its personal importance and relevance to the situation. These rankings provide information about each participant's stage of moral development. This test was scored based on three variables – P score, N2 score, and type indicator. The P score quantified the postconventional stage of moral development for each participant, indicating how often this level of morality was represented when participants made their decisions. The N2 score was a newer and more valid gauge of the level of moral development participants had attained; the N2 takes into account the P score (higher stage) and the personal interest items (lower stage) to indicate how often higher moral reasoning relative to lower moral reasoning was utilized in participants' decision-making. Lastly, the type

indicator scores provide the particular stage that best represents each participant's phase of development and more specifically whether each participant appeared to be at a consolidated or a transitional stage of development.

PROCEDURE

Participants were first recruited through psychology courses. However, in order to equalize the gender groups, number of Greek and non-Greek students, and the participants from each class year, students were also recruited directly from their Greek houses. Each participant was part of a group testing session (2-12 per group) lasting approximately 45-60 minutes. To begin the study, each student signed an informed consent and completed the demographic questionnaire. Next, participants viewed and responded to the thirty-six items of the Reading the Mind in the Eyes Test. After this test, participants completed the short story theory of mind task (10 lie and 10 joke scenarios in a fixed, but random order), the Moral Foundations Theory Questionnaire (30 questions), and the DIT2 (5 short story scenarios). At the conclusion of the study, participants received extra credit in a psychology class or a small gift card for their time.

Results

ANALYSES

Data was analyzed using SPSS by utilizing a 2 (Greek status: affiliated vs non-affiliated) \times 3 (class year: sophomore, junior or senior) \times 2 (gender: male vs female) between-participants ANOVA for each theory of mind, moral reasoning, and moral development variable. Each outcome measure was analyzed separately because we expected different patterns of performance across groups on different variables. When significant 3-way interaction effects emerged, follow-up simple two-way interaction analyses were run, applying a Bonferroni correction to avoid Type I errors. Additionally, when significant two-way interaction effects emerged, follow-up simple main effects further explored the nature of these interactions. Again, a Bonferroni correction was used to protect the Type I error rate. **Table 2** summarizes the scores of the 12 groups on each of the theory of mind, moral reasoning, and moral development measures.

Before conducting these primary analyses, we examined the reliability and intercorrelations amongst the main outcome variables. Individual test responses were available for two tests. Both the Winner Task (Chronbach's α

		Greek			Non-Greek		
		Sophomore	Junior	Senior	Sophomore	Junior	Senior
Gender		Theory of Mind					
Eyes	M	27.71(3.25)	23.82(3.74)	26.17(2.40)	29.00(1.73)	26.56(3.32)	28.43(3.87)
	F	27.67(3.00)	28.90(4.33)	27.91(5.12)	27.60(3.92)	28.00(3.41)	29.80(2.39)
Winner SB ^{2**}	M	1.80(0.11)	1.49(0.36)	1.59(0.24)	1.61(0.30)	1.81(0.22)	1.33(0.50)
	F	1.69(0.13)	1.47(0.26)	1.56(0.30)	1.51(0.36)	1.67(0.19)	1.66(0.22)
Winner ToM ^{1*}	M	1.67(0.22)	1.68(0.16)	1.71(0.21)	1.85(0.05)	1.66(0.23)	1.53(0.35)
	F	1.83(0.12)	1.72(0.16)	1.77(0.16)	1.70(0.24)	1.72(0.15)	1.83(0.10)
Moral Reasoning: Moral Foundations Questionnaire							
Ingroup	M	3.86(0.94)	3.80(0.69)	4.22(0.91)	3.94(0.95)	3.13(1.33)	3.86(0.34)
	F	3.81(0.48)	3.37(0.61)	3.77(0.60)	3.13(0.74)	3.48(0.78)	3.73(0.85)
Harm ^{ε*}	M	4.12(0.74)	4.23(0.84)	4.33(1.03)	4.61(1.11)	4.81(0.69)	4.57(0.43)
	F	4.81(0.61)	4.52(0.53)	4.85(0.48)	4.93(0.49)	4.50(0.58)	5.00(0.33)
Authority ^{α*}	M	3.98(0.70)	4.00(0.73)	4.25(0.98)	3.89(0.51)	3.43(1.22)	3.76(0.88)
	F	4.17(0.87)	3.97(0.87)	3.95(0.67)	3.58(0.77)	3.68(1.22)	3.75(0.45)
Purity ^{β**}	M	3.60(0.96)	3.53(0.91)	4.06(0.95)	3.00(0.44)	3.59(1.23)	3.31(1.11)
	F	4.07(0.51)	3.80(0.92)	3.85(0.72)	3.58(0.81)	2.78(0.76)	3.70(0.83)
Fairness ^{γ*}	M	4.36(0.20)	4.15(0.77)	4.50(0.66)	4.33(0.60)	4.76(0.74)	4.31(0.26)
	F	4.89(0.61)	4.50(0.46)	4.41(0.38)	4.57(0.58)	4.30(0.53)	4.85(0.57)

Table 2 continued on the next page

Moral Development: Defining Issues Test-2							
Progress ^{a**}	M	0.43(0.81)	0.41(0.83)	0.24(0.81)	0.86(1.09)	1.40(1.41)	0.80(0.83)
	F	0.83(0.64)	0.80(0.66)	0.77(0.52)	1.32(0.66)	1.09(0.85)	1.20(0.56)
P Score	M	38.36(13.42)	33.64(14.39)	36.33(11.41)	38.67(15.01)	38.00(14.42)	38.57(18.89)
	F	43.11(13.04)	29.00(12.59)	46.55(8.58)	40.00(15.08)	42.55(14.40)	40.80(11.20)
Type	M	5.14(1.86)	3.73(2.45)	4.33(2.58)	4.33(2.52)	4.75(2.25)	4.43(2.64)
	F	5.78(1.92)	4.00(1.70)	5.82(1.60)	4.10(2.38)	5.09(2.02)	5.50(1.90)
N2 Score	M	35.91(10.54)	31.83(16.94)	31.73(14.89)	33.39(16.54)	36.00(16.56)	35.73(20.57)
	F	42.06(10.12)	31.65(12.97)	44.27(10.78)	37.14(16.31)	39.78(12.22)	39.68(11.47)

Table 2. Mean (SD) for Theory of Mind, Moral Reasoning, and Moral Development Scores by Group

Notes: Eyes: Reading the Mind in the Eyes Test
 Winner SB: Winner Task Secondary Beliefs Score
 Winner ToM: Winner Task Theory of Mind
 Type: Type Indicator
 Progress: Progressivism
^a = main effect of affiliation
^g = main effect of gender
² = two-way affiliation x class year interaction effect
³ = three-way interaction
^{*} = $p < .05$
^{**} = $p < .01$

= .661) and the Moral Foundations Questionnaire (Chronbach's $\alpha = .826$) exhibited adequate internal consistency in our sample. The intercorrelations amongst outcome variables are summarized in **Table 3**. Limited correlations emerged between the various measures of Theory of Mind, suggesting the Mind in the Eyes Test and the Winner Task assess different aspects of this construct. For the Moral Foundations Questionnaire, the Harm and Fairness subscales correlated more highly with each other than with other foundations, as did Purity, Ingroup, and Authority. This pattern of correlations supports the calculation of the Progressivism measure that contrasts these two approaches to moral reasoning. Finally, all three scores on the DIT-2 measure of Moral Development were highly correlated with each other.

	MindEyes	WinnerSB	WinnerToM	Harm	Fairness	Ingroup	Authority	Purity	Progress	P Score	N2 Score
WinnerSB	.071										
WinnerToM	.097	.368***									
Harm	-.030	-.108	-.027								
Fairness	.213*	.136	.182	.345***							
Ingroup	-.035	-.093	.153	-.008	-.055						
Authority	-.034	-.045	.117	.110	.029	.677***					
Purity	.005	-.011	.119	.166	.172	.431***	.624***				
Progress	.083	.053	-.079	.419***	.427***	-.726***	-.725***	-.584***			
P Score	.173	.221*	.156	.006	.161	-.155	-.230*	-.073	.210*		
N2	.147	.147	.172	.058	.188	-.174	-.127	.000	.185	.902***	
Type	.263**	.227*	.183	-.057	.165	-.122	-.135	-.078	.146	.810***	.821***

Table 3. Intercorrelations Amongst Theory of Mind, Moral Reasoning, and Moral Development Measures.

Note: * = $p < .05$

** = $p < .01$

*** = $p < .001$

MindEyes: Reading the Mind in the Eyes Test

Winner SB: Winner Task Secondary Beliefs Score

Winner ToM: Winner Task, Theory of Mind

Progress: Progressivism

N2: N2 Score

Type: Type Indicator

THEORY OF MIND

Each of the three theory of mind measures were analyzed separately with a 2 (affiliation group) \times 3 (class year) \times 2 (gender) ANOVA. For the Reading the Mind in the Eyes Test, none of the interactions effects nor any of the main effects reached significance. The main effect associated with gender neared significance ($F(1, 92) = 3.19, p = .08$), with women outperforming men (see **Table 2**).

For the Winner task, significant interaction effects emerged for both secondary beliefs and theory of mind. Although the three-way interaction for secondary beliefs failed to reach significance ($F(2, 92) = 1.66, p = .20$), the two-way interaction between affiliation and class year was significant, $F(2, 92) = 5.48, p < .01$ (see **Table 2**). We ran follow-up simple main effect

analyses looking at the impact of class year separately for Greeks and non-Greeks ($p = .05/2 = .025$). This revealed a significant effect of class year for Greeks, ($F(1, 51) = 4.56, p = .015$), whereas for non-Greeks, the effect of class year was not significant, ($F(1, 47) = 2.45, p = .097$).

For the Winner Theory of Mind score, the main effect of gender neared significance, $F(1, 92) = 3.59, p = .06$, but this effect was also part of a significant three-way interaction, $F(2, 92) = 3.56, p < .05$ (see **Figure 1**). We ran follow-up simple interaction effect analyses examining the impact of class year and gender separately for Greeks and non-Greeks ($p = .05/2 = .025$). These analyses indicated that, for Greeks, neither the simple interaction effect nor either of the simple main effects reached significance (all $ps > .08$). However, for non-Greeks, the two-way interaction between class year and gender neared significance even with the Bonferroni correction applied, $F(1, 44) = 3.50, p = .039$. Further follow-up analyses of class year for non-Greek men versus non-Greek women ($p = .025/2 = .0125$) did not reveal significant simple main effects (both $ps > .22$).

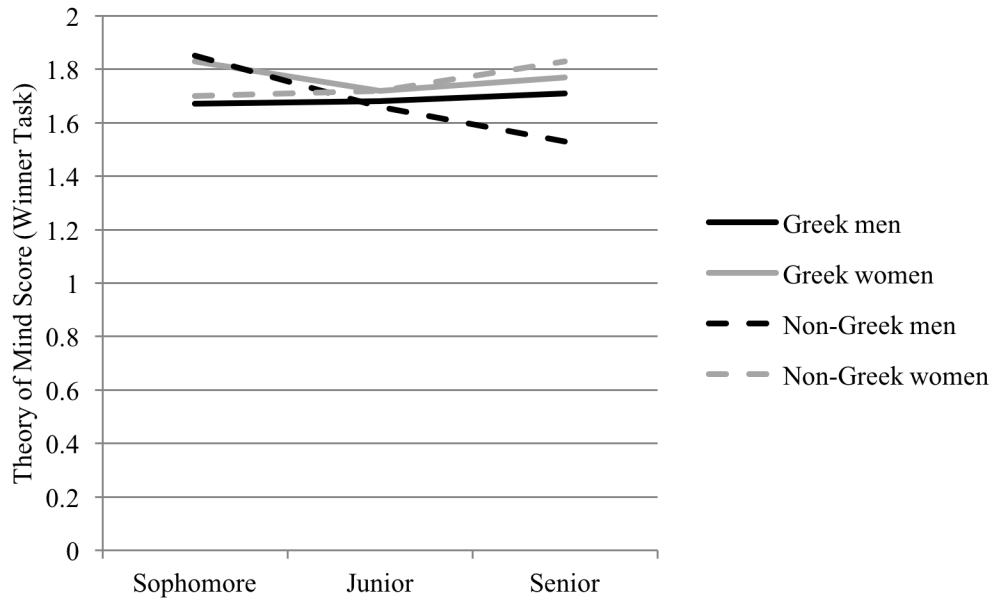


Figure 1. Theory of Mind Score (Winner Task) by Class Year, Affiliation, and Gender.

MORAL REASONING

A series of 2 (affiliation group) \times 3 (class year) \times 2 (gender) univariate ANOVAs analyzed each moral foundation score and the progressivism summary score from the Moral Foundations Questionnaire. Several of the foundation systems were impacted by main effects. First, for the ingroup foundation, a main effect of class year nearly reached significance $F(2, 92) = 2.94, p = .058$ such that scores for sophomores ($M = 3.60, SD = .79$) were somewhat higher than those for juniors ($M = 3.46, SD = .88$), and with seniors earning the highest scores on this measure ($M = 3.86, SD = .70$; see **Table 2**). Second, the main effect of gender reached significance only for the moral foundation of harm ($F(1, 92) = 5.86, p < .05$). Specifically, women were more likely than men to consider how their choice might bring pain or harm to another when making a moral decision (see **Table 2**). A near significant effect of affiliation also emerged for harm ($F(1, 92) = 3.83, p = .053$), indicating that non-Greeks cared more about harming others than Greeks did when making moral decisions (see **Table 2**). Greek affiliation also exerted a significant main effect for authority ($F(1, 92) = 4.14, p < .05$) and purity ($F(1, 92) = 7.08, p < .01$). Greeks tended to rely more on tradition and to weigh rules and laws more heavily when making moral decisions than non-Greeks (see **Table 2**). Similarly, Greeks showed a partiality towards virtue and God in moral decision-making relative to their non-affiliated peers (see **Table 2**). The analyses examining the final subsystem score, fairness, yielded a significant three-way interaction, $F(2, 92) = 3.70, p = .029$ (see **Figure 2**). Follow-up simple interaction effect analyses examined the impact of education and gender on fairness scores for Greek and non-Greek students ($p = .025/2 = .0125$). Neither the simple interaction effect nor either main effect reached significance for Greek students (all $ps > .09$). Rather, utilization of the fairness moral foundation was stable across class years regardless of gender for Greeks. Conversely, for the non-Greeks, the simple interaction effect showed a near significant trend with the Bonferroni correction applied, $F(1, 44) = 3.60, p = .036$. Further follow-up simple main effect analyses separately for non-Greek men and women revealed that class year did not significantly impact fairness for non-Greek students (both $ps > .99$).

Analyses for the final variable measured on the MFQ, progressivism, revealed a significant main effect for affiliation group ($F(1, 92) = 9.76, p < .01$; see **Table 2**) and a nearly significant main effect for gender ($F(1, 92) = 3.33, p = .07$; see **Table 2**). Non-Greeks and women scored higher on the progressivism scale than Greeks and men, suggesting that the former groups

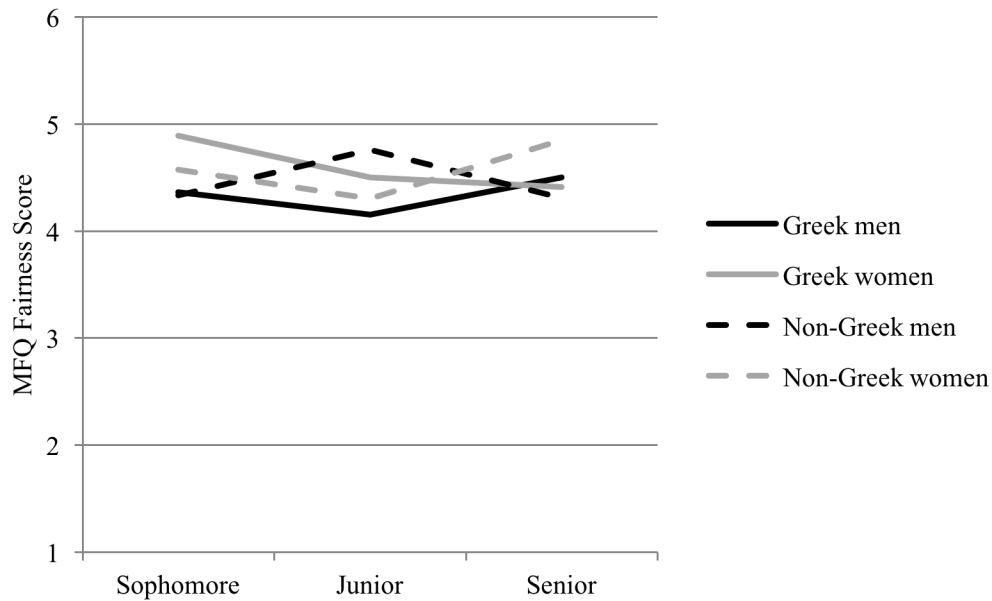


Figure 2. Moral Reasoning Fairness Score by Class Year, Affiliation, and Gender.

were more likely to consider harm and fairness during moral-decision making compared to the other three moral foundation subsystems.

MORAL DEVELOPMENT

Analogous to theory of mind and moral reasoning scores, the moral development scores from the DIT-2 were analyzed with 2 (affiliation groups) \times 3 (class year) \times 2 (gender) univariate ANOVAs. No significant interaction or main effects emerged for the P score (all $ps > .17$) or the type indicator score (all $ps > .11$). Although no interaction or main effects reached significance for the N2 score, the main effect of gender neared significance ($F(1, 91) = 2.82, p = .097$) such that women were more likely to evidence later rather than earlier stages of moral development compared to men.

Discussion

In an effort to build upon previous research, this study sought to investigate theory of mind, moral reasoning, and moral development in Greek and non-Greek students at various points in their college years. We utilized four modern measures of these constructs to examine differences associated with

gender, class year and affiliation status. Results were complex, with differential relationships emerging amongst these constructs.

CLASS YEAR DIFFERENCES IN THEORY OF MIND, MORAL REASONING, AND MORAL DEVELOPMENT

We found limited relationships between college students' class year and their performance on measures of theory of mind, moral reasoning, and moral development. In fact, the only score that neared significance across class years was the moral reasoning ingroup score. Although scores on this measure did increase from junior to senior year, these rising scores do not necessarily represent higher moral reasoning or moral development, but may actually indicate less sophisticated moral reasoning with advancing education. By relying more on ingroup judgments and loyalties, seniors were less likely to make moral decisions based upon contextual factors which may correspond to one of Kohlberg's earlier developmental stages as opposed to one of his later stages (Mayhew *et al.*, 2012). Interestingly, results from the current study failed to replicate those of past studies that found that moral development is positively correlated with age and education (Rest, *et al.*, 1974; Rest, *et al.*, 1978; Rest, *et al.*, 1999). This may be because Rest's research examined a wider range of ages and levels of education than were included in our study.

GREEK AFFILIATION DIFFERENCES IN THEORY OF MIND, MORAL REASONING, AND MORAL DEVELOPMENT

We found that Greek affiliation shared a significant relationship with moral reasoning, but not with the other outcome measures included in our study. Non-Greek students were more likely than Greek students to take into account whether they were harming others during moral decision-making. Conversely, Greek students were more likely to consider rules, societal norms, and God when making moral decisions compared to non-Greek students. Together, these particular moral foundations affected the overall progressivism scores for the participants and support the idea that non-Greek students are more progressive and liberal in their moral reasoning than their affiliated peers. Research by Mayhew and colleagues (2012) demonstrated that as individuals progress through Kohlberg's stages of development, their moral reasoning takes into account how their actions influence larger groups of people. Thus, higher scores on the harm scale suggest an increased level of moral reasoning; increased purity and authority scores indicate the opposite.

These results further suggest that Greek students are more often in the consolidation phase of moral development as they consider right and wrong to be independent of context. In contrast, non-Greek students could more often be categorized as transitional moral reasoners since they are more sensitive to change and used a greater variety of methods to process external stimuli and make moral decisions (Mayhew *et al.*, 2012). Interestingly, however, we were not able to document any differences between affiliated and non-affiliated college students on our formal measure of moral development.

GENDER DIFFERENCES IN THEORY OF MIND, MORAL REASONING, AND MORAL DEVELOPMENT

Gender seemed to have a broader influence on the social skills of college students, affecting both theory of mind and moral reasoning. On the Mind in the Eyes Test, women scored higher than men, indicating that women better understand other's emotions. Additionally, women were more likely to consider harm when making moral decisions which also contributed to their higher progressivism scores compared to men. Gender also affected how well non-Greek students performed on the Winner Theory of Mind task and how much they considered fairness in moral decision-making at different points in their college career. For non-Greek students, women of increasing class years showed greater appreciation of theory of mind and increasing consideration of fairness, whereas men who were sophomores were less attuned to theory of mind and showed less reliance on fairness than men who were in their senior year. These results support past research that demonstrated non-Greek women are better at moral reasoning tasks than Greek women, Greek men or non-Greek men (Kilgannon & Erwin, 1992).

Conclusion

Overall, this study supports research by Graham *et al.* (2011) that identifies the multi-dimensional functionalist approach as the drive behind moral reasoning. We found that college students today choose to integrate multiple moral systems and to consider personal, familial, and societal values when making moral decisions. No past studies have investigated the combination of Greek affiliation, gender, and class year and their impact on theory of mind and morality in college students. Thus, the current study built upon previous research by investigating the relationship between Greek and non-Greek affiliation and theory of mind, moral reasoning, and moral development.

Although interaction effects and main effects varied across outcome measures, several significant results alluded to an important trend: Greek affiliation is associated with less sophisticated moral reasoning.

LIMITATIONS AND FUTURE STUDIES

Although this study is the first of its kind to examine the Greek affiliation of men and women and its effect on theory of mind, moral reasoning, and moral development tasks across the college years, there were several limitations that make the results difficult to generalize. First, Butler has a deferred recruitment process, meaning that recruitment week for men and women occurs during the second semester of freshman year rather than during the fall. This limited our ability to examine the full range of collegiate years since freshman could not be included in the sample. Second, Butler has a unique Greek system: 35% of the campus is Greek, activities geared towards Greeks are emphasized throughout the school year, and Greek events are widely attended. Although this enhanced focus on Greek life at Butler relative to other campuses may limit the generalizability of our results, it actually should have led to increased differences between Greek and non-Greek students in our study. Lastly, male participants were difficult to recruit for this study since Butler University has a 60:40 female to male ratio. This difficulty was heightened by the fact that many of the participants were psychology majors, and the majority of students in this major at Butler are female.

As such, future studies need to replicate the investigation of theory of mind, moral reasoning, and moral development in Greek and non-Greek men and women across their college years with a greater variety of Greek systems on campuses of different sizes. Specifically, more research should be done on campuses in which Greeks have both a prominent and inconspicuous presence at both public and private undergraduate institutions. Additionally, the samples should be larger with a more equal distribution of males and females, and participants should be recruited from a greater variety of majors in order to best attain a representation of the student body.

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STEREOTYPE THREAT AND OBSESSIVE COMPULSIVE SYMPTOMATOLOGY: THE IMPACT OF MESSY VS. CLEAN ENVIRONMENTS ON COGNITIVE TEST PERFORMANCE

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Abstract

Stereotype threat has been researched in a variety of contexts such as African Americans' intellect, older adults' memory, and women's performance in math. Despite this extensive research, little has been done in the domain of mental illness. This study examines whether stereotype threat can be induced in people high in obsessive compulsive (OC) symptoms. We hypothesized that, when given explicit information about their OC tendencies, individuals high in OC symptoms would perform less well on cognitive tests in a messy than a clean environment compared to those low in OC symptoms. Group testing sessions included a mix of college students high ($n = 25$) and low ($n = 22$) in OC symptomatology. The classroom and testing packets were either messy or clean. At the beginning of the session, participants were given confidential, accurate information about their OC tendencies before completing tests of concentration and immediate and delayed memory. Across the four tests, the High and Low OC groups performed similarly in a non-threat inducing clean environment. However, in a threat-inducing messy environment the High OC group showed a strong tendency to perform less well than the Low OC group on a test of auditory attention. Thus, our results suggest that individuals with OCD or related symptoms may be susceptible to stereotype threat, much like other vulnerable populations.

Stereotype threat was first studied and described by Steele and Aronson (1995). It involves a situation in which an individual is "at risk of confirming, as self-characteristic, a negative stereotype about one's group." Various groups can be prone to differing stereotypes, and stereotype threat can emerge when society holds stereotypes about the group that might transfer to the individual. Because one common stereotype held by society is that African

Americans are less intelligent than whites, Steele and Aronson looked at the performance of African Americans on intelligence tests in their 1995 study. They found that African Americans who were told that the test was diagnostic of their abilities performed worse than those who were not told it was aiming to measure their abilities, consistent with the effect of stereotype threat on performance. They also found that even when the test was not presented as diagnostic of abilities and participants were asked to simply indicate their race on a questionnaire prior to taking the test (a race prime), blacks performed worse than whites.

Other researchers have examined threats to other groups. Levy (1996) found both positive and negative effects on memory performance and memory self-efficacy as a result of exposure to varying stereotypes of older adults. This study was performed in a between-subject design in which participants aged 60 or older were given subliminal information about aging stereotypes through a computer that presented older adults as being either senile (negative) or wise (positive). In order to help them self-identify with the old age category, they were presented with subtle cues throughout the process such as being recruited through advertisements that asked for participants aged 60 or older, being asked to answer questions related to their own age, and being exposed to the words old or senior at the beginning of each word block. Results showed that older adults primed with positive views of aging performed better than those primed with negative views. This finding did not transfer to younger participants (ages 18-35), showing that only when the stereotype is relevant to the person does the priming have an effect.

Another study found that women's performance on mathematical tests was increased when they were presented with an intervention that nullified the stereotype of women's performance in mathematics (Good, Aronson & Harder, 2008). Participants in this study were in one of two conditions: stereotype threat or stereotype nullification. The intervention was presented through the use of math test instructions that described the test as either examining why differences in mathematical abilities exist between people (threat condition) or as examining how well the test can measure abilities, noting that the test has shown no differences between genders (stereotype nullification). Results of the study showed that women in the stereotype nullification condition actually outperformed both women and men in the threat condition.

Aronson, Lustina, Good, Keough, Steele, and Brown (1999) also examined stereotype threat in the domain of mathematics by studying white males' math abilities. In this study, they used a group who generally fit more positive stereotypes and looked to see whether stereotype threat could be

induced. Specifically, they gave a group of mathematically high achieving white males a math test in either a threat or no-threat condition. The threat condition involved having participants skim over articles about the high mathematical abilities of Asians and being told that the study was interested in finding out why Asians perform better than others on math tests. Participants in the control condition did not receive the stereotype information. These researchers demonstrated that stereotype threat results in lower performance, even with these mathematically talented individuals.

One particularly interesting study found that the same task can produce different outcomes depending on which racial stereotypes the threat activates (Stone, Lynch, Sjomeling, & Darley, 1999). Specifically, the way in which you describe a task can affect whether participants feel threatened or not. This study found that, when a test of golf performance was described as measuring “sports intelligence,” blacks performed less well than when it was described as testing “psychological factors correlated with general sports performance.” However, when it was described as testing natural athletic ability, the performance of blacks improved. In contrast, when it was described as testing natural athletic ability, whites performed less well than they did when it was described as testing sports intelligence.

Together, these studies have illustrated the effects of stereotype threat in many different domains of life. This literature indicates that stereotype threat can be affected by the highlighting of stereotype information, by increasing someone’s self-identification with a particular stereotyped group, by nullifying stereotypes, and by manipulating the description of a task.

STEREOTYPE THREAT IN MENTAL ILLNESS

One out of five adults (Substance Abuse and Mental Health Services Administration, 2013) and one out of every four to five adolescents ages 13 to 18 (Merikangas *et al.*, 2010) experiences mental illness. Given these numbers, stereotype threat associated with mental illness is a concept that could affect many people. Research examining stereotype threat and individuals with mental illness has been somewhat limited. One study examined the impact of stereotype threat on people with schizophrenia (Henry, von Hippel, Shapiro, 2010). The common stereotype of those with schizophrenia is that they do not function well in social situations. In this study, participants were in one of two conditions: stereotype threat or non-stereotype threat. Those in the stereotype threat condition had a conversation with a confederate after being told that the confederate knew

about their diagnosis, and those in the non-stereotype threat condition were told that the confederate was unaware of their diagnosis. The confederates rated those in the no-threat condition as displaying better social skills than those in the threat condition, even though they were unaware of the participant's condition during the interaction. However, no differences existed between the two conditions in how the participants perceived their own social behavior during the interactions. Results of this study show that stereotype threat can have an effect in the domain of mental illness and that individuals may not even be aware of how the threat is influencing their own behavior.

OBSESSIVE-COMPULSIVE DISORDER

One particular mental illness that has received much attention in recent years is Obsessive Compulsive Disorder (OCD). The Mayo Clinic describes OCD as “an anxiety disorder characterized by unreasonable thoughts and fears (obsessions) that lead you to do repetitive behaviors (compulsions).” This is a serious disorder that can make life very difficult for those who suffer from it for many reasons, such as spending countless hours on obsessions and compulsions each day. Although many people with OCD realize that their obsessions are unreasonable, they may perform compulsions to relieve their stress, only causing their stress to rise. The latest Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5; American Psychiatric Association, 2013) describes certain themes that are common in the obsessions and compulsions of different people such as cleanliness, symmetry, forbidden or taboo thoughts, and harm. The DSM-5 states that 1.2% of people have the disorder each year, and people first experience the disorder at an average age of 19.5 years.

Given the prevalence and life-altering nature of OCD, it is crucial to find ways to diminish its effects for those who suffer from it. Symptoms may be very distressing and disabling for those with the disorder even when no one is aware of their diagnosis. Additionally, recent evidence suggests that mental illnesses like OCD may not be categorical (individuals either meet criteria for the disorder or they do not), but rather may reflect symptoms that lie along a continuum (see Linscott & van Os for a review of the literature relating to the psychosis continuum). Multiple recent studies have focused on subclinical obsessive compulsive (OC) symptomatology and have related behavioral (Toffolo, van den Hout, Hooge, Engelhard & Cath, 2013; Zhu *et al.*, 2014), neural (Kubota, et al., 2016; Zhu et al., 2014) and neurocognitive (Sternheim, van der Burgh, Berkhout, Dekker & Ruiter, 2014) outcomes to

the presence of OC symptomatology. Adding stereotype threat either to a formal diagnosis of OCD or to the presence of OC symptoms in individuals who have not been formally diagnosed may exacerbate the difficulties they experience in their everyday lives. To our knowledge, no research has been conducted about stereotype threat and OCD or OC tendencies, and in fact little has even been conducted about common stereotypes of the disorder. However, given the diagnostic criteria, it is possible that one common believable stereotype is that individuals with OCD or OC symptoms may struggle to function in a messy environment.

RESEARCH QUESTIONS & HYPOTHESES

Many studies have investigated and confirmed the existence and effect of stereotype threat in a variety of domains. Although some research has been done in the domain of mental illness, it was previously unknown whether stereotype threat can affect individuals with Obsessive Compulsive symptoms. The present study addresses this question by examining the possible effect of stereotype threat on individuals who are high in OC symptoms. Because of the wide range of settings in which the literature has shown stereotype threat to occur, we expected that individuals high in OC symptoms would also be prone to stereotype threat. Although no prominent stereotypes about OC exist in the literature, we predicted that a believable stereotype to present to participants would be that individuals with OC symptomatology do not function well in messy environments. We hypothesized that, with presentation of this stereotype, individuals high in OC symptoms placed in a messy environment would experience stereotype threat and perform less well on tests of cognitive functioning compared to those low in OC symptoms. We also hypothesized that, in a clean environment, the performance of individuals high in OC symptoms would not differ from those low in OC symptoms on the same test measures because no stereotype threat would occur.

Methods

PARTICIPANTS

We recruited 48 Butler students, 26 high in OC symptoms and 22 low in OC symptoms, to participate in our study. To recruit participants we contacted the Student Disabilities listserv and posted entries in the Butler Connection with information about how to complete a questionnaire to determine

eligibility for the study. Additionally, we included a questionnaire within the pretesting packets completed by students enrolled in psychology courses at the beginning of the fall and spring semesters. This questionnaire, OCI-R (OCI-R; Foa et al., 2002) helped identify students who were high or low in OC symptoms. This 18-item, 5-point Likert scale questionnaire asked respondents to indicate how much each experience had distressed or bothered him or her during the past month on a scale from “Not at all” to “Extremely.” The items combine to form six subscales: hoarding, checking, order, germs, thoughts, and counting. Students with all six subscale scores at or below 2.00 were invited to participate in the study as part of the Low OC group. To be included in the High OC group, participants needed an Order subscale score of 4.00 or above. Students who were enrolled in psychology classes had the choice of either extra credit or a \$10 gift card as a thank you for their participation. Those who were not in psychology courses were each given a \$10 gift card at the completion of the session.

PROCEDURE

Testing sessions took place in a classroom in Jordan Hall. Participants were typically tested in small groups, with the number of participants per session ranging from 1 to 11. Group sessions included a mix of participants who were high and low in OC symptoms, and the classroom was set up in either a messy or clean fashion (see **Appendix**). The messy classroom was arranged so that the desks were out of alignment, there were old bottles and cups strewn around the room, there was partially erased writing on the white board, and the testing packets were stained with coffee. On the other hand, the clean condition classroom was set up in a meticulous fashion so that the desks were in perfect alignment and there was not a single piece of trash lying around. Participants were welcomed and informed of the study’s procedures. They then gave their consent to participate. To highlight the stereotype threat, the study was described as examining “why messy environments interrupt cognitive performance for people with OCD.” Then, each participant was provided with confidential, accurate information about his or her level of OC symptomatology based on the OCI-R. This feedback was as follows:

HIGH OC GROUP

"Based on your responses to one of the questionnaires you completed about yourself, you qualify for participation in our study. Your endorsement of certain personal characteristics is above average

compared to all of the undergraduate students who completed the questionnaire. This does not mean that you have a diagnosable disorder. It only means that you have been assigned to a HIGH OBSESSIVE COMPULSIVE GROUP for the purposes of our research study.

This feedback is confidential. We will collect this sheet back from you before any test measures are administered, and we will shred it immediately following the testing session. You will answer one question about your group assignment on the questionnaires during the study. This is to make sure you know which group you are a part of for the purposes of our study. Your name will not be on any of the study questionnaires, which are only coded with your participant ID number in order to continue to keep this information confidential.

If you have any questions or concerns or would like referral information for a more formal clinical evaluation, you may contact one of the researchers listed on your consent form at any time in the future."

LOW OC GROUP

"Based on your responses to one of the questionnaires you completed about yourself, you qualify for participation in our study. Your endorsement of certain personal characteristics is below average compared to all of the undergraduate students who completed the questionnaire. This does not mean that you have a diagnosable disorder. It only means that you have been assigned to a LOW OBSESSIVE COMPULSIVE GROUP for the purposes of our research study.

This feedback is confidential. We will collect this sheet back from you before any test measures are administered, and we will shred it immediately following the testing session. You will answer one question about your group assignment on the questionnaires during the study. This is to make sure you know which group you are a part of for the purposes of our study. Your name will not be on any of the study questionnaires, which are only coded with your participant ID number in order to continue to keep this information confidential.

If you have any questions or concerns or would like referral information for a more formal clinical evaluation, you may contact one of the researchers listed on your consent form at any time in the future."

Participants then filled out a demographic questionnaire and a mood questionnaire before completing several tests of intelligence, concentration, and memory.

MATERIALS

Demographic questionnaire. Participants completed a brief questionnaire that asked about age, gender, class rank, race, and their OC classification. This assured that participants understood their feedback regarding their level of OC symptomatology correctly.

Center for Epidemiological Studies-Depression Scale (CES-D: Radloff, 1977).

The CES-D included 20 questions that asked participants how often they had experienced specific symptoms of depression (e.g., “I felt lonely,” “I felt that everything I did was an effort,” or “I talked less than usual”) during the prior week. Participants answered using a 4-point Likert scale ranging from 0 “rarely or none of the time” to 3 “most or all of the time.” Possible scores ranged from 0-60, with higher scores indicating more depressive symptoms.

Shipley Institute of Living Scale (Zachary, 1986). This test required participants to identify synonyms of given words (Vocabulary Subscale) and to recognize and complete logical sequences (Abstraction Subscale). Possible scores ranged from 0-40 for Vocabulary and 0-20 for Abstraction, with higher scores indicating higher levels of verbal and non-verbal intelligence.

Written Digit Span. Adapted from a subtest of the Wechsler Memory Scale—Third Edition (Wechsler, 1997), participants heard a series of numbers read aloud. After they heard the numbers, participants attempted to write the numbers in the same order that they heard them. The number of digits in each sequence increased as the test progressed. Possible scores ranged from 0-16, with higher scores indicating greater concentration.

Sentence Construction (Hultsch, 1990). In this test, participants viewed individual sentences displayed on PowerPoint slides. As a group, they read each sentence aloud. In each sentence, one word was underlined, and participants attempted to remember those underlined words. After a certain number of slides, participants recalled all of the underlined words by writing them down in order, forming a sentence. Scores ranged from 0-54, with higher scores indicating greater concentration.

Immediate and Delayed Story Recall (Wechsler, 1945). During this subtest from the original Wechsler Memory Scale, participants heard a story and then wrote down word-for-word as many of the details of the story as they could recall. After approximately 25 minutes (during which time they completed other measures for the study), they again wrote down as much of the story as they could remember. Possible scores for each type of recall (immediate and delayed) ranged from 0-22 points, with higher scores representing greater memory of the story.

Results

SELF-CATEGORIZATION

Before running other analyses, we examined participants' self-identification of group on the demographic questionnaire to determine whether their self-identification after receiving their feedback matched with the actual feedback they were given (low or high OC). One participant in the High OC group incorrectly identified this classification and was excluded from all analyses; all other participants identified their classification correctly.

PARTICIPANT CHARACTERISTICS

Next, we examined the demographic characteristics of the remaining 25 High and 22 Low OC participants assigned to either the non-threatening clean or the threatening messy condition. **Table 1** summarizes the demographic characteristics of these four groups.

A 2 (OC: high versus low) \times 2 (Condition: clean versus messy) analysis of variance showed that the four groups of participants were similar in age and class year, all main effect and interaction effect F s (1, 43) $<$ 1.4, n.s. Chi Square analyses demonstrated that the four groups were also similar in their distribution of gender (χ^2 ($n = 47$) = 2.2, $p = .53$) and race, χ^2 ($n = 47$) = 3.78, $p = .29$. A 2 (OC) \times 2 (Condition) MANOVA with subscale scores from the Shipley Institute of Living Scale as dependent variables revealed that neither the OC groups (OC F (2, 42) $<$ 1), the participants assigned to the two conditions (condition F (2, 42) = 2.04, $p = .14$) nor the four groups created by their interaction (OC \times condition F (2, 42) $<$ 1) differed in intelligence. However, a 2

Demographic Trait	Clean Environment		Messy Environment	
	Low OC (<i>n</i> = 10)	High OC (<i>n</i> = 12)	Low OC (<i>n</i> = 12)	High OC (<i>n</i> = 13)
Age	19.50 (1.35)	19.08 (1.17)	19.83 (1.12)	19.38 (1.39)
Year in College	2.20 (1.23)	2.00 (0.95)	2.58 (1.17)	2.15 (1.21)
Gender (% Female)	90%	83.34%	100%	84.62%
Race (% White)	90%	100%	100%	100%
Depression*	13.50 (7.91)	22.92 (11.94)	12.08 (5.95)	17.80 (9.69)
Shipley Vocabulary	29.00 (2.36)	29.08 (3.75)	31.08 (2.15)	30.46 (3.05)
Shipley Abstraction	17.10 (1.60)	17.58 (1.44)	17.33 (2.15)	17.23 (2.01)

* Participants high in OC symptoms had significantly higher levels of depressive affect than those low in OC symptoms, ($F(1, 43) = 14.37, p < .001$). Otherwise, the four groups were statistically equivalent in their demographic characteristics.

Table 1. Demographic characteristics of the sample.

$\times 2$ ANOVA did indicate that the two OC groups differed significantly in their depressive affect (OC $F(1, 43) = 14.37, p < .001$), with high OC students endorsing more depressive symptoms than low OC students. Because of this, we used depression as a covariate in all subsequent analyses.

PRIMARY ANALYSIS

Our primary objective in this study was to determine whether the groups differed on the measures of neurocognitive functioning in a manner consistent with the effects of stereotype threat. To determine this, we ran a 2 (OC: high versus low) \times 2 (Condition: messy versus clean environment) MANCOVA that included raw scores on digit span, sentence span, and both immediate and delayed story recall as outcome variables. Table 2 summarizes the scores of the four groups on each test measure. We included depression as a covariate since the two OC groups differed in their depressive affect.

Neither the main effect of OC ($F(4, 39) < 1$) nor the main effect of condition ($F(4, 39) < 1$) reached significance in the MANCOVA. However, a trend towards significance emerged in the OC by condition interaction, $F(4, 39) =$

Test Measure	Clean Environment		Messy Environment	
	Low OC	High OC	Low OC	High OC
	(<i>n</i> = 10)	(<i>n</i> = 12)	(<i>n</i> = 12)	(<i>n</i> = 13)
Digit Span*	11.20 (1.75)	12.58 (1.88)	12.58 (2.39)	11.62 (2.06)
Sentence Span	50.40 (4.22)	48.67 (6.04)	49.50 (3.71)	52.08 (2.84)
Immediate Recall	5.85 (1.83)	6.67 (2.90)	7.13 (2.59)	6.23 (2.06)
Delayed Recall	5.45 (2.63)	5.75 (2.35)	7.00 (2.70)	5.89 (2.41)

* Participants high in OC performed less well than those low in OC in the messy environment on the digit span subtest, ($F(1, 22) = 6.65, p = .02$).

Table 2. Performance on neuropsychological tests by group and condition.

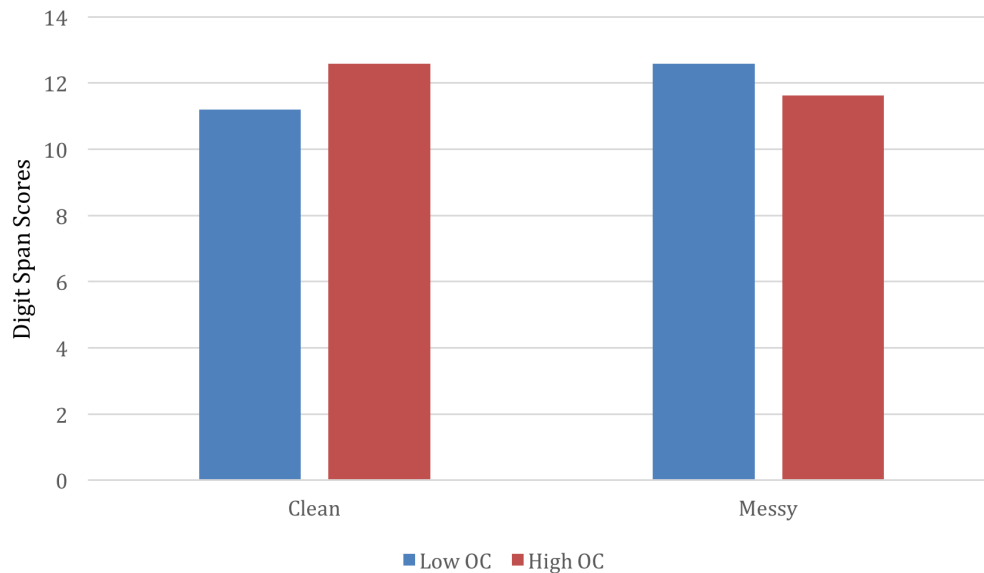


Figure 1. Scores on the Digit Span Test by group and condition.

2.29, $p = .08, \eta^2 = .19$. Because the effect size associated with this effect was moderate to large, we examined the univariate analyses to see if there were differences on individual tests. The univariate interaction effect reached significance for scores on the digit span subtest, $F(1, 42) = 4.66, p = .037, \eta^2 = .10$. Follow-up simple main effect analyses indicated that, consistent with

our hypothesis, participants high in OC symptoms performed less well than those low in OC symptoms in the threatening messy environment on the digit span subtest, $F(1, 22) = 6.65, p = .02, \eta^2 = .23$. In contrast, the two OC groups performed equivalently on the digit span subtest in the non-threatening clean environment, $F(1, 19) = 1.55, p = .23, \eta^2 = .08$. Figure 1 depicts this result.

Discussion

This study examined stereotype threat in regards to Obsessive Compulsive Disorder and its associated symptoms. Stereotype threat is a concept that has been studied in various contexts including: African Americans' intellect (Steele & Aronson, 1995), older adults' memory (Levy, 1996), and women's performance in math (Good, *et al.*, 2008). However, there is little research about stereotype threat in mental illness, and to our knowledge there have been no studies examining stereotype threat in individuals with OC symptoms. Our goal was to induce stereotype threat in college students with OC symptomatology to determine whether they perform less well on neurocognitive tests when they experience stereotype threat. Although only true for one of our outcome measures, consistent with our expectations, we found that participants high in OC symptoms tended to perform worse than participants low in OC symptoms in a threat inducing messy environment, but the two groups performed more similarly when in a non-threat inducing clean environment. These results suggest that individuals with OC symptomatology may be susceptible to stereotype threat, much like other vulnerable populations.

These findings are consistent with past research examining stereotype threat and mental illness. A previous study found that stereotype threat interfered with social skills of people with schizophrenia (Henry *et al.*, 2010) when they were told that a confederate was either aware or unaware of their diagnosis. The current study expands on this previous work by applying the phenomenon of stereotype threat to a new population—individuals high in OC symptoms. Additionally, Henry *et al.* measured social skills under threat and no-threat conditions, whereas we examined the impact of stereotype threat on neurocognitive abilities. We found that students with OC tendencies scored lower on the digit span subtest than their non-OC peers in a threatening (messy), but not a non-threatening (clean) environment.

Although our study supports the possible presence of stereotype threat in OC populations, we only found a significant OC by condition effect on one

of the four dependent variables included in our study in follow up to a near significant multivariate trend. Thus, the findings were not robust. Stereotype threat did not appear to impact immediate or delayed memory, and it only had an effect on one of the two concentration tests. The fact that digit span was vulnerable to threat but sentence construction was not could be due to the fact that the information was presented differently in the two tests. During the sentence construction test, the information was presented visually on a screen at the front of the room. Therefore, participants may have been focused on the screen rather than on the condition of the room. During the digit span test, however, the information was presented only orally. Thus, during this test of concentration participants may have been more likely to notice and feel threatened by the room condition.

There are some limitations to this study. The stereotype about individuals with OC tendencies that we presented to participants has not been documented in the literature and may not be a commonly held belief about OCD or its symptoms. Thus, it is possible that people may not have accepted the stereotype as true. Additionally, the sample size in our study was fairly small, especially because the sample was divided into four groups. We were pleased to identify 26 participants with OC tendencies, but a future study with larger samples might yield better evidence for stereotype threat in this population. Participants in this study were not required to have a formal OCD diagnosis. Therefore, it is possible that with a clinical sample, stronger results would emerge. Another limitation is that the two OC groups differed in their levels of depressive affect. Although we accounted for these differences by covarying depression, using groups matched in depression in future studies would better control for depression's potential influence on both cognitive performance and susceptibility to stereotype threat. Lastly, because there was only a strong trend in the MANCOVA, it is difficult to determine whether it reflects a true underlying difference between the groups based on the threatening versus non-threatening environment.

In addition to addressing the limitations already discussed, future studies could implement some additional features to help sort out potential explanations of differences between the groups. One possibility would be to tell some participants that the researcher is aware that they are high or low in OC symptoms and tell other participants that the researcher is unaware of their OC classification. Another possibility would be to create a more neutral environment that is neither messy nor clean but is described as messy in some conditions and as clean in other conditions. Yet another option would be to introduce a stereotype nullification condition to the study like that used by

Good, *et al.* (2008). Due to the anticipated small sample size of our study, we did not include these additional factors. However, expanding the study design in one or more of these ways would help determine whether stereotype threat accounts for the decreased concentration we documented in students with OC symptoms in the threatening messy environment.

Although it is not possible for the results of this study to completely separate the effect of stereotype threat from the effect of a messy environment on concentration, these results do indicate that messy environments can directly disrupt cognitive performance in students with OC symptoms. This has implications for educational settings in that these students may learn less well in messy environments compared to clean environments. Additionally, the discovery that stereotype threat could be a factor in OCD is important because OCD is a debilitating illness for individuals who experience it. If stereotype threat is exacerbating the symptoms of people with this disorder, it is important to find ways to diminish the effects of these stereotypes in order to help individuals with OCD to reach their full potential despite stereotypes other people may hold about them.

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Appendix A

CONSENT FORM

Research Project: Stimulus Threat in the Presence of Safety when Given Experiments on Cognitive Taskload

Investigators: Tara Lineweaver, Ph.D., Department of Psychology, Butler University

I, _____, hereby consent to participate in the above named research project.

I understand that the purpose of the above named project at Butler University, is to learn as much as I can about my own free choice without undue influence and after the following has been explained to me:

1. Nature and Duration of Procedures

The purpose of this study is to determine the relative effect of combining cognitive tasks in order to assess performance on individual and or overall symptoms of Obsessive Compulsive Disorder. Participation in this study will be completed in one session lasting approximately 45 minutes. If you choose to participate in this study, you will be asked to complete some questions about your sign cognitive assessments.

2. Potential Risks and Benefits

There are minimal risks or discomforts associated with this research. We do not anticipate that either you or other participants will directly benefit from your participation. Your participation may however contribute towards improving our understanding of how symptoms about Obsessive Compulsive Disorder affect people with OCD tests.

3. Voluntary Nature of Participation

Your participation in the project is entirely voluntary. You are free to decide not to participate in this study or to withdraw at any time without adversely affecting your relationship with any faculty at Butler University. Your decision will not result in any loss of benefits or status you are otherwise entitled. If you choose to participate, you may withdraw at any time by notifying the person administering the research session. Upon your request to withdraw, all information pertaining to you will be destroyed.

4. Confidentiality

If you choose to participate, all information will be held in strict confidence and will have no bearing on services you receive from the University. Your responses to the questionnaires will be considered only in combination with those from other participants. The information obtained in the study may be published in scientific journals or presented at scientific meetings, but your identity will be kept strictly confidential.

5. Consent

I have read the above information, have had the opportunity to ask questions concerning any and all aspects of the project, and have had my questions answered. I understand that participation is voluntary and that I may withdraw my consent at any time without prejudice to me. Confidentiality of records concerning my involvement in this project will be maintained in an appropriate manner. When required by law, the records of this research may be reviewed by appropriate government agencies. A copy of this written consent has been given to me. I understand that if I have any questions concerning this research I can contact the investigators stated below.

Signature of Subject

Date

If you have questions, you may contact:
Dr. Tara Lineweaver, 317-943-9848 or tlinewe@butler.edu
Butler University, 4600 Sunset Avenue, Indianapolis, IN 46206



COMPARISON OF TRANEXAMIC ACID AND AMINOCAPROIC ACID IN CORONARY BYPASS SURGERY

LISA K. LECLEIR, BUTLER UNIVERSITY
MENTOR: CHAD KNODERER

Abstract

OBJECTIVE: Tranexamic acid (TXA) and ϵ -aminocaproic acid (EACA) are used in coronary bypass surgery for anti-fibrinolytic therapy. Since the removal of aprotinin, data directly comparing their blood sparing effect and their side effects is still missing.

METHODS: Fifty patients undergoing coronary bypass cardiac surgery at a community teaching hospital were evaluated in a retrospective cohort study. Perioperative data was collected by a thorough chart review. Patients received EACA from 01/01/2013 to 04/05/2013 or TXA from 05/07/2013 to 12/31/2013. Primary outcome was the amount of chest tube output throughout the hospital stay. Secondary outcomes were the amount of blood transfusion requirements, post-operative complications, number of ICU days, need for re-exploration, and in-hospital mortality.

RESULTS: All demographic and pre-operative parameters were well comparable for patients who received EACA ($n = 25$) and those who received TXA ($n = 25$). There was no difference in chest tube output (EACA 942 ± 371 mL vs. TXA 1162 ± 480 mL, $p = 0.077$). There were also not any differences in blood transfusion requirements (EACA 4.92 ± 3.29 units vs. TXA 3.44 ± 2.10 units, $p = 0.064$), nor in post-operative complications such as atrial fibrillation, unstable blood pressure, pneumonia, or pleural effusions related to surgery (EACA 20% vs. TXA 32%, $p = 0.520$). There were not any patients in the study who experienced a need for re-exploration or in-hospital mortality. The number of days spent in the ICU (EACA 1.60 ± 1.35 vs. TXA 1.08 ± 0.4 , $p = 0.0717$) were also found to be statistically non-significant.

CONCLUSIONS: TXA and EACA are comparable in the effect of chest tube output and blood transfusion requirements, as well as their adverse event profile. Although the number of days spent in the ICU approached statistical significance for favoring TXA, either agent would be appropriate to be utilized in coronary bypass cardiac surgery.

Background

Cardiopulmonary bypass (CPB), or the ‘heart-lung machine,’ is an essential part of cardiac surgery. It allows the blood to be oxygenated and dissipates carbon dioxide while the heart and lungs are at rest. In order for CPB to be fully safe and effective, reversible anticoagulation must be used and the blood must be pumped without destruction of red blood cells or other blood components.¹ To achieve this, the patient is systemically heparinized and the CPB components are heparin coated.² Although protamine can be utilized to reverse the effects of heparin, cardiac surgery patients are still at an increased bleeding risk.^{3,4,5} Up to 10% of cardiac surgery patients experience massive blood loss after CPB. Massive blood loss is defined as chest tube bleeding >2 L up to 24 hours post-operatives, ≥ 10 units of packed red blood cells (RBC) transfused, or bleeding requiring a re-exploration surgery. This coagulopathy related to CPB is multifactorial by alterations in the coagulation cascade, inflammatory processes, and fibrinolysis.³

During CPB, the coagulation cascade is altered by heparin and anti-platelet use. CPB also requires hemodilution of the blood volume which results in decreased numbers of coagulation factors and causes platelet dysfunction. When activated, certain coagulation factors are pro-inflammatory, such as factor Xa and thrombin. The resultant inflammation can ultimately cause end-organ damage, such as renal dysfunction. For adequate clot formation after CPB, fibrinogen levels should be maintained at ≥ 200 mg/dL. Fibrinolysis can occur as a result of decreased levels of fibrinogen and the release of endogenous fibrinolytics. Endogenous fibrinolytics, such as urokinase and tissue plasminogen activator (tPA), can split fibrin and fibrinogen into inactive segments. These inactive segments are called D dimers, and they have no coagulation activity.³ To manage perioperative bleeding from the CPB-related coagulopathy, various medications are given prophylactically. Fibrinogen concentrate can be given to increase fibrinogen levels.⁶ Also, anti-fibrinolytics, such as aminocaproic acid (EACA)⁷ and tranexamic acid (TXA)⁸, are given in the majority of cardiac surgeries that use CPB. Anti-fibrinolytics are utilized to diminish the effects of endogenous fibrinolytics which are released in response to CPB-related coagulopathy.⁴

CPB-related coagulopathy greatly increases the bleeding risk in patients. Anti-fibrinolytics are used preoperatively to minimize the incidence of postoperative bleeding, but no head-to-head trials exist to compare TXA and EACA. Both medications came to market based on non-inferiority studies to aprotinin, which was pulled from the market due to post-marketing safety

studies. Increased bleeding can increase the patient's mortality, increase the hospital length of stay, and increase the amount of hospital resources utilized.³ The Society of Thoracic Surgeons and Society of Cardiovascular Anesthesiologists currently recommend anti-fibrinolytics to be a Class I, level of evidence A guideline recommendation for them to be used in perioperative blood conservation in cardiac surgery.⁴

The objective of this study is to evaluate the difference between EACA and TXA in cardiac bypass surgery. If a difference is shown preferring either agent in blood conservation, an argument will be able to be made to utilize this agent preferably in an effort to decrease other hospital costs and conserve the blood bank.

Methods

Based on previous non-inferiority studies of EACA and TXA to aprotinin, a power of fifty patients was found to be adequate for this study. Inclusion criteria were any patient undergoing coronary bypass cardiac surgery at a community teaching hospital from 4/6/2013 to 5/6/2013. Exclusion criteria were any patient who was pregnant or under 18 years of age. This month duration was the transition period of switching medications and there was the possibility of prescriber bias for which patient received either medication. In this retrospective cohort study, patients were randomly selected until there were twenty-five patients who had received TXA and twenty-five patients who had received EACA. Primary outcome was the amount of chest tube output throughout the hospital stay. Secondary outcomes were the amount of blood transfusion requirements, post-operative complications, number of ICU days, need for re-exploration, and in-hospital mortality.

Patients were identified by billing records for EACA or TXA during 2013. Perioperative data was collected by a chart review conducted by the secondary investigators. Baseline characteristics collected were age, gender, race, weight, smoker status, and past medical history. Past medical history included chronic hypertension, type 2 diabetes mellitus, history of arrhythmia, previous MI, previous thromboembolic event, number of prior surgeries. All surgeries were included, with the exception of orthopedic, ophthalmic, or otorhinolaryngologic interventions. Medications accounted for at baseline included aspirin, clopidogrel, and anticoagulation use. Pre-operative laboratory values evaluated were serum creatinine (SCr), estimated creatinine clearance (CrCl), hemoglobin (Hgb), hematocrit (Hct), activated partial thromboplastin time (aPTT), prothrombin time (PT), fibrinogen, and international normalized ratio (INR). Patient confidentiality was ensured by

maintaining information on an encrypted jump drive and will not be destroyed for two years after data collection. IRB approval was granted from the community teaching hospital and the affiliated university. As a retrospective cohort study, there were no ethical or safety issues in completing this study.

Demographic characteristics and all categorical data points were evaluated by a Fischer's exact test with a two-tailed p value. Fischer's exact test was chosen over the chi-square test, due to some demographic characteristics, such as race or past medical history, which had numerical values less than five. Continuous data points, such as laboratory values, were evaluated by an unpaired t-test with a two-tailed p value. The unpaired t-test was chosen over the paired t-test, due to nature of the study comparing two independent patient groups. Alpha was set at 0.05. Due to the lack of post-operative laboratories that were evaluated, this was not included as a data collection endpoint. The specific dosing regimen for each patient was unable to be acquired; however, the collective amount of EACA or TXA billed to the patient was included in the original patient identification process.

Results

Patients received EACA from 01/01/2013 to 04/05/2013 or TXA from 05/07/2013 to 12/31/2013. There were not any patients evaluated that met the exclusion criteria. All demographic and pre-operative parameters were well comparable (**Tables 1 and 2**).

All patients underwent a coronary artery bypass graft due to coronary atherosclerosis. Each patient's antiplatelet therapy (aspirin, clopidogrel) was held for 24 hours prior to surgery, if applicable. During the surgery, each patient was systemically heparinized and was given EACA or TXA according to the dosing protocols.

There was no difference in the primary outcome of chest tube output (EACA 942 ± 371 mL vs. TXA 1162 ± 480 mL, $p = 0.077$). See **Figure 1**. There were also not any differences in blood transfusion requirements (EACA 4.92 ± 3.29 units vs. TXA 3.44 ± 2.10 units, $p = 0.064$), nor in the amount of patients who required platelets, fresh frozen plasma, cryoprecipitate, factor VII, or prothrombin complex concentrate (EACA 28% vs. TXA 24%, $p = 1.000$). Also, post-operative complications such as atrial fibrillation, unstable blood pressure, pneumonia, or pleural effusions related to surgery (EACA 20% vs. TXA 32%, $p = 0.520$) were not found to be statistically significant. There were not any patients in the study who experienced a need for re-exploration or in-hospital mortality. Finally, the number of days spent in the

ICU (EACA 1.60 ± 1.35 vs. TXA 1.08 ± 0.4 , $p = 0.0717$) were also not found to be statistically significant.

Demographics	Aminocaproic Acid (n=25)	Tranexamic Acid (n=25)	P value
Age (mean)	64 ± 9 years	67 ± 8 years	0.189
% Smokers	72% (18)	64% (16)	0.762
% Male	68% (17)	92% (23)	0.074
% Non-Hispanic White	80% (20)	88% (22)	0.702
% African American	20% (5)	4% (1)	
% Arab American		4% (1)	
% Hispanic American		4% (1)	
Weight (mean)	97 ± 22 kg	91 ± 16 kg	0.247
BMI (mean)	32 ± 5.4 kg/m ²	30 ± 4.2 kg/m ²	0.136
Past Medical History			
Chronic Hypertension	88% (22)	80% (20)	0.702
Type 2 Diabetes Mellitus	32% (8)	44% (11)	0.561
History of Arrhythmia	8% (2)	16% (4)	0.667
Previous MI	20% (5)	16% (4)	1.000
Previous thromboembolic event (DVT, PE, TIA/CVA)	16% (4)	12% (3)	1.000
Amount of prior surgeries (All included except orthopedic, ophthalmic, or otorhinolaryngology surgeries)	8% (2)	8% (2)	1.000
ASA therapy alone before surgery	52% (13)	56% (14)	1.000
Clopidogrel therapy alone before surgery	12% (3)	4% (1)	0.609
ASA + clopidogrel therapy before surgery	12% (3)	12% (3)	1.000
No antiplatelet therapy before surgery	24% (6)	28% (7)	1.000
Anticoagulation therapy (warfarin, rivaroxaban, apixaban, dabigatran)	0%	0%	1.000

Table 1. EACA & TXA demographic parameters.

Laboratories (mean)	Aminocaproic Acid (n=25)	Tranexamic Acid (n=25)	P value
Pre-op SCr	1.21 ± 0.74 mg/dL	1.23 ± 0.72 mg/dL	0.923
Pre-op CrCl	68 ± 29.5 ml/min	67 ± 25.1 ml/min	0.894
Pre-op Hgb (12.8-16.9 g/dL)	13.7 ± 1.9 g/dL	14.5 ± 1.8 g/dL	0.082
Post-op Hgb	11.03 ± 1.03 g/dL	11.15 ± 1.05 g/dL	0.521
Pre-op Hct (38.8-50.2%)	40.5 ± 5.5%	42.3 ± 5.2%	0.176
Post-op Hct	32.7 ± 3.1%	32.6 ± 3.1%	0.832
Pre-op aPTT (12.1-33 sec)	30.3 ± 4.9 sec	30.5 ± 6.8 sec	0.618
Pre-op PT time (9.5-11.9 sec)	12.2 ± 1.1 sec	11.9 ± 1.2 sec	0.184
Pre-op fibrinogen (179-381 mg/dL)	209 ± 81.4 mg/dL	198 ± 55.6 mg/dL	0.484
Pre-op INR	1.13 ± 0.11	1.10 ± 0.12	0.318

Table 2. EACA & TXA pre-operative parameters.

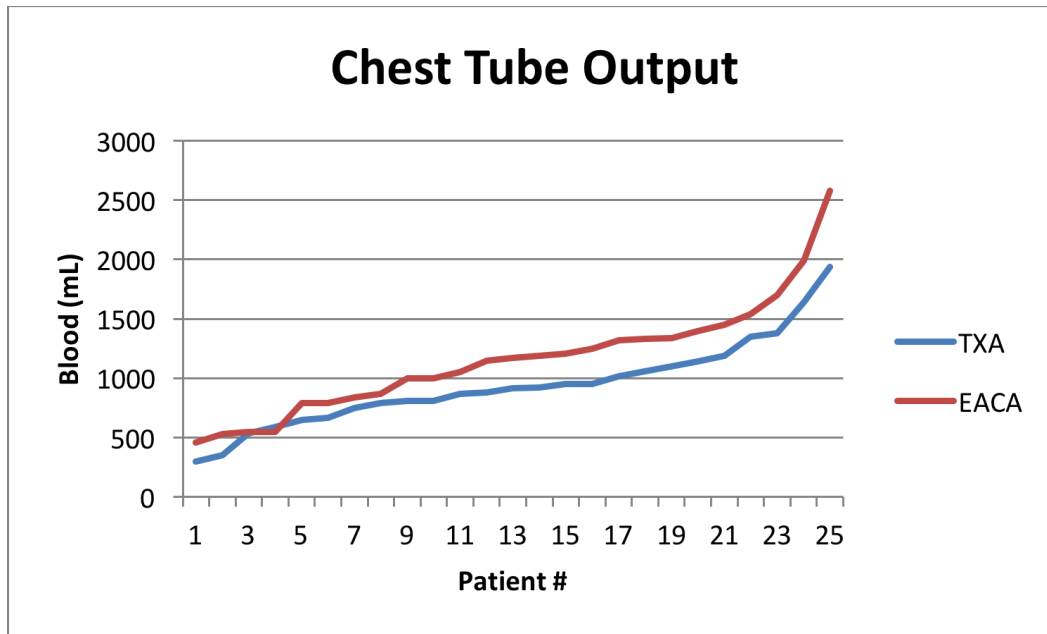


Figure 1. Primary outcome of chest tube output.

Discussion

Patients received EACA from 01/01/2013 to 04/05/2013 or TXA from 05/07/2013 to 12/31/2013. There were not any patients evaluated that met There have been three anti-fibrinolytics that have been on the market: aprotinin, EACA, and TXA. Aprotinin is a peptide serine protease inhibitor that inhibits fibrinolysis and affects the inflammatory process. Aprotinin was consistently shown to be efficacious in decreasing the need for transfusions. However, in two large observational studies it was shown to have an increased mortality rate and increased serum creatinine levels leading to kidney injury. Therefore, aprotinin was removed from market in November 2007.³⁻⁴

The other two anti-fibrinolytics are lysine analogs: EACA and TXA. These medications compete with fibrin for binding sites which then inhibits the conversion from plasminogen to plasmin. The dosing of these medications typically includes a CPB priming dose, loading dose, and maintenance dose. Various dosing regimens have been utilized. There are multiple ways to dose EACA and TXA. At the community hospital studied, EACA is dosed as 5-10 grams loading dose, then 1-2.5 grams/hr maintenance dose, until the end of the operation. On average, this calculates out to a 75 mg/kg loading dose, then a 10-15 mg/kg/hr until the end of the surgery. For TXA, a 2mg/kg CPB prime, 30 mg/kg load, and 16 mg/kg/hr maintenance dose was utilized.³ As for the efficacy, the studies to date are done in comparison to aprotinin and both have been found to be alternatives to aprotinin.

In 2001, a randomized, double-blind, placebo-controlled, non-inferiority trial was completed comparing EACA and aprotinin in 81 patients undergoing CABG with CPB. EACA was shown to be non-inferior to aprotinin by the surrogate marker of D-dimer formation for fibrinolysis reduction and the endpoint of blood loss measured by 24-hour chest tube drainage. For D dimer formation, the results were: aprotinin 608 ± 279 $\mu\text{g/L}$ vs EACA 612 ± 335 $\mu\text{g/L}$ (difference -3.58 $\mu\text{g/L}$, 95% CI -203 to 195 $\mu\text{g/L}$). For the amount of chest tube drainage, the results were: aprotinin 685 ± 505 mL vs. EACA 715 ± 394 mL (difference 67 mL, 95% CI -90 to 230 mL).⁹ Both the surrogate marker of D dimer formation and endpoint of chest tube drainage was a non-significant difference between aprotinin and EACA. This shows that EACA is noninferior to aprotinin and can therefore be utilized as an alternative in patients undergoing CABG with CPB.

In 2004, a randomized, double-blind, prospective trial was completed comparing TXA and aprotinin in 118 patients undergoing CABG with CPB. TXA was shown be an alternative to aprotinin by the end points of total blood

loss and transfusion requirements. For total blood loss, the results were: aprotinin 756 mL \pm 347 vs TXA 896 mL \pm 354, $p = 0.03$. For RBC transfusion, the results were: aprotinin 1.5 units \pm 1.7 vs. TXA 1.5 units \pm 1.5, $p = 1.0$. The blood loss was concerning because the difference was found to be statistically significant; however, the transfusion requirements for both aprotinin and TXA patients were shown to be statistically insignificant.¹⁰

In this retrospective cohort study at a community teaching hospital of fifty patients, EACA and TXA were not found to be statistically different. Both are comparable for efficacy in regards to the amount of chest tube output, blood transfusion requirements, and amount of days spent in the ICU. Since the p value for the amount of days spent in the ICU approached statistical significance in favor of TXA, a future study with a larger sample population and greater power is warranted. The tolerability of EACA and TXA was shown to be similar, due to the lack of difference in re-exploration rates, mortality, or adverse effects.

As a retrospective cohort study, the ability for controlling confounding variables through non-statistical approaches is limited. One limitation to the data collection process is the lack of selection randomization. The investigators did randomly select patients, but this process was not formalized. Although a sample of fifty patients was found to be adequate for this study, the wide variation in standard deviation indicates that a type II error may have occurred. The comparable patient characteristics pre-operatively benefited this study and increased its validity.

Conclusion

EACA and TXA are comparable in the amount of chest tube output and blood transfusion requirements, as well as their adverse outcomes. A future study with a greater sample population could increase the power of this retrospective cohort study. Although the number of days spent in the ICU approached statistical significance for favoring TXA, either agent would be appropriate to be utilized in coronary bypass surgery.

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VIRGINITY AND GUILT DIFFERENCES BETWEEN MEN AND WOMEN

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ALEXIS MOORE, HANOVER COLLEGE
MENTOR: JOHN KRANTZ

Abstract

In this research, the authors measured the levels of sexual guilt between two groups of people on multiple levels, virgins and nonvirgins, by gender. The differences between men and women's virginity were also studied. Based on the sample size of college students, $n = 364$. College students completed a 34-item online survey of questions that measured guilt levels. Ten out of the twenty questions were demographic questions, such as: age, ethnicity, religion, year, etc. The other questions were a combination of Likert scaled questions and open ended responses. The researchers predicted that females would experience more guilt compared to males after the loss of their virginity. The researchers found that females experienced more sexual guilt compared to males, as well as, females with high scores of religiosity also experienced higher levels of sexual guilt.

Views of sex have changed over time, but what exactly makes an individual want to lose their virginity? Many factors seem to influence the quality and enjoyment of the first sexual experience. One was gender: Men seemed to have more positive attitudes than women about their first experience (Baumeister, 2001). Currently, the main factors that affect the decision to keep or lose one's virginity are primarily surrounded by gender differences in emotional reactions to first intercourse. To explain gender differences in emotional reactions to first intercourse, DeLamater (1987) conducted three studies to expand on reasons why males have more favorable reactions compared to females. The first reason is based on the assumption that males are more likely to experience an orgasm the first time they have intercourse. The second explanation DeLamater offered proposed that females need more closeness with their partners to enjoy fully the first intercourse (DeLamater, 1987). This finding seems to support the idea that women would experience more shame or guilt upon loss of virginity, especially if the ideal closeness is not achieved.

Along with the views of sexuality and sex changing, the definition seems to have changed several times over the years. People have very different ideas of what defines sex or sexual intercourse (Carpenter, 2001). According to Carroll, Volk, & Hyde (1985) the definition of sexual intercourse is sexual contact between individuals involving penetration, especially the insertion of a man's erect penis into a woman's vagina, typically culminating in orgasm and the ejaculation of semen. The definition that is generally used throughout this study is sexual contact between two individuals involving penetration of genitals to an orifice, or genitals being penetrated. Other sexual acts included in this working definition are: oral, anal, and manual. These definitions are used and explored because of the issues with studying sex and sexuality. Some of these issue are how people define their experience and their experiences of loss of virginity. Some may see the first time they had oral sex as a casual act rather than the loss of virginity. Most participants tended to believe that vaginal-penile intercourse as the only act which constitutes virginity loss, if it were the first partnered sexual activity in which a woman or man had engaged (Carpenter, 2001). Not only are there differences in the general definition of sex, there are gender differences in sex and its views and even how it is taught. This being said, this study will use a combination of definitions to test concepts of virginity.

One of the main ideas behind studying sexuality, in this case, is the idea of shame and guilt. Researchers found that males experienced more satisfaction and pleasure than did females in response to first intercourse (Baumeister, 2001). Furthermore, females were more likely to feel guilty (DeLamater, 1987).

A potential moderator for shame and guilt when it comes to virginity is religion and a person's score on religiosity. A person's religion often contributes largely to their value set (Liu & Koenig, 2013) and thus would moderate in part how people feel about virginity and sex. So to study how people feel about virginity and sex, it would be irresponsible to ignore a potential moderator that is at times so central to some's lives and belief system. Liu and Koenig (2013) studied how religiosity affects mental health, but their research and questions can be translated to hinting at a person's belief system.

Another potential moderator for virginity beliefs is the role of sharing. There have been a multitude of studies looking at the effects of sharing feelings with others. For negative emotions, sharing tends to exacerbate those emotions and for positive emotions, sharing adds to emotions, sharing tends to exacerbate those emotions and for positive emotions, sharing adds to

that positivity (Brans, Van Mechelen & Rime, 2014). In the previously mentioned study, it is discussed how one of the most common strategies for emotional regulations is social sharing.

This study will explore, in part, the effect that social sharing has on guilt or shame when it comes to the loss of virginity. According to the findings of Brans *et al.* (2014) and the correlation between sharing and negative versus positive emotions, it can be inferred that if a person feels negatively about the loss of their virginity, that sharing would exacerbate the negative feelings surround their experience and vice versa.

Given all of this information and background, we believe female students will produce more feelings of sexual guilt than males. In addition, to broaden the perspective, females will express more shame and guilt than males, as past studies have shown that females produce more sexual guilt compared to males after the loss of their virginity. We expect the proposed moderators of sharing and religiosity to make our results more significant. We expect a higher score on religiosity to produce a higher score on guilt. We subsequently expect the role of sharing to polarize or make the results more extreme.

Method

PARTICIPANTS

The participants were recruited from a social media pool (i.e. Facebook and Email) along with the faculty advisor website. The researchers obtained 376 participants between the ages of 18 to 65 years old. However, the age range was mostly between 18 to 23, specifically 78%. The experimenters obtained 280 females and 96 males. This study is focused on college age individuals in main. The researchers, for the most part, focused on individuals who have already lost their virginity, though some participants reported still being virgins.

MATERIALS

The study was conducted online, along with the consent form and the debriefing form. The study was a survey based in part on Eriksson and Humphrey's Virginity Beliefs Scale (VBS) (2014), the Hoge Religiosity Scale (Hoge, D. R. 1972), and some open ended questions aimed at finding out the role of sharing and other potential moderators of guilt. All of the questions

asked are included in the **Appendices**. Some of open ended moderator questions are items such as age of loss and the role of sharing in sexual experience, and items to measure the experience after loss of virginity and also included an extensive demographics section, with items including, but not limited to “Are you a virgin?”, “At what age did you have your first sexual experience?”, and “Do you see virginity as negative or positive?” All of the open ended items are free response.

The Hoge Religiosity Test is a brief questionnaire determining religiosity and was used to explore possible moderators of virginity beliefs. The Hoge is formatted as a likert scale questionnaire on a scale of 1 to 5. The VBS was used to determine participants base beliefs about virginity. It is formatted as a Likert scaled questionnaire on a scale from 1 to 7. The survey questions were formatted as multiple choice questions and free response and included the open ended section. In the **Appendices**, this section is labeled as “Secondary Demographics-Open Ended”. These were designed to measure the participants sexual experiences. Some examples of the open ended questions were “At what age did you have your first sexual experience”. The researchers provided a definition of a sexual experience to eliminate any potential confusion and ambiguity. The definition provided is as follows: “A sexual act is defined as sexual contact between two individuals involving penetration of genitals to an orifice, or genitals being penetrated. Other sexual acts include: oral, anal, and manual”. In order to obtain results from the religiosity scale and the role of sharing, the researchers coded the results into quantitative data. At the end of the survey there will be a section for open ended comments/answers.

The demographic questions were gender, age, race/ethnicity as well as “are you a virgin” and other such questions. There were also be a few questions regarding the status of the participants first partner. The most important of these was gender and age. The researchers expected to find that females experience more guilt surrounding the loss of virginity than males. The researchers then conducted a pretest to test reliability on the survey.

PROCEDURE

The participants were sent to a link through email or other social media. The participant then clicked on link to be redirected to the informed consent page where they clicked a box stating “I Agree”. Participants filled out a demographics survey then went to the next page and answered a religiosity scale survey. Then they were taken to the next page and took a survey based

on the Virginitly Beliefs Scale. After this survey they were taken to a page of more demographic type questions that were open ended. The Virginitly Beliefs Scale questionnaire is included in the **Appendix**. After participants took the Virginitly Beliefs Scale they were taken to an open ended box in which the participants could write any sort of explanation or comments they chose. Lastly, participants were then debriefed and thanked.

Results

Results were collected online and analyzed in SPSS. The Virginitly Beliefs Scale had a Cronbach's Alpha of .693 and the Hoge religiosity scale had a Cronbach's Alpha of .899. The scales were then averaged to create a scale score. Researchers performed a median split to convert religiosity into a high and low group. A 2×2 between subjects ANOVA was run with factors of religiosity and gender and guilt as the dependent measure. There was a significant main effect for gender, $F(1,313)=18.715, p < 0.01$. However, the main effect of religiosity, $F(1, 313) < 1, p = \text{n.s.}$, for the interaction, $F(1,313) = 2.401, p = 0.387$, was significant. These results are shown in **Figure 2** with gender on the x-axis, guilt score on the y-axis, and religiosity the different color bars. From these results, it is clear that women had a higher score of virginitly guilt.

Discussion

The researchers found through their analysis that their hypothesis was somewhat supported. Women seem to produce slightly more feelings of guilt than men as illustrated in **Figure 3** and **Table 3**. This gender difference is not significantly enhanced by religion. Interestingly enough it can be seen in **Figure 2** for this sample that religious men show the least amount of guilt (**Figure 4**) while religious women show the highest (**Figure 5**), though it is not statistically significant. For example, from our qualitative data, one male participant stated, "After finally feeling comfortable to discuss losing my virginitly I had moved on from that girlfriend at the time. When asked or telling others about my experience I often find myself feeling embarrassed because I know for a fact I did it for the wrong reasons." This example exhibits a non-religious male participant showing regret over the loss of his virginitly. An example of a religious female answer is "After talking to someone about my first time I felt like an adult. I felt like I had it all figured out at the time. We both bragged on how amazing it was even though it was

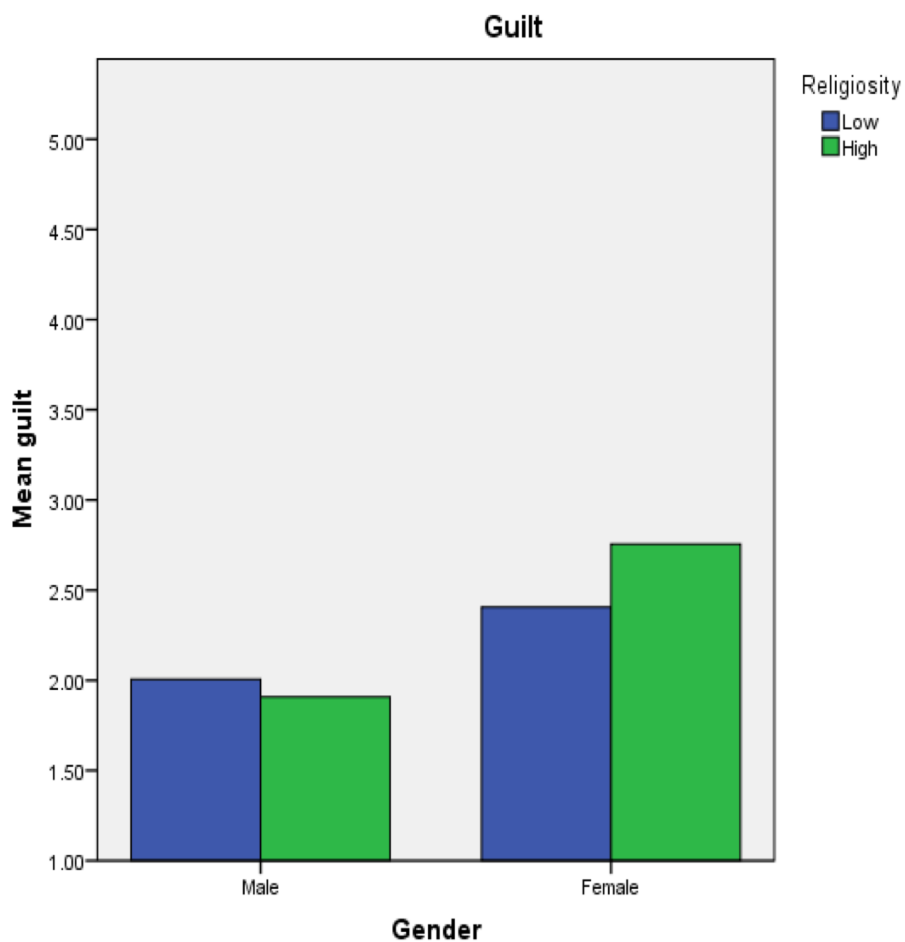


Figure 1. Guilt differences between men and women according to religiosity score.

Degrees of Freedom (1,313)	<i>F</i>	Significance Level
Gender	18.715	.000
Relative Risk	.751	.387
Interact	2.403	.122

Table 1. Numerical breakdown of guilt differences between men and women according to religiosity score



Figure 2. Regret differences between men and women according to religiosity score.

Degrees of Freedom (1,327)	<i>F</i>	Significance Level
Gender	2.128	.146
Relative Risk	1.033	.310
Interact	0.276	.600

Table 2. Numerical breakdown of regret differences between men and women according to religiosity score.

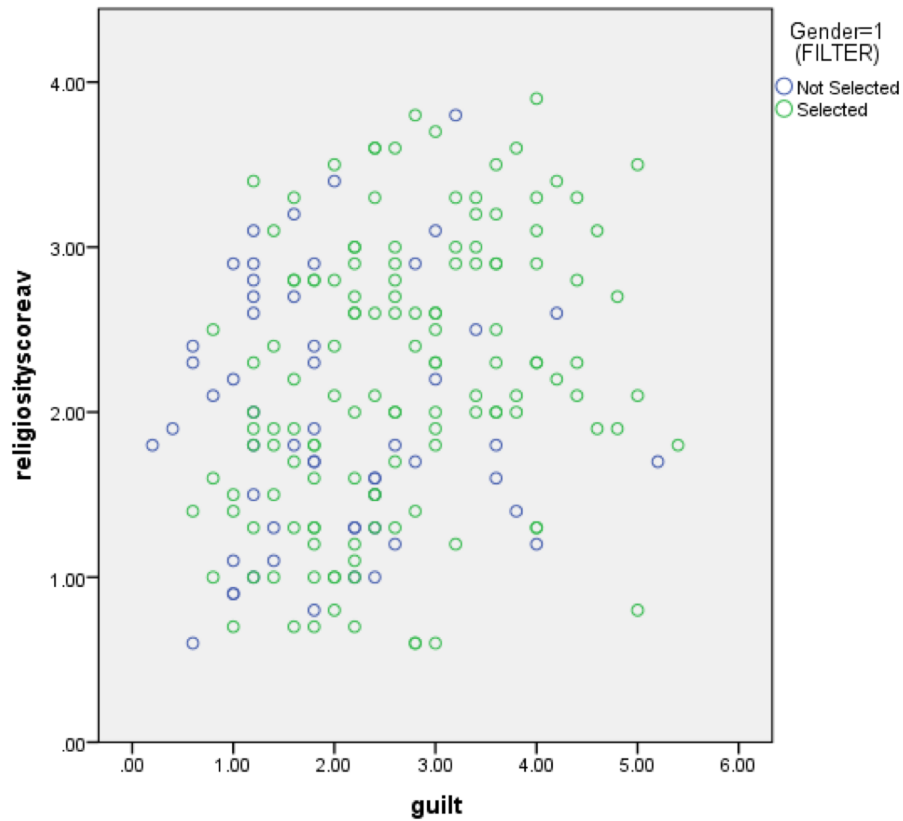


Figure 3. Gender differences between religiosity score and guilt.

Correlation	Guilt	Religiosity
Guilt	1.000	0.259
Religiosity	0.259	1.000

Table 3. Numerical breakdown of gender differences between religiosity score and guilt.

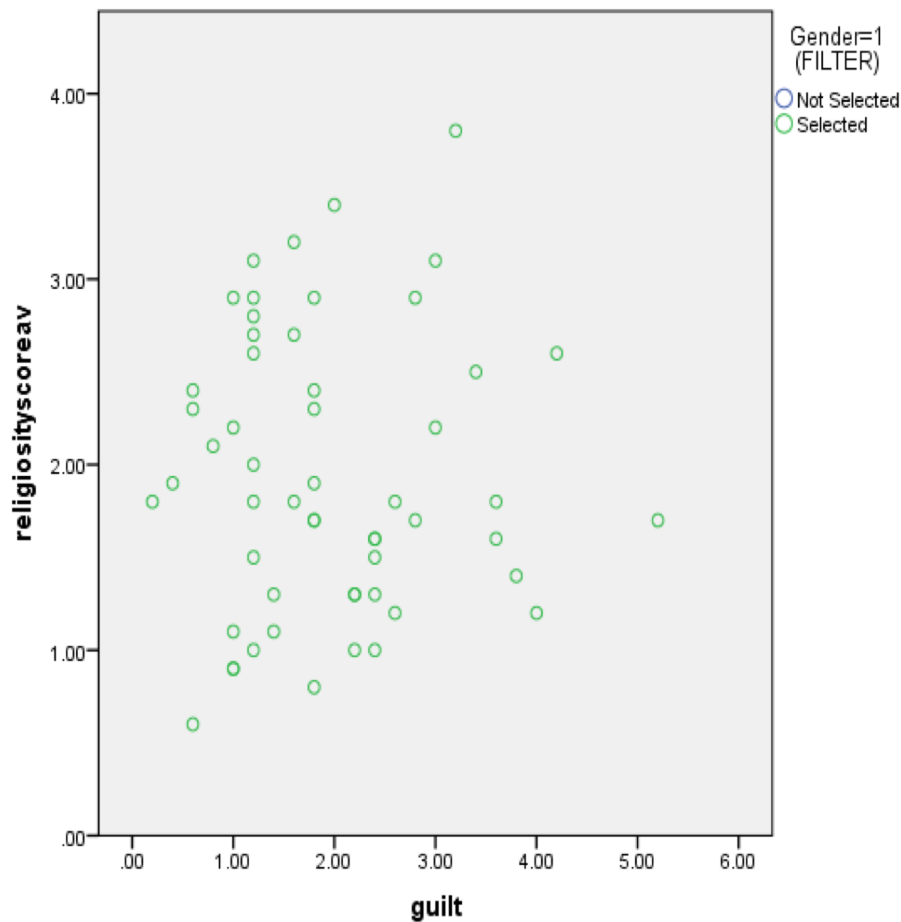


Figure 4. Interaction between religiosity and guilt for males.

painful and I felt really guilty.” These examples demonstrate the difference in the most guilty feelings surrounding the loss of their virginity between genders.

Along these lines our participants perfectly exhibited the virginity scripts from Eriksson and Humphreys. The Gift script was exhibited by both a male and a female as follows:

Passion is a great thing but when giving your virginity, it is something greater. It’s something beautiful and pure, something to be cherished, and I cherish that moment when I lost mine to a beautiful woman.

–Male

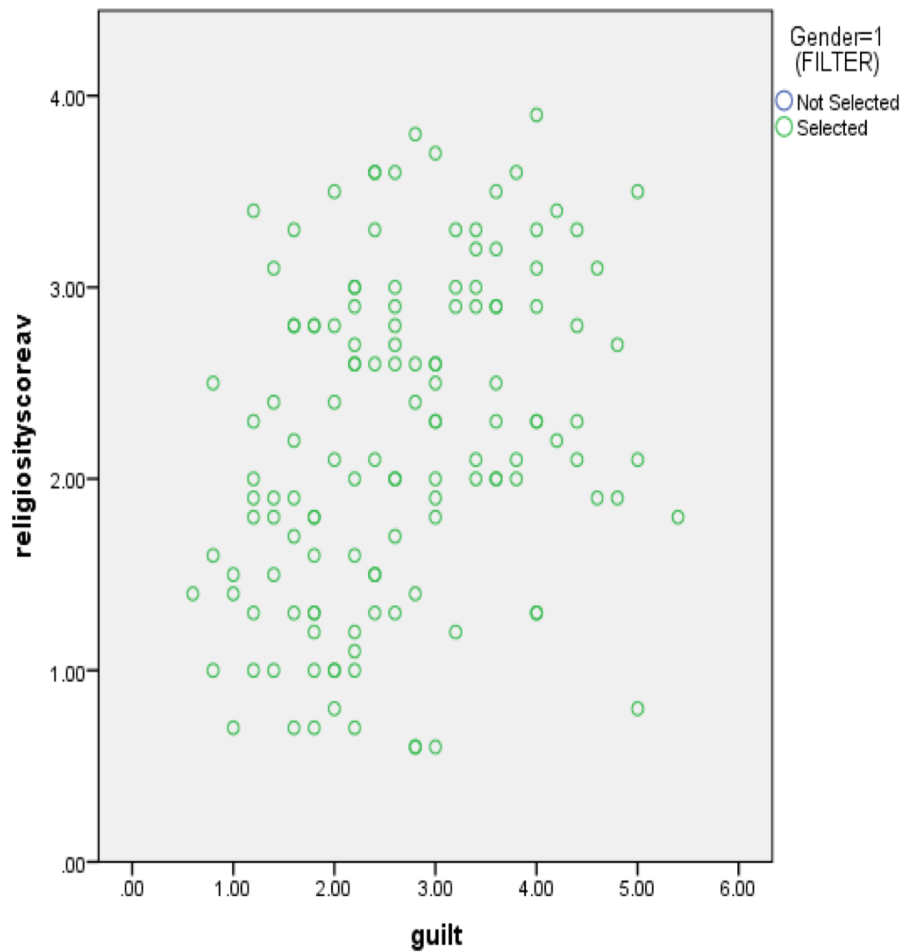


Figure 5. Interaction between religiosity and guilt for females.

To wait until I was married because sex is nothing special until you are with the man you are going to spend your life with. Way more men respect that.

–Female

The Process script was exhibited by the next few examples:

It is not something to fear nor is it something to place upon a pedestal. It is simply a part of life for most people—and your indifference towards it is too a part of life.

–Male

Sex doesn't mean love. It's a natural process that is put up too highly and regarded as something more than it needs to be.

—Female

The Stigma script was exhibited by the next few examples:

Have sex sooner! It feels good and as long as you are safe and protected it is amazing!

—Male

Make a greater effort to have sex sooner in life. Sample many different partners without committing to one.

—Female

These examples are very representative of the answers we received in the open ended section of our survey. This shows that females are still exhibiting higher levels of guilt over the loss of their virginity. This also implies that society is still instilling guilt in women. Although there is no comparative data here, the relatively low difference between men and women on the guilt scale seems to suggest at least a slight reduction in the effect size for guilt between males and females. Although the quantitative results are not statistically significant, the qualitative data seems to suggest some culturally relevant significance.

This study could have been made better with the presence of more participants, more diverse populations, and a more balanced proportion of males to females. If these limitations were fixed the results could have been more significant and representative than they are. For future studies, it might be interesting to look at sexual orientation differences, different religious sect differences, and ego identity differences between men and women and how they perceive themselves based on their virginity.

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Appendix A

SURVEY QUESTIONS

Demographics:

- What is your age?
- What year are you in college?
- What is your ethnicity?
- What is your religious background?
- Male or Female?
- Are you a virgin?
- What is your overall number of partners you have engaged in sexual activity with?

- What is your sexual orientation?
- What age did you have your first sexual experience?

Secondary Demographics – Open-Ended:

- Were you sober the first time you engaged in sexual activity?
- How often do you engage in sexual activity?
- Are your parents aware of your sexual activity?
- Where were you when you lost your virginity?
- Do you regret losing your virginity? If so, why?
- If you could go back in time and give yourself one piece of advice based on what you know now, what would it be?
- What was the age difference between you and the person you had your first sexual experience with?
- Was the person you had your first sexual experience with also a virgin? If not how many partners had they had?
- Did you talk to anyone after having your first sexual experience? Who was the first person you told?
- How did talking to someone about your experience make you feel?

Likert Scale:

- Rate your view of virginity. Scale 1 to 7, 1 being a burden and 7 being a treasure.
- How did you feel after your first sexual experience? Scale 1 to 7, 1 being shame and 7 being relief.
- How did you view your first sexual experience? Scale 1 to 7, 1 being negative and 7 being positive.
- How do you feel now about your first sexual experience? Scale 1 to 7, 1 being satisfied and 7 being shame or guilt.
- How would you rate the attractiveness to the person you had your first sexual experience with? Scale 1 to 7, 1 being not attractive and 7 being very attractive.

Hoge Intrinsic Religiosity Scale:

1 to 5; 1 being strongly disagree, 5 being strongly agree

1. My faith involves all of my life

2. In my life, I experience the presence of the Divine (i.e., God)
3. Although I am a religious person, I refuse to let religious considerations influence my everyday affairs
4. Nothing is as important to me as serving God as best as I know how
5. My faith sometimes restricts my actions
6. My religious beliefs are what really lie behind my whole approach to life
7. I try hard to carry my religion over into all my other dealings in life
8. One should seek God's guidance when making every important decision
9. Although I believe in religion, I feel there are many more important things in life
10. It does not matter so much what I believe as long as I lead a moral life

Appendix B

INFORMED CONSENT

This research is being conducted by Alexis Moore and Caitlin Lipman, students in the Psychology Advanced Research Seminar course at Hanover College. The experiment in which you are asked to participate in is designed to measure the guilt produced after the loss of one's virginity. You will be asked eight Demographic questions and twelve questions based off the Virginity Beliefs Scale (VBS). You are to answer these questions with the use of a Likert scale or an open-ended response, and after which you will be debriefed. The entire experiment will not take more than 30 minutes. There are no known risks involved in being in this study, beyond those of everyday life. The information you provide during the experiment is completely anonymous; at no time will your name be associated with the responses you give. If you have any questions about what you will be doing in the study or about the study itself, feel free to ask them now or at any other time during your participation. If you have any questions now or after the study, please contact:

- For questions about the research itself, you may contact the researchers: Caitlin Lipman (lipmanc15@hanover.edu) and Alexis Moore (moorea15@hanover.edu) .

- For questions about your rights as a participant in this research, you may contact the faculty member supervising the research, Dr. John Krantz (krantzj@hanover.edu), or the chair of Hanover College's Institutional Review Board, Dr. Dean Jacks, at (jacks@hanover.edu). Participation in this study is voluntary. Refusing to participate or ceasing to participate at any time will involve no penalty. Incomplete participation will not result in credit for participating, but you may complete an alternative assignment of equal time commitment in order to receive credit. Please inform the researchers if you would like to keep a copy of this informed consent form.

Signature

Date

Appendix C

DEBRIEFING

The study in which you just participated was designed to measure the amount of guilt produced based off the loss of your virginity. Please do not discuss this study with other potential participants until the year is over. If people know what we're testing before the study begins, they may respond differently, jeopardizing our results. As soon as the results from this study are available, you can read about them by going to the following website and clicking on the semester when you participated in the study:

<http://vault.hanover.edu/>

If you have any questions, please contact:

- For questions about the research itself, you may contact the researchers: Caitlin Lipman (lipmanc15@hanover.edu) and Alexis Moore (moorea15@hanover.edu).
- For questions about your rights as a participant in this research, you may contact the faculty member supervising the research, Dr. John Krantz (krantzj@hanover.edu), or the chair of Hanover College's Institutional Review Board, Dr. Dean Jacks, at (jacks@hanover.edu)

THE PREVALENCE OF *ESCHERICHIA COLI* AND FECAL COLIFORMS ON BACKPACKS OF COLLEGE STUDENTS IN CENTRAL KENTUCKY

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MENTOR: BEVERLY JUETT

Abstract

Escherichia coli (*E. coli*) is a gram negative, rod-shaped, facultative anaerobic bacterium, it is normally found in the lower intestines of warm-blooded animals and humans. *E. coli* and/or fecal coliforms have been used as fecal indicators in water, food, and contact surfaces. The purpose of this experiment is to identify the prevalence of *E. coli* and fecal coliforms on the bottom of backpacks belonging to college students in central Kentucky. Forty samples were taken from bottoms of college students' backpacks in central Kentucky. Sterile swabs were used to collect the samples from the backpacks. The swabs were placed in Stuart's transport medium and arrived at the lab within 2 hours. Upon arrival the samples were streaked for isolation on Coliscan Easygel© plates under a laminar air flow hood. The inoculated plates were placed in an incubator at 35° C and read for presence or absence of *E. coli* and/or fecal coliforms at 24 and 48 hours. *E. coli* was isolated from four samples (10%), fecal coliforms were isolated from nine samples (22.5%), and both *E. coli* and fecal coliforms were isolated from two samples (5%) out of the forty total samples collected. *E. coli* and fecal coliforms found on the backpacks may be a possible source of secondary infections in the communities.

Introduction

Escherichia coli (*E. coli*) is a gram negative, non-spore forming, rod-shaped, facultative anaerobic bacterium. It is normally found in the lower intestines of warm-blooded animals and humans. Examination of water for coliform bacilli such as *E. coli* can be used to determine fecal pollution in the water (Smith, 1984).

Previous studies of the prevalence of fecal and total coliforms found 20% of public surfaces were positive for coliform bacteria and 7% were positive for presence of fecal coliforms (Reynolds *et al.*, 2005). This study sampled many

different places such as the airport, bus station, public bathroom, home, children's playground equipment, and shopping mall (Reynolds *et al.*, 2005). They found the highest amount of fecal coliforms on children's playground equipment. Since there was such a high frequency in this area, they suggested further evaluation of the playground. Trindade *et al.* (2014) assessed the biological qualities and food safety practices in municipal schools in Jequitinhonha Valley, Brazil. In the food samples they collected, coliforms were found (52.9%), *E. coli* (1.5%) and *Staphylococcus aureus* (*S. aureus*) (32.4%) and on the food contact surfaces: coliforms (40.7%), *E. coli* (3.3%), and *S. aureus* (22.0%).

Sinclair and Gerba (2010) completed a study in the homes of a Cambodian village. This study was designed to survey the levels of microbial contamination on the kitchen and bathroom surfaces in the homes that had improved latrines. They compared their results to a study of the homes in the United States. Their findings indicated a high fecal coliform contamination on the ladle for sink water while the floor surfaces around the base of the toilet had a lower count for fecal contamination (Sinclair and Gerba, 2010). Rusin *et al.* (1998) determined which sites in a household kitchen and bathroom were heavily contaminated with fecal coliforms. Their findings demonstrated high levels of contamination among: the sponge/dish cloth, the kitchen sink drain area, the bath sink drain area, the kitchen faucet handle(s), the flush handle, the shower drain area, the bathroom sink faucet handle(s), the cutting board, the refrigerator handle, and the kitchen counter top. Most places that had the high amount of coliforms were the moist areas. The kitchen was more heavily contaminated than the bathroom, particularly the sponge/dishcloth (Rusin *et al.*, 1998).

Rusin *et al.* (2002) compared surface-to-hand and fingertip-to-mouth transfer efficiency of gram positive bacteria, gram negative bacteria, and phage. They used three microorganisms: *Serratia rubidea* (*S. rubidea*), *Micrococcus luteus* (*M. luteus*), and PDR-1 phage, and placed them on fomites and touching their lip. The study found that fomite to hand *M. luteus* was transferred more efficiently than the virus or phage, PDR-1 and the gram negative bacterium, *S. rubidea*, from all but two cases. Percent transfer was higher from porous surfaces than from non-porous surfaces; the contaminations of the hands were often high after handling porous fomites (Rusin *et al.*, 2002). The fingertip-to-lip transfer had *M. luteus* showing the highest percent transfer from the fingertip to the lower lip (40.99%). Gram positive bacteria were transmitted readily from environmental surfaces followed by viruses and gram negative bacteria (Rusin *et al.*, 2002).

Rinaldi *et al.* (2006) evaluated the extent of both fecal contamination and canine parasitic elements in Naples, Italy. They knew that the fecal matter was a public health problem for humans directly and indirectly (Rinaldi *et al.*, 2006). Their results showed a widespread distribution of canine feces throughout the city of Naples and even higher in residential neighborhoods in the southwestern part of the city (Rinaldi *et al.*, 2006).

Singh *et al.* (2011) did a study of nosocomial infection (bacterial pathogen) from library books. One hundred samples were collected from Himachal Institute of Life Sciences Library at Paonta Sahib in India. A total of 225 isolates were recovered from the 100 samples; *Staphylococcus sp.* (35.5%), *E. coli* (28.8%), and *Bacillus sp.* (22.2%). *Staphylococcus sp.* and *E. coli* were the most numerous organisms isolated from the library books (Singh *et al.*, 2011).

The purpose of this experiment is to identify the prevalence of *E. coli* and fecal coliforms on the bottom of backpacks belonging to college students in central Kentucky.

Hypotheses

H_{o1} = *E. coli* will not be found on the bottom of backpacks belonging to college students in central Kentucky.

H_{a1} = *E. coli* will be found on the bottom of backpacks belonging to college students in central Kentucky.

H_{o2} = Fecal coliforms will not be found on the bottom of backpacks belonging to college students in central Kentucky.

H_{a2} = Fecal coliforms will be found on the bottom of backpacks belonging to college students in central Kentucky.

Materials and Methods

The bottom of approximately 40 student backpacks on a campus was sampled with a sterile swab, placed into Stuart's transport medium, and taken to the lab. The samples were streaked for isolation under a laminar airflow hood within 2 hours of collection on Coliscan Easygel© plates (Micrology Laboratories). They were placed in an incubator at 35° C and read for the presence or absence of *E. coli* and coliforms at 28-30 hours. The media controls were *E. coli*, *Klebsiella pneumonia* (*K. pneumonia* - a coliform other

than *E. coli*) and *Alcalignes fecalis* (*A. fecalis* - another bacterium) with the expected results after 24-48 hours, incubation at 35° C. *E. coli* grew with a blue/dark purple color, *K. pneumonia* grew with a reddish color, and *A. fecalis* grew with a whitish/cream color. These colors indicated satisfactory results for the control organisms on the Coliscan Easygel© plates (Micrology, 2008).

Results

Four out of forty (10%) of the samples tested positive for *E. coli* from all the backpacks. From the total number of samples, thirty-six (90%) tested negative for *E. coli*. Nine out of the forty samples (22.5%) collected tested positive for fecal coliforms. Thirty-one samples from the total forty (77.5%) tested negative for fecal coliforms. Two out of the forty (5%) of the samples tested positive for both *E. coli* and fecal coliforms. Thirty-eight out of the forty (95%) tested negative for both *E. coli* and fecal coliforms (**Table 1**).

	Number (%) Positive	Number (%) Negative
Fecal coliforms	9 (22.5%)	31 (77.5%)
<i>E. coli</i>	4 (10%)	36 (90%)
<i>E. coli</i> & fecal coliforms	2 (5%)	38 (95%)
Total: 40		

Table 1. Total number/percentage of *E.coli* and fecal coliforms from the bottom of college students backpacks in central Kentucky. Study conducted during Fall 2014.

Discussion

Four out of forty samples tested positive for the presence of *E. coli*. Nine out of the forty samples tested positive for the presence of fecal coliforms. Two out of the forty samples tested were positive for both the presence of *E. coli* and fecal coliforms. The results did not support the first null hypothesis that stated *E. coli* would not be found on the bottom of backpacks of college

students in central Kentucky. The results did support the first alternative hypothesis that *E. coli* would be found on the bottom of backpacks of college students in central Kentucky. The results did not support the second null hypothesis that fecal coliforms would not be found on the bottom of backpacks of college students in central Kentucky. The results did support the second alternative hypothesis that fecal coliforms would be found on the bottom of backpacks of college students in central Kentucky.

No research studies were found that tested backpacks. However, some studies had similarities because fomites were sampled. Reynolds *et al.* (2005) sampled various places such as public bathrooms, homes, and children's playground equipment. Their results demonstrated that the prevalence of fecal and total coliforms found on 20% of the public surfaces was positive for coliform bacteria and 7% was positive for presence of fecal coliforms. The present study sampled backpacks (fomites) with results of *E. coli* (10%), fecal coliforms (22.5%), and both *E. coli* and fecal coliforms (5%). Another study similar to the present study was a study in India that sampled library books. Singh *et al.* (2011) sampled library books for nosocomial infection (bacterial pathogen). Out of the 100 samples taken 225 isolates were recovered. *Staphylococcus sp.* (35.5%), *E. coli* (28.8%), and *Bacillus sp.* (22.2%) were found on the samples. *Staphylococcus sp.* and *E. coli* were the most numerous organisms isolated from the books. The present study showed results of *E. coli* (10%), fecal coliforms (22.5%), and both *E. coli* and fecal coliforms (5%). These fomites could contribute to secondary infections in the communities.

This study had some limitations including small sample size, restricted location, and only testing backpacks of college students. A larger samples size and more locations could possibly find different result. If owners of backpacks were of different age groups the results might be different especially with children included.

In future studies, researchers may want to test backpacks outside of central Kentucky, backpacks of different age group of people (elementary, middle school, high school children) and have a larger sample size. This would possibly find different results.

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COMBATING BIASES: ILLUSORY IMAGERY IN US NEWS COVERAGE ON CENTRAL AMERICAN IMMIGRATION

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Abstract

This paper comprises of original research and analysis of contemporary news media discourse surrounding Central American immigration in the United States. Subjects of study included more than 50 news articles, images, and videos from a variety of major politically-unaffiliated news outlets for English-speaking audiences. Rhetoric was analyzed in representations of the Central American immigration “crisis” that sparked a trend of media coverage in 2014, as well as several articles that covered events leading up to the “crisis.” Common rhetorical analogies ascertained through media analyses include the representation of immigrants as aliens, diseases, parasites, floods, criminals, natural disasters, terrorists, and drug pushers. Such associations aggravate preexisting xenophobia, heighten domestic anxieties, forgo rationality and objectivity, foster monolithic dialogue, erode informed policymaking, and inspire nationalistic racism. The ubiquity of these racist and xenophobic metaphors underscores news media’s political nationalism that colors the language and mindset of journalism and media consumers. This paper contextualizes contemporary observations with a synthesis of larger-scale media studies, historical accounts of racism in immigration services and news media, the role of the “other” in US society, and critical media theory. The conclusive evidence derived from past studies and my contemporary analyses demonstrate a political predilection for biased diction in news coverage of Central American immigration in the US. The paper notes the work of news analysts, professors, and journalists towards ameliorating subjective, political xenophobia in the news, and calls upon media consumers to participate in a subversion of journalism's racist legacies.

“The Rio Grande Valley has become ground zero for an unprecedented surge in families and unaccompanied children flooding across the Southwest border”

– *Los Angeles Times*

“Experts agree, Central Americans who are deluging the southern border with tens of thousands of their children are breeding not only a humanitarian crisis, but also a serious national security threat to the US”

– CBS News

“The flow of Central and South Americans through South Texas has become an unmanageable torrent within the past month.”

– *Houston Chronicle*

“Communicable diseases continue to be a problem at the New Mexico facility built to house illegal immigrant families surging across the US – Mexico border, and the immigrants themselves aren’t taking their own health care very seriously”

– *Washington Times*

The above quotations typify pervading discourse in current US media reporting on immigrants crossing the border between the United States and Mexico. Four major news sources published these quotes between May and October 2014, in response to the heightened attention to Central American youths entering the US. Each of the cited news outlets claims to be nonpartisan, each has won prestigious media awards, and like all high-minded news sources, each aspires to an exalted level of credibility achieved through “non-biased” reporting. Yet, as illustrated above, their journalists utilize a specific, preordained vocabulary to report on undocumented immigrants. In descriptions of immigrant children seeking refuge in the United States, the four citations concurrently imply war, turmoil, “national security threat,” natural disaster, and plague at the hands of the young migrants. Through the personification of immigrants as incendiaries of social ills, news media engages in dangerous sensationalism, rouses unfounded suspicions, participates in fear mongering, inspires xenophobia, and promotes nationalist anger towards Central American immigrants.

The phenomenon of prejudiced, overdramatized media coverage illustrating immigration has developed through histories of tense foreign relations, nationalism, racism, and the rise of media powerhouses. Media analysts Michael Shifter and Rachel Schwartz attribute the roots of xenophobic discourse, directed specifically towards Central American immigrants, to the origins of US reporting on Mexico. In an essay titled, “Balance on the border? Evaluating US news media portrayals of Mexico,” they pinpoint the foundations of journalism during the Mexican-American

War of 1846 as a catalyst for tendentious US news representations of Mexicans. Explaining the incentives for journalists to twist national opinions, Shifter and Schwartz assert, “Initiated at the height of the US expansionist era, it was the first war covered extensively by US foreign correspondents whose slanted reporting of Mexican ‘backwardness’ was designed to drum up nationalist support.” Reporting of the war with Mexico originally served as a political tool to aggregate American patriotism in order to facilitate the annexation of Mexican land. Shifter and Schwartz affirm that this precedent of a colored journalistic tone set during the Mexican-American War perseveres in modern-day reporting: “The tropes of chaos and barbarity remain present in US media coverage of Mexico today.”

Cori E. Dauber, professor of Rhetorical Studies at University of North Carolina, argues that news outlets hold complex power to influence the mindsets of their readership; as an “objective” messenger, audiences allot heightened credibility to conclusions drawn in news articles. Dauber contends, “If imagery is powerful, it is all the more so when presented as ‘objective.’” The American Press Institute (API) historicizes the pursuit for objectivity in U.S. news media, alleging that in the 19th century, the concept of objectivity required an acknowledgement of bias and transparency in the reporting process. However, the journalism trends at the turn of the century evolved into a focus on realism—the idea of presenting all facts neutrally so that readers could discern the truths in the article. The API cites Walter Lippman, who, in 1919, condemned the naiveté of the shift towards realism, and argued that only “the unity of disciplined experiment” in the “scientific spirit” of the era could adequately ensure the transmission of “valid facts” (“The Hierarchy of Information”). As the API notes, Lippman’s call for applying scientific methodology towards the processing of evidence has had varying success; however, the assertion that a move towards scientific testing of evidence could undo irrationality and biases has persisted in the discipline.

On the one hand, news media consumers can appreciate the industry’s priority on fact-checking and amassing information from verifiable experts. Respected journalism purportedly operates free from political agenda or biased constraints. However, bias remains, and the misleading pretense of objectivity masking subjectivity in news media makes prejudice all the more pernicious—they are not named, expected, or acknowledged as such. Therefore, when inflammatory imagery depicting immigrants as invaders, freeloaders, disease-carriers, security threats, criminals, and drug traffickers permeates news articles, the public is predisposed to digest negative metaphors with heightened acceptance. As rhetoric analyst J. David Cisneros

emphasizes, “metaphors are more than linguistic ornamentation; they are significant rhetorical tools that affect political behavior and cognition. Metaphors create conventional understandings by connecting phenomena with familiar cultural assumptions and experiences.” As Cisneros indicates, reporters wield power through the subtle metaphors that decisively dictate readers’ reactions to articles.

Discussing the misuse of news media power in an essay titled, “Promoting Misconceptions: News Media Coverage of Immigration,” University of Southern California professor Roberto Suro asserts that news sources have incited racism and impeded the potential for balanced debate over the issue of immigration. He foregrounds the role of the news in pushing prejudices into the opinions of constituents and legislators alike: “The evidence suggests that the news media have hindered effective policy making by contributing to the polarization and distrust that surrounds the immigration issue.” He emphasizes that despite newcomers’ ability to “make new lives here with little public drama” the media persistently characterizes immigrants with “themes of illegality, crisis, controversy, and government failure.” Suro and other researchers have surmised that this perpetual pattern of biased discourse in the media establishes associations between supposed social disrupt and the arrival of immigrants in both public and political mindsets.

The persistence of specific metaphors used to discuss immigration in the media reveals underlying politics in allegedly objective news sources. University of California professor of Cognitive Science and Linguistics George Lakoff describes the media’s propensity for “framing” reporting to sway an audience. He argues, “Everything you [the reader] understand is a matter of framing... every word is defined relative to a conceptual framework” that emanates myriad connotations, associations, and preconceptions based in historically established rhetoric. His investigations of the subtle infiltration of loaded language and political persuasion in the news underscore the capacity for media outlets to direct public discourse and polarize issues. Based on decades’ of media scholarship and empirical studies connecting media frames, public policy, and readers’ conceptualizations of global issues, Stefaan Walgrave and Peter Van Aelst assert, “the notion of agenda setting has provided one of the most influential and fertile paradigms in media and communications research”; agenda setting theory underscores the powerful influence that the news holds over the constructed narratives of and selective concern for current events (88). Using this conceptual model, Cisneros argues that “this framing [of Central American immigration in news media] is NOT

neutral but dehumanizes immigrants and pre-empts a consideration of broader social and economic concerns.” Researchers such as Shifter and Schwartz further recognize an urgency to subvert decades’ of biased rhetorical frameworks for media coverage of immigration in order to counter “alarmist fervor [which] stifles public debate by forestalling more critical examinations of the problem.” Referencing the scholarship on news media influence, I argue that analyzing and dismantling bias in representation of immigration is of the utmost urgency—the specific frames with which news media sources craft narratives significantly mold and color public opinion of immigrants.

Founded in this historical framework of linking immigrants to illegality, drug violence, terrorism, pollution, environmental damage, and disease, news media today often succumbs to the same conveniently pre-constructed yet racist and hackneyed metaphors as their journalist predecessors. Drawing from past studies and analyses, I conducted an investigation of contemporary media coverage on Central American immigration in major English-language US news outlets, concentrating on the reporting of the 2014 humanitarian crisis at the US-Mexico border. I studied over fifty contemporary articles reporting on “immigration,” some of which bypassed inflammatory language and some of which propagated discriminatory tropes. Based on the media research above, I flagged language in the aggregated articles that connoted the aforementioned antiquated metaphors—illegality, drug violence, terrorism, pollution, and disease. As I read through the article, themes of natural disaster, sudden threat, social disruption, and economic devastation as byproducts of immigration also emerged as potent patterns, and I included these metaphors in my research in order to dissect comprehensively the contemporary manifestation of xenophobia and anti-immigration propaganda in news coverage.

Examples of contemporary iterations of negative imagery penetrate masses of reporting on Central American immigration in English-language media outlets in the US. Roberto Suro analyzed 1,848 Associated Press stories printed before 2007 pertaining to immigration and found that 79% discussed illegality. In a subsequent study of 2,614 immigration articles in *The New York Times*, he found that 86% foregrounded illegality. Suro theorizes that news outlets centralize the concept of the “illegal” immigrant, despite a significantly larger proportion of legal immigrants than undocumented immigrants in the United States. Thus, he notes an inaccurate conflation between immigration and criminality in media discourse.

The sampling of 2014 news articles similarly belabors illegality. *The New York Times* bemoans the “administration’s failure to secure the Mexican border after years of illegal crossings,” *The Washington Post* describes the “influx of illegal immigrants,” *The Los Angeles Times* report on “31 immigrants spotted illegally crossing the Rio Grande,” and *The Houston Chronicle* describes the crisis as a “flood of illegal immigration.” *Colorado Newsday* pushes the weight and centrality of “illegal” further by asserting, “Murderers, kidnappers, drug traffickers, and sex offenders were among the illegal immigrants.” By describing an immigrant as “illegal,” media outlets axiomatically generate associations with criminality, disregard for the law, and low moral groundings. These generalized misrepresentations disregard the complex economic, political, and social situations that motivate immigrants to leave their home country, and cast an insular, disproportionate focus on the act of crossing the border without legal documentation. Despite advocacy groups’ efforts to retire the word and its dehumanizing ramifications, most articles used the word “illegal” to describe undocumented immigrants. The ubiquity of the term “illegal” begets a depthless, one-dimensional identity for hundreds of thousands of people, thus negating their individual experiences and personhood.

Media emphasis on the universality of drug violence in Mexico further reinforces the embedded construction of illegality. In 2011, Shifter and Schwartz conducted analyses on depictions of Mexican immigrants in three of the most widely read US newspapers: *The New York Times*, *The Washington Post*, and *The Los Angeles Times*. In the research, they emphasize the popularization of the word “war” to characterize drug-based violence in Mexico. Each newspaper utilized “war” with such ubiquity that Shifter and Schwartz contemplate whether “the use of the word ‘war’ has almost become the journalistic standard in describing drug violence, decisively molding US public perceptions.” In their analysis, they further delineate that descriptors such as “reign of terror,” “criminal anarchy,” “lawless no-man’s land,” “bloody urban battlefields,” and “out-of-control narco-violence,” often add dimensionality to articles on “drug wars” and elicit anxious rumination on the potential for Mexican drug violence to spill over into US land. Shifter and Schwartz argue that the consequential dramatization generates a monolithic discourse on Mexican immigrants, which ignores complex examinations, stonewalls multilateral debate, and inflames US fears and misconceptions.

The identifier “illegal” provokes public concern that immigrants are prone to many types of criminal behavior. The excerpt from *Colorado Newsday* illustrates a reflection of those fears, by emphasizing the many

types of criminals—such as “murderers, kidnappers, drug traffickers, and sex offenders,” who allegedly comprise the population of undocumented immigrants. *The Washington Times* similarly conflates an illegal border crossing with a propensity for felonious activity; in an article titled “With Bombs Away, Drug Traffickers and Illegal Immigrants Make Their Play,” journalist Jerry Seper contends that “Drug and alien-smuggling gangs make use of the ... soft underbelly of border security.” *The Washington Post* quotes radio talk show host Jeri Thompson relaying particularly demeaning fears of immigrants, “It’s not just street urchins from Central America carrying diseases in, but also criminals, thugs, gang members. No other country is dumb enough to have their borders wide open like us.” In conjunction with the stereotypes of Mexican drug violence, inflated by media reporting on the “drug war,” news propagations of drug traffickers and criminals rouse fear and xenophobia in media consumers.

A 2005 news study offers further evidence of the fallacies of immigrant crime portrayed in US newspapers. Conducted by Regina P. Branton and Johanna Dunaway, the study indicated that papers closer to the US-Mexico border have the highest rate of negative news and opinion pieces on immigration, with a particularly high emphasis on immigrants’ drug crimes. Analyzing the study results for the *Pacific Standard*, Lee Drutman alleges that “Actual crime statistics show that levels of immigrant crime do not increase closer to the border. Only the coverage of such crime increases.” This study elucidates the imbedded, yet unfounded stereotypes connecting immigrants with increased criminality and drug violence.

Media’s inculcation of the delinquency of Central American immigrants crossing the US-Mexico border becomes further reinforced through imagery relating immigration with terrorism. The terrorist attacks on September 11 incited a wave of anger and apprehension towards outsiders, which the media both reflected and reinforced with a renewed xenophobic discourse. Excerpts of interviews with politicians, ranging from southwestern representatives like Tom Tancredo and Rick Perry to northeastern congressmen like Scott Brown, assert the urgency of closing the southern border to Central American immigrants in order to decrease the risk of terrorism in the US. Media Matters Action Network (MMAN) emphasizes news commentators’ role in distorting news stories and hyperbolizing potential threats. In an analysis of Glenn Beck, Pat Buchanan, Fox News’ Bill O’Reilly and CNN’s Lou Dobbs, MMAN highlights numerous instances in which each commentator linked open borders, “illegal” immigrants, and lax border security policies with heightened risk of terrorism. By conflating immigration with an increased

possibility of terrorist attacks, media voices generalize entire nations of people as a homogeneous threat, ignoring nuanced challenges, individuality, and complex sociopolitical impetuses for fleeing home countries that do not involve terrorizing the US.

Contemporary media assiduously fans public fear of “Mexican violence” penetrating US borders. For example, Fox News’ Chris Wallace charges that Islamist terrorists could easily infiltrate our “open” southern border and wage warfare on the US. In another article titled, “Congressman: ‘At Least 10 Isis Fighters Caught Trying to Cross into the US,’” Fox News further indicates that the government purposefully avoids admitting the “threat of Islamic State militants infiltrating the US through the southern border.” CBS News compares the Central American humanitarian crisis to the fight against Al Qaeda, propagating the sensation that both situations present dire national security threats and claiming the southern border to be a new front for the War on Terror. Under the headline “Is the Surge of Illegal Child Immigrants a National Security Threat?” CBS journalist Lindsey Boerma expounds,

While lawmakers harp over potential military action to stem escalating sectarian bloodletting at the hands of an al Qaeda-inspired insurgency movement in Iraq and Syria, another issue on the national security front has surfaced after lurking for years in the bowels of US foreign policy concerns: the staggering influx of undocumented minors at the US-Mexico line.

Later in the article, Boerma concludes that the “Central Americans who are deluging the southern border with tens of thousands of their children are breeding not only a humanitarian crisis, but also a serious national security threat to the US.” With this imagery, she recklessly generates an association between self-identified terrorists and children fleeing violence.

The Los Angeles Times evokes similar metaphoric rhetoric that conflates Central American immigration with imagery of war and terrorism through describing the Rio Grande region as a “ground zero for an unprecedented surge in families and unaccompanied children flooding across the Southwest border.” The connotations of “ground zero” suggest bombs, war-struck catastrophe, and sites of terrorist offensives. The same article also characterizes the crisis as an “onslaught of homeless detainees,” using a synonym for violent and incessant assault to portray the rate of undocumented immigrants. Each of these media representations equates the presence of Central American immigrants in southern Texas to the devastation of the September 11 attacks on the US, and thus draws a

dangerous line paralleling victims of violence and poverty with anti-American terrorist organizations. News articles that affiliate immigration with terrorism engage in fear mongering, propagate problematic, imprecise journalism to their readership, and activate flames of restrictionism.

Journalists typecast immigrants as criminals, survivors of drug warfare, and individuals who have become desensitized to violence; Cisneros alleges that news media further molds the immigrant into a “pollutant,” through metaphoric parallels between immigration and environmental contamination. Lisa A. Flores, Associate Professor of Communications and Ethnic Studies at the University of Utah, indicates that the fusion of concerns for pollution and fears of Central American immigration emerged as early as the 1920s. In her essay, “Constructing Rhetorical Boundaries: Peons, Illegal Aliens, and Competing Narratives of Immigration,” she notes that:

Fears that unassimilable and undesirable aliens might pollute the stock and dilute the character of Americanism had not disappeared... The commentaries and tropes that had highlighted the supposed problems of degeneracy, illiteracy, and other forms of pollution could now be transferred from the Asian and European menace to the characters in the narratives of the Mexican problem. (373)

Foregrounding contemporary evidence from papers and televised newsreels, Cisneros demonstrates the propagation of the discourse of pollution and adulteration. Through analysis of articles covering California’s Proposition 187, a ballot initiative introduced in 1994 to limit undocumented immigrants’ access to public services, Cisneros unearths a marked discourse conflating immigration with pollution, generated through “images of biological invasion or contamination.” He evidences this claim with visual analyses, discussing the capacity of images and video to compound meaning in textual and verbal assertions in the news. In a primary analysis, Cisneros deconstructs Fox News footage from 2005 of undocumented immigrants “in a disorganized and huddled heap, in sharp contrast to the peaceful desert environment that they are physically disrupting.” He claims that the depiction of a “chaotic mess” induces fear of a threat to the “ordered, peaceful, and pristine desert wilderness,” similar to the threat of toxic contaminants. In conjunction with newscasters’ descriptions of the magnitude of undocumented immigration, the impending peril to US citizens and natural resources becomes clear.

Cisneros further notes the media’s tendency to depict immigrants as pollutants in images of “unorganized groups of immigrants milling on street corners and sidewalks...disrupt[ing] a sense of order and safety,” and

jumping over fences, exuding a sense of a surreptitious invasion. Most significantly, he scrutinizes Fox News nighttime coverage at the Rio Grande, in which journalists film immigrants walking directly towards the camera, connoting an immediate and direct threat to the viewers. Cisneros discusses the purposefully distorted filmography further:

Particular features of the immigrants are indistinguishable in such adverse lighting conditions. Instead, the night vision lens gives the immigrant bodies a strange neon green luminosity; they blend together, and the footage creates an impression of an ominous and oncoming stream of toxic green pollution. (581)

Thus, Cisneros confirms a media conflation of ecological devastation with immigration from Central America.

Covert incorporations of pernicious imagery into reporting on the 2014 Central American border issue also extends beyond imagery of illegality, drugs, and terrorism. As originally investigated by Cisneros, contemporary articles further the subtle reinforcement of immigration evils through scapegoating immigrants as pollutants. An article in *Tucson Weekly* titled “Trashing Arizona” describes the immigration “invasion” and consequential ecological damage inflicted by the purported “24 million pounds... of trash dumped on our borderlands illegal aliens.” The article, accompanied by an image of heaps of waste lumped haphazardly in a muddy ditch, asserts that water supplies become “especially vulnerable, because these trash dumps are often found at water sources. Some ranchers have reported their wells are contaminated with fecal bacteria, likely the result of so many illegal aliens defecating near water sources.” In rhetoric that delineates and juxtaposes an allegedly victimized group (the US) and a predatory invader (the polluting immigrants), “objective” news becomes colored by biased, circumscribed reporting. Again, journalism covering Central American immigration falls into the same simplistic, hackneyed depiction in which immigrants unabashedly impose damage on the US.

Imagery positing immigrants as contaminants fluidly elasticizes to depict immigrants as germs. Researchers indicate a common intersection of fears of disease with fears of outsiders. Restrictionists and opponents of immigration reform often describe the US-Mexico border as “porous,” signifying a perceived vulnerability to the nation, as well as denoting a need to protect the US from a corporal attack through comparing the nation to a living body. Citing the work of Otto Santa Ana, a researcher of media terminologies utilized in coverage of immigration issues, Cisneros

paraphrases, “When the nation is conceived as a physical body, immigrants are presented either as an infectious disease or as a physical burden.” Two professor of the History of Medicine at the University of Michigan, Howard Markel and Alexandra Minna Stern explore the theme of immigrants as disease-carriers in their paper, “The Foreignness of Germs: The Persistent Association of Immigrants and Disease in American Society.” Introducing the history of a dynamic heterogeneity in US society, they assert, “Despite the dramatic changes in demography, the meaning of citizenship, and the ability to treat and cure acute and chronic diseases, foreigners were consistently associated with germs and contagion.” Flores dates the origin of media rhetoric assuming Central American immigrants to be disease-carriers to early 20th century xenophobia, noting that:

the common descriptors of Mexicans shifted from docile to diseased and criminal. The mainstream American presses of the late 1920s and early 1930s were filled with commentaries on the pervasiveness of social contagions. Tales of Mexicans with illness appeared and the Mexican threat was depicted as both numerical and visceral, as medical and social metaphors were used. (374)

Paralleling Flores’ historical contextualization, Markel and Stern note the turn of the century as a transformative moment in media depictions of Mexican immigrants, arguing “US immigration and health officials became uncomfortably aware of the openness of the border...besides being cast as transient and uprooted, Mexicans also began to be categorized as diseased and dirty.” After decades of more lenient immigration policy starting in the 1960s, Markel and Stern reference a resurgence of restrictionist sentiments during the 1980s AIDS crisis; pervasive health-based xenophobia reemerged as a product of heightened fears of foreign disease-carriers.

Today, in our connected global community, public anxiety over the potential for foreign diseases to penetrate national borders has magnified. Laura Murphy, writing for *The Guardian*, identifies the pervasion of modern media rhetoric inaccurately portraying Latin American immigrants as disproportionately high-risk disease carriers, citing headlines such as “Border Patrol Agents Test Positive For Disease Carried By Immigrants” and slander asserting that immigrants crossing the US-Mexico border cause disease-based deaths of US children.

Journalists fortify this antiquated angle in contemporary articles through portrayals of Central American undocumented immigrants as disease-carriers and origins of epidemics. Writing for *The Chicago Tribune*,

Cal Thomas raises suspicions that immigrants from the south bring disease with them, and therefore should be denied entry into the US. He claims:

The Department of Homeland Security website published a list of restrictions and prohibitions on aliens wishing to enter the United States. Among those barred are people with a 'communicable disease of public health significance.' From various media reports it appears some of those flooding our southern border have, or are suspected of having, such diseases.

Rhetoric conflating immigrants with the impending arrival of unwanted germs permeates news articles and provokes irrational fear of newcomers. News media reflects enhanced, health-based xenophobia in the current call to close the US-Mexico border to safeguard against Ebola. Despite the reassurance of health officials, such as Dr. Anthony Fauci, director of the National Institute of Allergies and Disease, who remarked that while Ebola cases exist in the US, none have been reported in Central America, newscasters, journalists, and conservative politicians continue to perpetuate the tenuous concern that an Ebola epidemic will enter the US through an undocumented immigrant.

The Daily Caller further claimed that thousands of US children caught the "deadly EV-D68 enterovirus" this fall, which "was likely propelled through America by President Barack Obama's decision to allow tens of thousands of Central Americans across the Texas border, according to a growing body of genetic and statistical evidence." The Center for Disease Control and Prevention confirms that an unusually high number of US citizens fell ill this year with the EV-D68 enterovirus, a respiratory illness, but of the many patients with the virus, only twelve have died, and the cause of their deaths have not been attributed to the virus. Furthermore, the CDC does not accuse Central American undocumented immigrants of projecting the virus onto the US population; the report summarizing the disease, risks, and precautions never mentions Central Americans or immigrants. Thus, *The Daily Caller* disseminates an unsubstantiated statement that undocumented Central Americans in the US cause a break out of the virus, instilling fear in the public, ostracizing immigrants, and broadcasting disinformation. However, through citing purported "genetic and statistical evidence," *The Daily Caller's* article masquerades as a reliable and objective source. By skewing language to imply greater scientific evidence, the paper manipulates rhetoric to gain credibility and distort reality, while compounding preexisting xenophobia.

Alarmist analogues linking undocumented immigrants with impending natural disaster further stir xenophobic disquietude in news media consumers. National news outlets apply the term “flood” to describe the border crossings with dogged consistency. For example, NBC News, Fox News, *The New York Times*, CNN, *The Los Angeles Times*, CBS News, *The Huffington Post*, *The Chicago Tribune*, *The Boston Globe*, and many more prizewinning news sources propagate a sensationalist parallel in their use of “flood” as a descriptor for the humanitarian crisis, thereby metaphorically interlacing characterizations of immigration with uncontrollable waves of catastrophic waters. “Flood” dehumanizes the individual experiences and circumstances for each immigrant, imposes an assumed destructive nature on a vast population of people, and associates immigration with a negative image, inculcating readers with a reinforced bias.

Journalists further bolster the visual corollary of immigration as natural disaster with echoing metaphors and magnifying descriptors such as “flowing across” (*The Washington Post*), “engaged in a calamity” (*The Washington Post*), “surging across” (*The New York Times*), and “an unmanageable torrent” (*The Houston Chronicle*). When electing verbs such as “flowing” and “surging” that connote strong, immediate movements as adjectival expansions of the term “flood,” journalists develop inflated layers of alarm and immediacy to the potential destruction. “Calamity” confirms the threat of the “flood’s” devastation, and the imagery of “an unmanageable torrent,” a promulgation of mayhem and ruination, exemplifies vitriolic hyperbole that departs cohesively from the claim of objectivity. *The Los Angeles Times* similarly describes “a seemingly endless surge” of immigrants, aggravating fears of a ceaseless disaster. CBS News chides “Central Americans who are deluging the southern border with tens of thousands of their children.” Here, “deluging” denotes both catastrophic flooding of US lands and purposeful intent; the author reprimands perceived acts of deliberate devastation by Central American parents who inundate the US with their children.

The Houston Chronicle uses the verb “disgorge” to describe immigrants disembarking from a bus. A term often used to describe river overflows and oil spills, synonyms of “disgorge” include belch, spit, expel, vomit, and spew, and the connotations imply rapid expulsion of unwanted contents. Yet rather than insert a commonplace descriptor for “getting off the bus,” such as disembark, exit, alight, walk off, descend, or leave, the journalist decisively wrangled the undertone of the sentence by integrating an association between immigrants and vomit and floods. In a subsequent sentence, the author asserts that “the steep influx of children and families in particular has

caused turmoil,” sustaining the metaphoric conflation of Central American immigration as a turbulent, cataclysmic flood.

News media also distorts depictions of undocumented immigrants by highlighting an nonexistent suddenness of the situation. As illustrated by Roberto Suro, “The surges in coverage have conditioned the public and policymakers to think of immigration as a sudden event, often tinged with the air of crisis.” Suro analyzes the rises and dips in media attention to immigration, and postulates that spikes in coverage correlate with a heightened perception of a magnified issue. However, undocumented immigration occurs even when news outlets focus reporting elsewhere; thus, Suro contends that increases in immigration journalism inaccurately constructs public understanding of an immediate, isolated issue.

When discussing the “current crisis” (*The Washington Post*), reporters often omit the contextual backdrop, thereby failing to ground contemporary coverage in the historical palimpsest of social, political, and economic exigencies that continue to shape the current manifestations of Central American immigration issues. Between May and July of 2014, *The New York Times* delineated a “sudden mass,” an “influx,” and a “surge” of undocumented immigrant youths crossing the border in three articles, without acknowledging the historical framework which suggests that Central American immigration has not occurred suddenly, but rather continues as a trend ignited decades ago. By forgoing historical repercussions and reporting on immigration as an abrupt, unforeseen crisis, journalists fail to recount veritable information to their readers and demarcate Central American immigration as a precipitous, accelerating threat.

Perhaps the most efficacious appeal to latent xenophobia in US media consumers manifests in news articulations of imminent social disrupt upon the admittance of undocumented Central Americans to US society. The representations of immigrants’ social threat occur in two overarching tropes: devastation to physical and figurative social spaces, and drain on finite economic resources. In an article titled “In Texas’ Rio Grande Valley, A Seemingly Endless Surge of Immigrants” from June 13, 2014, *The Los Angeles Times* exposes the media’s preoccupation with the perceived social menace of immigration. Authors Molly Hennessy-Fiske and Cindy Carcamo illustrate undocumented immigrants crossing through the Rio Grande Valley, spoiling the peace of a riverside park, and disturbing US families enjoying picnics and ballgames. They report, “Anzalduas Park, a 96-acre expanse of close-cropped fields and woodland that sits on the southern bend of the river, has turned from an idyllic family recreation area into a high-traffic zone for

illegal migration.” In this description, Hennessy-Fiske and Carcamo juxtapose two antiquated, yet embedded traditions—the dream of bucolic, family-oriented America contrasted with the stereotype of the infiltrating southern neighbor. The authors surreptitiously provoke readers to contemplate the potential for US national values, such as the unified family and halcyonian pastoral spaces, to persist while “illegal migration” interrupts social settings.

These journalists further underscore the assumed disruptive nature of undocumented immigration in an account of a pregnant immigrant giving birth in the park: “Not long ago, a Honduran woman barely made it across the river before giving birth among the park’s red and blue picnic tables and signs warning ‘Children at Play.’” In selecting details connoting family values—such as the colorful picnic tables arranged and painted for family gatherings and the signs protecting US children—Hennessy-Fiske and Carcamo direct the emotion of their article to vilify the Honduran woman as an invader who engages in obscene activity in family settings. Rather than concentrate on the details of a woman who traveled thousands of miles from home while carrying a baby and gives birth without physicians’ aid, medical care, or privacy while alone in a strange country, the authors demonize her as a representative face for the Central American immigrants who threaten US families by going into labor while “children [are] at play.”

Fox News reinforces the imagery of immigration as social disruption with another allegory: “Imagine you’re about to sit down for supper when suddenly 760 folks show up on your front porch wanting fried catfish and hushpuppies.” This framing asserts that immigrants again threaten the viability of US family life, privacy, and resources. By interweaving allusions to invading private homes, demanding food, and interrupting a family dinner, the journalist constructs another correlation between the disparagement of family values and immigration by forging a tie between immigration and invasion, threat to property, and thinning of resources.

Fox News also inflates public concern for economic ramifications spurred by undocumented immigration. In an article titled, “Crisis in the Classroom: Surge in Illegal Immigrant Kids Poses Challenge for Schools,” reporters emphasize economic burdens for public school systems, claiming that immigration’s imposition of “additional strain on the resources” will prove to be a “major challenge for school administrators across the country.” Disregarding their adherence to a persistent opposition to tax increases that would serve to redistribute funds and assist struggling public school systems, Fox News shrewdly professes anxiety for the consequences of undocumented

immigration on public welfare in a strategic ploy to garner widespread opposition to immigration. Depicted as freeloaders and burdens to taxpayers, the article denigrates undocumented immigrants by presenting them as heretics of the “American dream”—of success achieved through steadfast determination and diligence. Their tactic molds undocumented immigrants into leeches sucking the US economy for undeserved benefits and into a population threatening the persistence of US “values” such as hard work and belief in the meritocracy.

The representation of undocumented immigrants as entitled economic parasites reverberates throughout news media. *The New York Times* reports “Child welfare had been outstripped by sudden increase [in immigrant children],” *The Independent Sentinel* cautions “Resources will be poured into illegal children instead of citizens,” and *The Chicago Tribune*, echoing the sentiments of Fox News, affirms that districts will be “stretching funds and setting off improvisation at public schools.” *The Houston Chronicle* asserts that immigration has “caused major overcrowding at Border Patrol stations severely overtaxing an agency and facilities.” Their article titled, “The Effect of Illegal Immigration on the Service Industry” also emphasizes immigration’s threat to job security for US citizens: “Given the increase in the supply of labor, service industry jobs are scarcer than they otherwise would be.” Finally, *The Washington Times* describes perceived consequences for Black Americans, urging readers to “focus on unemployment to get an idea of how African Americans and other historically disadvantaged groups are adversely affected by high levels of immigration.” By framing the angle of the article to foreground potential impediments to US citizens, rather than underscoring the pressing crisis confronting immigrants, journalistic rhetoric reinforces unilateral deliberation.

As exemplified by the cited studies and articles, many scholars and journalists have acknowledged and investigated the extent and ramifications of predetermined, perverted representations of immigration in the media. Despite the endurance of unsophisticated discourse in the news, the publication of their findings has dilatorily catalyzed a reevaluation of the consequences of euphemistic connotations. The Associated Press, the award-winning independent news-gathering organization that feeds stories to most major American news sources, publicly removed both “illegal immigrant” and “illegal” when used as a descriptor for a human from their style book on April 2, 2013. In a political and literary stance against defining a person based on a solitary behavior, the AP founded a precedent that has been gradually followed by news outlets such as *Vox*, National Public Radio, Univision, *USA*

Today, *Politico*, *Buzzfeed*, and University of California Los Angeles' student newspaper, *The Daily Bruin*.

Two weeks after the AP stylebook update, *The New York Times* released a statement intimating that while the corporation encourages “reporters and editors to consider alternatives [to “illegal”] when appropriate to explain the specific circumstances of the person in question, or to focus on actions,” the newspaper would not ban the usage of “illegal immigrant.” A public editor of *The New York Times*, Margaret Sullivan, argues for the reporters’ right to use “illegal” in an opinion piece published in 2012: “It is clear and accurate; it gets its job done in two words that are easily understood.” She refutes any “implication that those described that way necessarily have committed a crime,” thereby denying the potential for dehumanizing connotations of identities summarized by criminality.

Multidimensional perspectives have begun rippling through immigration coverage and complicating rhetoric in *The Chicago Tribune* as well. In an article titled, “When Children Cross Over the Border,” reporter Steve Chapman provides a human angle, investigating the perspectives of the newcomers, rather than simply potential impact on the US. He chastises news sources that inflate xenophobia and fear of health and safety threats on unfounded evidence and berates the bias in immigration discourse in a poignant plea to both journalists and the public: “The surge of kids is a logistical and humanitarian challenge but not a dangerous wave of pestilential predators and vermin. In pondering immigration policy, it's sometimes useful to keep in mind that we are, after all, talking about human beings.” Although reporters like Chapman complicate the homogeneity in immigration coverage, *The Chicago Tribune* maintains xenophobic undertones, as evidenced by the headlines such as “US Classrooms prepare for flood as migrants become pupils” and discussions of the “porous border,” taxpayer subsidies for undocumented immigrants, and immigrants’ potential to spread disease.

Other news outlets have similarly expressed hope that the insular viewpoints covering immigration will acknowledge and appreciate nuances in the conversation. CNN reported on bias in immigration rhetoric, exposing the danger of a Fox News article with a contextual framework constructed from opinions of health experts who overturn the article’s assertion that Ebola could spread in the US from Central American immigrants. CNN quotes Jeh Johnson, the Secretary of Homeland Security, who “warned [media outlets] against creating fear and anxiety in the public by passing on speculation and rumor.” Their article represents the tip of a latent, emergent body of

gradation in the one-sided perspective concomitant with immigration coverage in the news.

Many news analysts also reiterate the ramifications of caustic insinuations in media coverage on immigration. Victoria Esses, a professor of Psychology at University of Western Ontario, conducts research on the undertones coloring immigration reporting in Canada. Though her findings indicate a xenophobic, dehumanizing sensationalism, she remains hopeful that with more research, promulgation of the results, and widespread education, positive change will occur. In an interview with *Wired UK*, she says, "I believe that this is a problem that can be reversed. A major goal of this research is to determine how we can present a more impartial, fact-based view of immigrants and refugees, and counteract the negative messages that tend to be disseminated." She articulates a sentiment shared by many news critics: increasing illumination of the issue will precipitate a transition in the timbre of immigration dialogues.

The conclusive evidence derived from past studies and synthesized with contemporary analyses demonstrates a historical predilection for biased diction in news coverage of Central American immigration in the US. Myriad examples of metaphoric language that effuses adverse connotations percolate "objective" reporting of immigrants on the US-Mexico border. Incisive euphemisms in the news engender associations between immigrants and a slew of encroaching, nefarious menaces - from drug violence and terrorism to floods and plagues. Such associations aggravate preexisting xenophobia, heighten domestic anxieties, forgo rationality and objectivity, foster monolithic dialogue, erode informed policymaking, and inspire nationalistic racism. News analysts, professors, and journalists have begun to deconstruct vernacular rhetoric, inciting the development of progressive variations in immigration discourse. As news consumers, we also have an obligation to respond actively to racist imagery in the media. Through collective multi-fronted resistance, we can dismantle the tradition of interweaving reporting on Central American immigration with predatory, dehumanizing metaphors, overturn predetermined negative discourse, and facilitate informed, productive, and proactive conversation.

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BINGE DRINKING: SUBTYPES AND ASSOCIATIONS IN YOUNG ADULTS

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Abstract

Binge drinking has been common practice and a rite of passage for many young adults in the college population. The practice of binge drinking has continued even as bingeing is associated with several cognitive deficits. One unanswered question still remains: namely, at what levels of binge drinking do these cognitive deficits associate? To investigate this question, three different groups of binge drinkers (low, moderate, and heavy) were compared on two measures of cognition: intelligence (IQ) and executive working memory (EWM) capacity. The binge groups were also compared to non-bingers and abstainers to further investigate how they differed in EWM capacity and IQ. Lastly, correlations were made between binge density and the cognitive measures. Based on the previous literature, the following hypotheses were made: (1) low, moderate, and heavy binge clusters would emerge from the cluster analyses, (2) the heavy and moderate cluster would exhibit decreased performance in the two cognitive domains in comparison to the low cluster, (3) the binge density measure would be negatively correlated with the cognitive measures, and (4) the low, moderate, and heavy clusters would exhibit lower EWM capacity and IQ scores in comparison with non-bingers and abstainers. Some of the obtained data support that different binge subtypes are indeed differentially associated with both EWM capacity and IQ in young adults who binge. However, the mixed findings illustrate that additional longitudinal research is merited.

Introduction

The use of alcohol is common practice among young adults. This is often manifested in the form of binge drinking, with the 18-30 age population exhibiting the highest rates of alcohol bingeing (Kessler *et al.*, 2005). A binge drinking episode is defined by the NIAAA as 4 drinks for women (5 for men) in two hours (NIAAA; Wechsler & Nelson, 2008). Due to its ubiquitous

(Wechsler *et al.*, 1995) and seemingly innocuous nature, binge drinking is habitually viewed as harmless among young adults. Psychological and neurological study has suggested more malevolent consequences: namely, decreased inhibition in decision making (Fridberg, Gerst, & Finn, 2013; Mazas *et al.*, 2000), increased risk of self-harm (Klonsky, 2011), decreased academic performance (Singleton & Wolfson, 2009), among others. Public health consequences such as an increased rate of incidence of car accidents (Norman & Conner, 2006), sexual assault (Abbey, 2002), and property damage (Wechsler *et al.*, 1995) are also commonly associated with binge drinking. Most importantly, as binge drinking has led to 88,000 deaths from 2006-2010 and about 1 in 10 deaths in working age adults, its continued study is essential (Stahre *et al.*, 2014).

Several binge drinking studies have previously found associations between bingeing and cognitive performance. Parada *et al.* (2011) studied a cohort of Spanish individuals who bingeed and their performance on declarative memory tasks. It was found that the individuals who bingeed remembered fewer words on this memory task as well as performed worse in comparison to a control group on a Logical Memory Task (Parada *et al.*, 2011). This study utilized the Alcohol Use Disorders Identification Task (AUDIT; WHO, 1982) and the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA; Bucholz *et al.*, 1994) to classify students. The researchers suggested further study was necessary to further substantiate and develop these findings, especially with a sample of young, North American adults. The second study, Sanhueza *et al.* (2011), used the California Learning Verbal Test (CLVT) as well as the Tower of Hanoi task to examine cognition in relation to binge drinking. These data illustrate that the binge drinking group exhibited lower performance in terms of immediate recall as well as delayed recall (Sanhueza *et al.*, 2011). The third study, Thoma *et al.* (2011), tested a cognitive battery of tests on 48 alcohol using adolescents. It was found that these subjects exhibited an inverse relationship between the intensity of drinking and the reduction of executive functioning abilities and attention (Thoma *et al.*, 2011). One finding from the work of Thoma *et al.* (2011) that will be sought to be confirmed in these data is a negative correlation between alcohol use and tests of the neuropsychological battery. This study will seek to build on the work of these three studies by comparing binge drinking subtypes with cognitive performance.

One method to gain a greater understanding of the problems individuals who binge experience could be to consider different bingeing subtypes. Often

within the broad umbrella of certain clinical populations, different subtypes or groupings of individuals are present. Though several studies have considered typologies of alcohol abuse (Cable & Sacker, 2008; Morey *et al.*, 1984), few have considered solely binge subtypes in young adults. A longitudinal study by Goudriaan *et al.* (2007) suggests several binge drinking trajectories over time: low, stable moderate, increasing, and stable high. Other studies have confirmed a similar finding of generally three main groups (i.e., low, moderate, and heavy) (Tucker *et al.*, 2003; Muthén & Shedden, 1999). Formation of groups based upon the natural trends in these data may provide insights as to typical young adult binge drinking and the potential differences in cognitive performance among these groups.

Individuals who binge, individuals who drink, but do not binge (non-bingers), and abstainers could elicit differences when considering their respective cognitive performance. Previous research has considered differences in terms of alcohol related problems among individuals who binge, non-bingers, and abstainers, but there is a paucity of research in terms of cognitive comparisons among these groups (Wechsler, Lee, Kuo, & Lee, 2000). In individuals who binge specifically, two cognitive areas have been observed to be associated with binge drinking: executive working memory capacity (EWM capacity) and IQ.

In several studies considering the cognitive effects of alcohol use, researchers have used both EWM capacity (Finn *et al.*, 2009; Finn & Hall, 2004; Squeglia, Schweinsburg, Pulido, & Tapert, 2011) and IQ assessments (Finn & Hall, 2004; Moss *et al.*, 1994; Tapert *et al.*, 2004; Sanhueza *et al.*, 2011) as measures of neuropsychological performance. Baddeley's (2002) definition of working memory is as follows: a system that allows humans to actively interpret their environments, engage in attention shifting, and solve problems in face of other competing information. Research supports the conclusion that executive functioning is highly contingent on certain levels of EWM capacity (Finn, 2002). Thus, based on these previous findings, IQ is used as a broad measure of general intelligence, whereas EWM capacity serves as a much more specific measure of cognition in this study.

Based on this research, this study seeks to investigate several questions. Through the use of both Ward's method and a k-means cluster analysis, clusters of individuals who binge will be formed in two separate samples. These clusters will then be compared to the abstainer group and non-binger group on measures of cognition: IQ and EWM capacity. Finally, correlations between the cognitive measures and binge density will also be made. This study therefore makes four predictions: (1) from the cluster analysis, three

groups will emerge: low, moderate, and heavy clusters, (2) the moderate and heavy clusters will exhibit decreased performance in the two cognitive domains in comparison to the low cluster, (3) the binge density measure will be negatively correlated with the cognitive measures, and (4) low, moderate, and heavy clusters will exhibit lower cognitive performance in comparison to the non-bingers and abstainers.

Methods

PARTICIPANTS

Recruitment. Data for this study was taken from two previous studies conducted from 2002-2004 (Sample 1) and 2010-2012 (Sample 2). Both of these samples utilized similar methods in recruiting participants. These studies sought individuals from the community who demonstrated a variety of levels in externalizing behaviors and disinhibited personality traits. Participants were recruited from the Bloomington, IN community and Indiana University using Widom's method (1977). Recruitment flyers were placed around campus and around the community. Flyers contained phrases such as the following: "Are you a heavy drinker?", "Are you a more reserved and introverted type of person?", "WANTED: Subjects interested in psychological research", "Are you impulsive?", "WANTED: Males/Females, 18-25 yrs old, who only drink modest amounts of alcohol and who do not take drugs.", "Do you think you have a drinking problem?", "Are you adventurous (daring, etc)?"

Telephone screen. Participants called the lab to conduct a ten minute phone screen to see if they met study selection criteria. The phone screen first consisted of the screener giving a short description of the study. The participant was then asked questions that addressed several different conditions of externalizing psychopathology: alcohol and drug abuse, childhood conduct disorder, antisocial personality disorder, and attention-deficit hyperactivity disorder. If the participant met the study criteria, he or she would be given more information regarding the tasks that would be completed during the study. They were instructed that the study would take about three sessions, reaching a total of about nine hours, and would be required to take a breath-alcohol test. In addition, participants were instructed to refrain from using alcohol and recreational drugs for 12 hours prior to their session, sleep 6 hours the night before, and eat something

within 3 hours of testing. Participants were paid for their participation in the studies.

Exclusion criteria. Exclusion criteria included being not being 18-30 years of age, inadequate English proficiency (i.e., ability to read and speak effectively and efficiently), not having obtained a 6th grade education or higher, never having consumed alcohol, a history of head trauma or cognitive impairment, taking prescriptions that severely affect behavior (e.g., antipsychotics), or a history of non-externalizing, psychological disorder. At the start of each session, the participant was asked about their drug and alcohol use over the past 12 hours and given a breath alcohol test using an Alco Sensor IV (Intoximeters Inc., St. Louis, MO). If the participant demonstrated any blood-alcohol concentration over .000%, any drug use over the past 12 hours, feeling hung over or sleepy, or unable to answer the screening questions, they were unable to participate that day and rescheduled.

SAMPLE CHARACTERISTICS

Sample 1. 468 participants (256 males and 212 females) were recruited in Sample 1. **Table 1** lists the sample demographics and binge drinking patterns. Additionally, the Semi-Structured Assessment for the Genetics of Alcoholism (SSAGA; Bucholz *et al.*, 1994) was used to gain an understanding of other problems that are present in these individuals. The number of participants with diagnoses of alcohol, drug, and marijuana dependence are also listed in **Table 1**. 29 abstainers were excluded due to past diagnoses of alcohol dependence.

Sample 2. 823 participants (447 males and 376 females) were recruited in Sample 2. **Table 1** details sample demographics and binge drinking patterns. In addition, as in Sample 1, the Semi Structured Assessment for the Genetics of Alcoholism was used to depict and identify other problems observed in these participants (see **Table 1**). The number of participants with alcohol, drug, and marijuana dependence are also listed in **Table 1**. 39 abstainers were excluded because of past alcohol dependence diagnoses.

MEASURES

Binge drinking. Binge frequency and binge density were used to measure binge drinking. Binge frequency indicated the average number of days per week an individual would typically binge. Contrastingly, binge density indicated the average number of drinks per binge occasion over the past

Category	Sample 1	Sample 2
Age (years)	21.91±2.835	21.20±2.413
Years education	13.74±2.079	14.090±1.705
Binge frequency, past 6 months	2.180±2.052	2.056±1.707
Binge density, past 6 months	8.459±3.945	8.384±3.727
Maximum # of drinks ever consumed	21.70±17.980	19.864±17.049
Maximum # of drinks consumed in past 6 months	13.20±12.643	13.479±8.908
# of individuals with alcohol dependence diagnosis	255	317
# of individuals with marijuana dependence diagnosis	167	253
# of individuals with other drug dependence diagnosis	102	114

Table 1. Descriptive statistics of Sample 1 and Sample 2.

several months (i.e., 6 months in Sample 1, 3 months in Sample 2). The binge density variable was calculated simply by dividing the total drinks consumed across all binge occasions by the number of binge episodes per week. These variables were calculated using data from an alcohol use history measure which measured the typical drinking patterns over the past several months on each day of the week (again, past 6 months in Sample 1, past 3 months in Sample 2). Following the logic of Stahre *et al.* (2006), it is thought this form of the frequency-quantity measure would provide for an accurate measure of an individual's binge drinking. Both of these factors are also important as frequency is thought to be heavily influenced by social factors, whereas quantity is influenced by personal control (Vogel-Sprott, 1974).

Executive working memory capacity (EWM). EWM capacity was assessed using two separate dual span measures: a modified version of the Auditory Consonant Trigram task (ACT; Brown, 1958) and the Operation Word Span Task (OWS; Conway & Engle, 1994). Numerous studies are indicative of the reliability and validity of these measures in measuring EWM capacity (Engle *et al.*, 1999; Unsworth & Engle, 2008).

The ACT consists of being given a nonsense sequence of letters. The participant was then instructed to count backwards by multiples of 3 for

either 18 or 36 seconds (undisclosed to the participant). The participant recalled the original given sequence of letters following this delay. Performance was measured by the correct number of letters recalled. The working memory load on this version of the ACT was higher than the original task (Brown, 1958) as a previous study illustrated that a greater working memory load gives greater group differences (Finn *et al.*, 2009).

On the OWS, the participant is again instructed to focus upon past information in the face of competing information. Here, the subject is given a packet of flashcards. Each flashcard consists of a mathematical equation and a word. The subject is instructed to say whether or not the equation is a valid mathematical expression and to remember the word (e.g., $22/2 + 1 = 15$? Fish). A series of these flashcards were completed (trials range from 2-6 cards). After each series participants were instructed to recall the words in the order they were presented. Performance was measured by the correct number of words recalled.

IQ. For Sample 1, the Shipley Institute of Living Scale (Zachary, 1986) was used to assess IQ. The Shipley measures IQ through tests on both vocabulary and abstract reasoning and has been shown to be an accurate approximation of IQ (Goodman, Streiner, & Woodward, 1974). In Sample 2, the Wechsler Abbreviated Scale of Intelligence (WASI) was used. The WASI has four sections testing different components of a participant's cognition: vocabulary, block design, similarities, and matrix reasoning. The WASI has been shown to have excellent reliability in predicting IQ ($r_s = .97$) (Wechsler, 1999) and has been frequently used to quickly predict an individual's IQ (Moss *et al.*, 1994; Sanhueza *et al.*, 2011).

DATA ANALYSIS

Group formation. The participants were clustered based on the binge density measure. Hierarchical clustering using Ward's method and squared Euclidean distance as the distance measure was first completed to analyze how many different binge clusters emerged in the sample (i.e., through use of the dendrogram and agglomeration schedule). Subsequently, a k means cluster analysis was then completed for group formation based upon the binge density measure. K means analysis was completed as it has been demonstrated to be a more rigorous method of assigning cases to clusters than agglomerative methodologies such as Ward's method (Aldenderfer & Blashfield, 1984). In addition to these three clusters, an abstainer group and

a non-binger group were also formed separately of the cluster analyses for comparative purposes on the cognitive tasks.

Analysis of variance and group comparisons. ANOVA's with the factors of group (i.e., abstainer, non-binger, low, moderate, and heavy), sex, working memory, and IQ were all conducted. Post hoc analyses using Tukey's HSD and Cohen's *d* to examine effect size were also used in making comparisons among the groups.

In summary, the same analyses were run on each of the two samples. Analyses were run separately as Sample 1 and Sample 2 because the two samples differed slightly on a number of measures as previously mentioned. Three participants were excluded from Sample 1 because their binge drinking values were extreme outliers, more than 3 standard deviations above the mean. Five outlier participants also were excluded from Sample 2 using the same criteria.

Results

SAMPLE 1

Ward's method indicated that three clusters fit these data best. This solution was reached in consideration of the dendrogram of cluster distance and the agglomeration schedule, which indicated an increase in error variance at the 216th step relative to the previous steps. The *k* means cluster analysis was thereafter run to assign participants to a three cluster solution. From examination of the cluster solutions emerged three types of binge drinkers: low, moderate, and heavy individuals who binge. Sample 1 contained 181 low individuals who binge, 103 moderate individuals who binge, and 31 heavy individuals who binge (**Table 2**).

Group differences. The obtained data on the cognitive tasks is summarized in Table 3. The ANOVA indicated a significant main effect of drinker group on the OWS, $F(4,431) = 3.847, p < .005$ and the Shipley, $F(4,437) = 7.180, p < .005$. There were not any significant main effects on the ACT, $F(4,429) = 2.137$. Post hoc tests indicated that the heavy individuals who binge had significantly lower scores on the OWS compared to both the non-bingers ($d_1 = -.61, p < .05$) and the low individuals who binge ($d_2 = -.62, p < .05$). Comparisons on the Shipley showed that heavy individuals who binge scored significantly less than non-bingers ($d_1 = -.77, p < .005$), low individuals who binge ($d_2 = -.68, p < .005$), and moderate individuals who binge ($d_3 = -.56, p <$

.005). Post-hoc comparisons are summarized in **Table 4**. There was not a significant main effect of sex, nor were there any significant Cluster by Sex interactions. Finally, negative correlations between binge density and the three cognitive measures were significant (-OWS: $-.242, p < .01$; ACT: $-.212, p < .05$; Shipley: $-.321, p < .01$).

SAMPLE 2

Results of the agglomerative cluster analysis of participants' binge density using Ward's method gave that three clusters fit these data best. This solution was reached in consideration of the dendrogram of cluster distance and the agglomeration schedule, which indicated an increase in error variance at the 454th step relative to the previous steps. The k means cluster analysis was thus run to assign participants to a three cluster solution. From examination of the cluster solutions emerged three subtypes of individuals who binge: low ($n = 366$), moderate ($n = 192$), and heavy ($n = 18$) (**Table 2**).

Group differences. **Table 3** summarizes the cognitive performance across all groups. ANOVA revealed a significant main effect of group on the WASI, $F(4, 800) = 4.156, p < .005$. There was not a significant main effect of drinker group on OWS, $F(4, 813) = 2.260, p = .061$, or ACT, $F(4, 813) = 1.675, p = .154$. Post-hoc comparisons indicated on the WASI that low individuals who binge scored significantly less than abstainers ($d1 = -.29, p < .05$) and non-bingers ($d2 = -.33, p < .05$). A summary of the post-hoc analyses is in **Table 4**. There was not a significant main effect of sex, nor were there any significant Group by Sex interactions. Finally, there were not any significant correlations between the binge density and the cognitive measures (OWS: $-.015$; ACT: $-.033$; WASI: $-.014$).

Discussion

Binge drinking is associated with several cognitive deficits. Numerous studies have shown effects in populations with individuals suffering clinical diagnoses of alcohol dependence, but few have considered these associations in populations of adults who binge ages 18-30. The studies which have investigated these domains have found that individuals who binge remember fewer words on declarative memory tasks and perform worse on a Logical Memory Task (Parada *et al.*, 2011), exhibit decreases in immediate and delayed recall abilities in comparison to control groups (Sanhueza *et al.*, 2011), and show a positive correlation between the intensity of drinking and dysfunction in executive functioning (Thoma *et al.*, 2011).

Sample 1	Cluster A Low (n=181)	Cluster B Moderate (n=103)	Cluster C Heavy (n=31)
Binge density	5.815±1.926	10.433±1.355	17.331±3.114
Binge frequency	2.558±1.340	4.049±1.611	4.516±1.503
Sample 2	Cluster A Low (n=366)	Cluster B Moderate (n=192)	Cluster C Heavy (n=18)
Binge density	6.172±1.396	11.431±1.973	20.839±3.154
Binge frequency	2.631±1.134	3.422±1.120	4.000±1.879

Table 2. Cluster analysis results from Sample 1 and Sample 2.

Sample 1 Measure	Cluster A (Low) (n=181)		Cluster B (Moderate) (n=103)		Cluster C (Heavy) (n=31)		(Abstainers) (n=36)		(Non-Bingers) (n=117)		<i>F</i> (4,429)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
	OWS	42.54	10.988	39.21	10.958	34.72	14.749	40.28	13.333	43.04	
ACT	28.98	10.534	26.94	11.133	24.54	11.523	27.81	14.036	30.43	11.423	2.137 ^{n.s.}
IQ	106.27	8.491	104.61	8.359	97.04	17.130	103.30	13.589	107.33	8.244	7.180**

Sample 2 Measure	Cluster A (Low) (n=366)		Cluster B (Moderate) (n=192)		Cluster C (Heavy) (n=18)		(Abstainers) (n=115)		(Non-Bingers) (n=132)		<i>F</i> (4,800)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
	OWS	39.07	11.095	40.91	10.095	36.89	11.926	41.16	12.617	41.58	
ACT	30.24	10.049	31.51	9.376	27.39	10.416	28.87	10.410	30.58	10.657	1.675 ^{n.s.}
IQ	110.64	9.897	111.05	8.976	108.94	8.011	113.96	12.530	113.97	10.107	4.156**

Table 3. Cognitive performance in Sample 1 and Sample 2.

Note: * = $p < .05$

** = $p < .005$

n.s. = not significant

Degrees of freedom differed slightly from task to task due to missing data in each sample. For example, Sample 1, OWS, $F(4,431)$, ACT $F(4,429)$, Shipley $F(4,437)$; Sample 2, OWS $F(4,812)$, ACT $F(4,812)$, WASI $F(4,800)$

Sample 1		Tukey's HSD	HB vs. NB	HB vs. LB	HB vs. MB
<i>F</i> (4,429)			<i>d</i> ₁	<i>d</i> ₂	<i>d</i> ₃
OWS	3.847**	HB<NB, LB	-.61	-.60	—
ACT	2.137 ^{n.s.}	—	—	—	—
IQ	7.180**	HB<NB, LB, MB	-.77	-.68	-.56
Sample 2		Tukey's HSD	HB vs. NB	HB vs. LB	
<i>F</i> (4,800)			<i>d</i> ₁	<i>d</i> ₂	
OWS	2.260 ^{n.s.}	HB<NB, LB	-.61	-.60	—
ACT	1.675 ^{n.s.}	—	—	—	—
IQ	7.180**	HB<NB, LB, MB	-.77	-.68	-.56

Table 4. Post-hoc comparisons and effect sizes among groups.

Note: ** = $p < .005$

n.s. = not significant

Abstainer (AB), non-bingers (NB), low individuals who binge (LB), moderate individuals who binge (MB), and heavy individuals who binge (HB).

To complement and further develop the work these researchers have already completed, this study sought to investigate how an individual's binge drinking in the recent past was associated with their cognitive performance. Four hypotheses concerning these associations were originally made: (1) low, moderate, and heavy bingeing subtypes will emerge from cluster analyses in both Sample 1 and Sample 2, (2) the moderate and heavy bingeing clusters will exhibit decreased performance on the cognitive measures in comparison to the low cluster, (3) the binge density measure will be negatively correlated with the cognitive measures, and the (4) low, moderate, and heavy bingeing clusters will exhibit lower cognitive performance in comparison to the non-bingeing and abstainer groups.

To summarize, the analyses brought conflicting results to the proposed hypotheses. The use of Ward's method followed by a k-means analysis did indeed yield the three predicted clusters in each clustering method. The Sample 1 analyses gave significant main effects on the OWS and the Shipley tasks, with no significant findings on the ACT. Contrastingly, Sample 2's analyses found significant main effects solely on the WASI. Sample 1's post-

hoc comparisons illustrated that individuals who binge heavily scored significantly lower than all groups besides abstainers (Shipley) and that individuals who binge heavily scored significantly lower than individuals who binge at low levels and abstainers (OWS). Thus, Hypothesis 2 was partly supported in Sample 1. Hypothesis 3, the prediction of a significant negative correlation between the binge density measure and cognitive performance, was supported in Sample 1, but not supported in Sample 2. Finally, Hypothesis 4 was significant in Sample 1 as individuals who binge heavily significantly differed from non-bingers, individuals who binge at low levels, and individuals who binge at moderate levels (Shipley), and by individuals who binge heavily also significantly differing from non-bingers and individuals who binge at low levels (OWS). Hypothesis 4 was also supported in Sample 2 as individuals who binge at low levels significantly differed from non-bingers and abstainers (WASI).

As predicted, Hypothesis 1 was supported as three clusters emerged from each sample. This confirms the findings of previous studies indicating three overall binge drinking groups (Goudriaan *et al.*, 2007; Tucker *et al.*, 2003; Muthén & Shedden, 1999). Furthermore, each respective cluster was observed to have similar binge frequencies and densities as well as similar ratios of participants in each cluster (e.g., both low clusters gave similar binge frequencies and densities; similar proportions of the sample in each cluster). Though these clustering methods were a useful tool in classifying these data and efforts were made to ensure for more valid clustering (i.e., the use of the two separate methods), it is difficult to determine their external validity. Continued research using similar clustering methodologies in samples with a wider demographic and longer term measures of binge drinking would be of merit.

One of the primary aims of this study was to consider the association of cognitive deficits with young adult binge drinking behavior. Hypothesis 2, addressing if the moderate and heavy clusters significantly differed from the low cluster, was supported in Sample 1, but not in Sample 2. There are several possible conclusions that could be reached from this result. One possible conclusion is that Sample 1's significant findings are indicative of binge drinking's effects on cognitive ability. As previously mentioned, extensive research exists considering the effects of chronic alcohol use upon cognition in numerous alcohol induced disorders such as Korsakoff's syndrome and Wernicke encephalopathy (Marshall, Guerrini, & Thomson, 2009). Hermens *et al.* (2013) noted, however, there has been a deficit on the

research concerning the early phases of neurological damage and cognitive deficits, especially in young adults.

The results in this study suggest recent binge levels associate with the cognitive deficits at the heavier end of the spectrum of bingeing. Something to consider, however, is that this level of bingeing may not be the early stage Hermens *et al.* (2013) specifies: the level of bingeing present in this heavy subtype (**Table 2**) would likely go beyond casual “social bingeing” and manifest more so a DSM V diagnosis of dependence. Contrastingly, a separate conclusion could be drawn based on Sample 2’s lack of significance: namely, decreases in cognitive ability in relation to young adult binge drinking are not evident at these levels and in this age group. The discrepancy between these two conclusions may be attributable to differences in the sampled populations.

While these samples have similar binge drinking patterns, they may differ in how long they had been bingeing at these levels. While the length of time the subjects had been bingeing for is not available, it is very possible that Sample 1 had individuals who had been bingers for longer periods of time (i.e., had started bingeing earlier in adolescence), which could have impacted their cognitive performance and led to the significant findings. This result, however, is indicative of why longitudinal research into individuals who binge over time would be invaluable in comparison to two separate archival data samples. Despite this, the presented averages of binge densities and frequencies may prove to be a useful starting point for future studies.

Hypothesis 3 was supported as a significant negative correlation between the binge density and cognitive measures was observed in Sample 1, but not in Sample 2. The significant effect in Sample 1 supports the results of other studies of the possible deleterious effects of heavy alcohol use (Ferrett *et al.*, 2010; Squeglia *et al.*, 2009; Goudriann *et al.*, 2007; Courtney & Polich, 2009; Courtney & Polich, 2010; Parada *et al.*, 2011). Specifically, this study supported similar correlations made by Tapert *et al.* (2004) on IQ tasks. This finding is logical as alcohol use over the course of many years is commonly associated with cognitive ability, especially EWM capacity (Finn & Hall, 2004; Finn *et al.*, 2009). However, the directionality between these two variables and the variety of other factors that may moderate this relationship still requires additional research. However, the analyses in Sample 2 were not significant for Hypothesis 3. A conclusion that could be made based on this result is that the negative correlation expected between these variables would not be seen until an individual engages in higher levels of drinking over the course of a greater time span (i.e., not in this young population). In

addition, this result is again likely due to population differences (i.e., length of time an individual had been a binge drinker, different levels of cognitive performance). Regardless, the directionality between these two variables and the variety of other factors that may moderate this relationship still requires additional research.

Hypothesis 4 was designed to investigate differences between not only individuals who binge, but also among different types of drinkers as well (i.e., abstainers, non-bingers). Several noteworthy points to consider include the following: heavy individuals who binge scored significantly less than non-bingers, low individuals who binge, and moderate individuals who binge in Sample 1 on the Shipley and that low individuals who binge scored significantly lower than abstainers and non-bingers on the WASI in Sample 2. The first finding, heavy individuals who binge scoring significantly lower, supports the aforementioned research that suggests higher levels of bingeing are associated with differences in cognitive performance. The finding that low individuals who binge scored significantly lower than abstainers and non-bingers is of particular interest in the context of the research questions posed. However, the argument made regarding this finding is that while it is a statistically significant finding, it is not of clinical significance. This conclusion has been made as the difference in IQ scores between non-bingers/abstainers and low individuals who binge is about 3 points (less than half a standard deviation). In addition, Cohen's d only gives a small effect ($d = -.29$). Both of these findings suggest that though this finding is of interest in relation to the proposed questions, it is likely not of clinical significance.

Although this study elicited novel findings regarding associations between binge drinking and cognitive capacity, it comes with the caveat of several limitations. Most notably, this study used two archival data sets which were designed to analyze different questions than the ones proposed in this study. In an ideal setting, based upon the recommendations of Goudriann *et al* (2007), participants' drinking patterns would be assessed in 6 month increments and over the course of several years. This design would provide for more accurate estimates of participants' binge drinking. However, although the ideal measure of alcohol use was not used in this study, it seems that the available data does provide a useful method of considering the average college student's binge drinking.

In addition, the participants who were sought for these samples often had high rates of externalizing pathology. A recent meta-analysis (Ruiz, Pincus, & Schinka, 2008) and a separate study (Finn, Gunn, & Gerst, 2014) suggest that those who suffer from externalizing pathology (most commonly

in these two samples: antisocial personality disorder, conduct disorder, and borderline personality disorder) will typically engage in more alcohol and drug abuse, resulting in higher levels of substance use disorder diagnosis. Lastly, the obtained heavy bingeing cluster was significantly smaller than its moderate and low counterparts. This cluster was kept separate as it was seen that these individuals exhibited unique binge drinking patterns in comparison to the other two clusters.

Conclusions

As the pervasiveness of binge drinking continues across the United States in the young adult population, continued research into its effects on multiple cognitive domains remains essential. Acute, intense alcohol use greatly associates with neuropsychological performance especially in EWM capacity and IQ. As the drug of choice in both college populations as well as the general population, further longitudinal research concerning the biological and cognitive effects of binge drinking will allow young adults to make wiser decisions in their behaviors. The mixed findings observed in this study between Sample 1 and Sample 2 demonstrate the necessity of such longitudinal study, which could potentially comprehensively answer this question. In conclusion, though mixed results were obtained, some of the analyses in this study suggest that different levels of binge drinking are associated with cognitive effects in the young adult population.

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EFFECT OF *APOE* ϵ 4 VARIANT ON PROGRESSION FROM MILD COGNITIVE IMPAIRMENT TO ALZHEIMER'S DISEASE

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Abstract

Alzheimer's disease is a very prevalent and fatal disorder in older adults, and Mild Cognitive Impairment is often seen as a precursor to Alzheimer's disease. Alzheimer's disease is a form of Dementia that is characterized by loss of cognitive abilities while aging. It is ultimately fatal. Mild Cognitive Impairment is more of an intermediate stage between normal mental decline with aging and the more serious decline of dementia. The *APOE* ϵ 4 gene has been shown to be highly correlated with a greater likelihood of acquiring late-onset Alzheimer's disease. This study looked to see the effect that the *APOE* ϵ 4 gene has on the rate of brain volume loss (specifically in the hippocampus, entorhinal cortex, and cerebral cortex) in patients who transition from Mild Cognitive Impairment to Alzheimer's disease. This was done by comparing people, gathered from the Alzheimer's Disease Neuroimaging Initiative, with Mild Cognitive Impairment who test positive for the ϵ 4 allele vs. those with Mild Cognitive Impairment who test negative for the ϵ 4 allele, to see which group has a faster loss of brain volume to Alzheimer's disease. My study found that testing positive for the ϵ 4 allele led to faster neurodegeneration in both people with Mild Cognitive Impairment who converted to Alzheimer's and even those who did not convert to Alzheimer's. This study is beneficial because it could provide further insight into the potential genetic cause of Alzheimer's disease, especially if the study is replicable. It is unique from other studies of this nature because it involves a new cohort.

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Introduction

Dementia is an umbrella term used to describe a group of illnesses that occur in the aging process and are associated with the loss of cognitive abilities, including memory. The diseases that fall under the category of dementia are characterized by the fact that the loss of cognitive abilities is such that it interferes significantly with one's daily life (National Institutes of Health, 2013). Dementia is life-altering and has major effects on the patient's health, his or her family, and society as a whole.

Dementia was not always the major health problem it is today. In recent times, people are living significantly longer than they ever did in the past (Verbrugge, 1984). A lot of this is because of recent medical advancements and increased knowledge of the benefits of diet and exercise. In the past, people had the genetic code that would make them more prone to acquiring dementia later in life; however, they never acquired the disease because they died at an earlier age, likely from another illness that recent medical advancements have cured. It is important to note this because it means dementia has not been studied as much as some other diseases that have been a problem in the past. As future generations continue to live longer and longer, dementia will similarly continue to increase in prevalence (Ferri *et al.*, 2005). Therefore, it is absolutely vital that researchers look into further understanding these diseases.

Alzheimer's disease (AD) is one of the many forms of dementia and is characterized by the significant loss of cognitive abilities, primarily memory, that it makes one unable to go about one's daily life. According to the Alzheimer's Association (2014), it is estimated that 5.2 million Americans currently have AD. AD has no cure and is 100% fatal. The disease is first characterized by short-term memory loss, but progresses to confusion, language difficulties, long-term memory loss, and even mood swings. It also causes a significant and gradual loss of brain volume (Braak & Braak, 1998). Alzheimer's disease is truly horrifying for the patient and the family and friends of the patient who must now witness him or her completely regress mentally, forget the past, and basically disappear before their very eyes. An example of AD may be someone who seems to lack continuity of conversation. The patient may forget a story he just told you merely an hour before and proceed to retell the story in its entirety again. This person has experienced such a significant degree of memory loss that they can no longer function properly in society. However, it should be noted that AD does not strike

completely out of the blue; there is thought to be a prodromal stage called Mild Cognitive Impairment (MCI).

Often times, MCI is seen as a precursor or a warning sign that AD is to come (Friedrich, 1999). MCI should best be thought of as an intermediate stage between the normal, slight cognitive declines associated with healthy aging and the drastic cognitive declines of AD (Petersen, 2009). It is the moderate slope of decline that occurs before a sharp drop-off to an AD diagnosis. While MCI is a diagnosis of its own and sometimes shows with no progression to AD, the majority of patients with MCI slowly progress to AD, and for purposes of this study, it is best to think of it as a step on the path to AD. When a patient starts to exhibit symptoms of MCI, usually the patient, close family, and friends will begin to notice a decline in mental abilities, usually memory. An example of someone with MCI may be someone who loses their keys on a more frequent basis, such that it moderately, not significantly like it does in AD, interferes with daily life. This person is still able to function as a part of society. He or she can still get up, get dressed, and go to work like before. However, there is a noticeable impairment. Not everyone with MCI progresses to AD, but it means one's chances of progressing to Alzheimer's disease are significantly higher (Boyle, Wilson, Aggarwal, Tang, & Bennett, 2006). This begs the question: how are MCI and AD diagnosed?

These diseases are diagnosed often by neuropsychological tests, which are tests of cognitive abilities and basic motor skills (Khachaturian, 1985). These include things like basic memory tasks and walking tests, for example. Clinical neuropsychologists look for declines in scores from one time to another. Participants may come in with different baseline scores, as a result of having a more intellectual background, for example, and this is why future tests are needed to see if the scores decline. However, most people do not just have neuropsychological tests on file. That is why input from family members or close friends is often used to first see if a neuropsychological test should be administered. For example, a close friend may notice that the patient has been forgetting their car keys more frequently than usual and may refer him or her to a Clinical neuropsychologist for a test. More recently, brain imaging is starting to be used as a means of diagnosis (Chetelat & Baron, 2003). Scans from two different times are beneficial to see if neurodegeneration, or loss of brain volume, is taking place. The regions primarily affected, and the regions I will be focusing on in this study, are the hippocampus and entorhinal cortex (due to their roles in memory) and the cerebral cortex (due to its density of grey matter, which is where the neurons are) (Du *et al.*,

2001). Based on previous research, there appears to be a gene that may explain why greater neurodegeneration, and risk of AD, happens in some people than others.

ApoE is short for Apolipoprotein E. An apolipoprotein is a protein that binds lipids to form lipoproteins. It has a role in the central nervous system (the brain and spinal cord) to transport cholesterol to neurons via ApoE receptors (Yao, 2002). The gene that codes for ApoE is *APOE* and is mapped on chromosome 19 (Olaisen, Teisberg, & Gedde-Dahl, 1982). It has three major alleles, which is just an alternate form of the same gene (Corbo, Scacchi, 1994). A specific allele ($\epsilon 4$) of this gene (*APOE*) has been found to be strongly correlated with AD. If one has this specific allele (14% do), one's chances of eventually being diagnosed with AD are much higher than if one is without this specific allele of the *APOE* gene (Corder *et al.*, 1993). Of course, there are other factors that contribute to progression to AD: fitness, education level, degree of sustained-thinking throughout one's life, and even personality traits (The Search, 2014). All of these traits can improve one's chances of not acquiring AD or at least delay the onset of AD. However, that is solely focusing on the nurture side of things. My study, on the other hand, will be focusing solely on the potential genetic effect of a specific gene (*APOE*). There has been research already conducted on the effect of having the *APOE* $\epsilon 4$ allele on likelihood of acquiring AD, but the effect of having an *APOE* $\epsilon 4$ allele on neurodegeneration and conversion from MCI to AD as compared to people without an *APOE* $\epsilon 4$ allele (they have combinations of the two other variants ($\epsilon 2$ or $\epsilon 3$)) is significantly less-studied.

The following research questions are then posed: (1) Does being *APOE* $\epsilon 4$ positive lead to greater change in brain volume in people with MCI who either did or did not convert to AD as compared to those who are *APOE* $\epsilon 4$ negative? Prior research from Dr. Risacher of the Department of Radiology and Imaging Sciences at the Indiana University School of Medicine and other researchers would suggest that this is likely (Risacher 2009, Risacher 2010). Therefore, our hypothesis follows that *APOE* $\epsilon 4$ positive MCI patients will exhibit faster change in brain volume than the *APOE* $\epsilon 4$ negative patients regardless of conversion status and that *APOE* $\epsilon 4$ group status will be significantly correlated with conversion status, potentially in addition to (and independent from) the effect ongoing neurodegeneration of crucial brain regions.

Methods

PARTICIPANTS

This is an archival study. The participants come from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database. ADNI was launched in 2003 by the National Institute on Aging (NIA), the National Institute of Biomedical Imaging and Bioengineering (NIBIB), the Food and Drug Administration (FDA), private pharmaceutical companies and non-profit organizations, as a \$60 million, 5-year public-private partnership. The primary goal of ADNI has been to test whether serial magnetic resonance imaging (MRI), positron emission tomography (PET), other biological markers, and clinical and neuropsychological assessment can be combined to measure the progression of mild cognitive impairment (MCI) and early Alzheimer's disease (AD). Determination of sensitive and specific markers of very early AD progression is intended to aid researchers and clinicians to develop new treatments and monitor their effectiveness, as well as lessen the time and cost of clinical trials.

The Principal Investigator of this initiative is Michael W. Weiner, MD, VA Medical Center and University of California-San Francisco. ADNI is the result of efforts of many co-investigators from a broad range of academic institutions and private corporations, and subjects have been recruited from over 50 sites across the U.S. and Canada. The initial goal of ADNI was to recruit 800 subjects but ADNI has been followed by ADNI-GO and ADNI-2. To date these three protocols have recruited over 1500 adults, ages 55 to 90, to participate in the research, consisting of cognitively normal older individuals, people with early or late MCI, and people with early AD. The follow up duration of each group is specified in the protocols for ADNI-1, ADNI-2 and ADNI-GO. Subjects originally recruited for ADNI-1 and ADNI-GO had the option to be followed in ADNI-2. Further information can be found at <http://www.adni-info.org/> and <http://adni.loni.usc.edu>.

Data about longitudinal clinical diagnosis (cognitively normal, MCI, or AD) and conversion, APOE genotype data, and structural MRI scans were downloaded from the ADNI data repository (<http://adni.loni.usc.edu>). The database has longitudinal brain scans, so we compare one person's brain scans over time and watch how they worsen as the person progresses from MCI to AD. There were 454 original patients with MCI who converted to AD at some point over a two-year span. 234 of them were APOE ϵ 4 positive, and the other 220 participants were either APOE ϵ 4 negative. Subjects ranged between 47 and 91 years of age, with the average age being 73.3 years old.

PROCEDURE

Brain scans are gathered by using MRI machines. These work by the fact that atoms are spinning in random motion in their own magnetic fields (Berger, 2002). When a magnetic field is applied, most atoms either point north or south, but some do not line up either way. When a radio frequency pulse is applied, these atoms that are not lined up either way, spin the opposite direction. When that radio frequency is turned off, the atoms that are not lined up return to their original position. This emits energy, which is sent to a computer, and that computer converts the signal into an image (i.e. a brain scan). These brain scans are completed on all participants and archived for analysis in ADNI.

After obtaining the brain scans of people from the ADNI, the brains of patients with the APOE ϵ 4 allele will be compared against patients without the APOE ϵ 4 allele to see if the APOE ϵ 4 allele leads to greater neurodegeneration in MCI patients, and increased rate of conversion from MCI to late-onset AD.

MEASURES

Freesurfer (version 5.1) is a software program that takes the brain image and divides it up into the anatomical sub-regions. For regions like the hippocampus, the program essentially traces a 3D line around where it thinks this structure is based on previous knowledge of structure location and landmarks identified in the image. Then it gives you the total volume of the structure. For the cortical surface, it estimates the thickness of the grey matter across the entire cortex. Then it slices the brain up into different anatomical cortical regions and reports the average thickness of the cortex across that part of the grey matter. Figure 1 shows a pictorial representation of Freesurfer (Desikan et al., 2006; Freesurfer (n.d.)).

STATISTICS

Three separate ANCOVA models were used to compare differences in annualized percent change (APC) in three brain areas (hippocampal volume, entorhinal cortex thickness, and cerebral cortex volume) as a function of APOE ϵ 4 carrier status (positive or negative) and two-year conversion status (convert to AD or stable at MCI), covaried for age, gender, education, and handedness between groups. A logistic regression model was used to assess

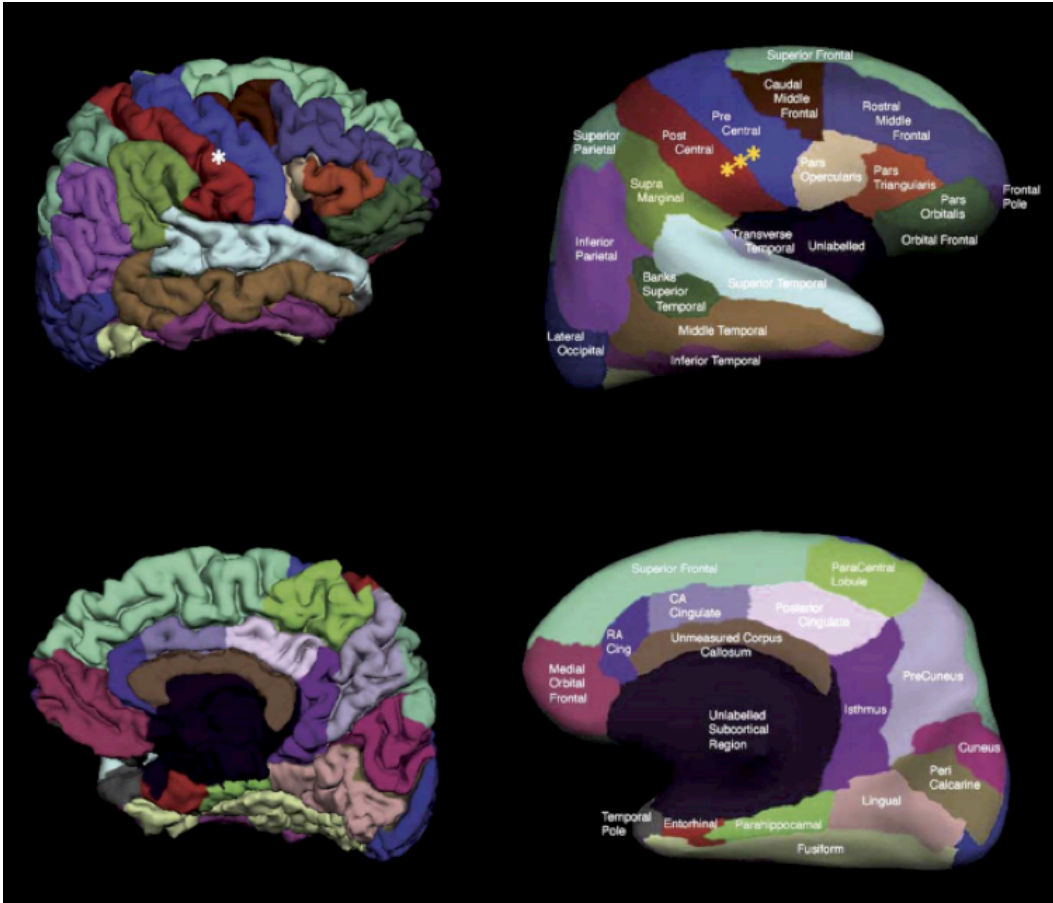


Figure 1. This image demonstrates how Freesurfer represents different brain regions.

the effect of APOE $\epsilon 4$ carrier status on likelihood of conversion from MCI to AD over two years, covaried for age, education, gender, MCI type (early or late), and handedness. A second logistic regression model was estimated to determine the independent effects of hippocampal atrophy rate and APOE $\epsilon 4$ carrier status on clinical conversion from MCI to AD over and above age, gender, MCI type (early or late), education, and handedness. This second logistic regression model was run again for both entorhinal cortex thickness atrophy rate and cerebral cortex atrophy rate.

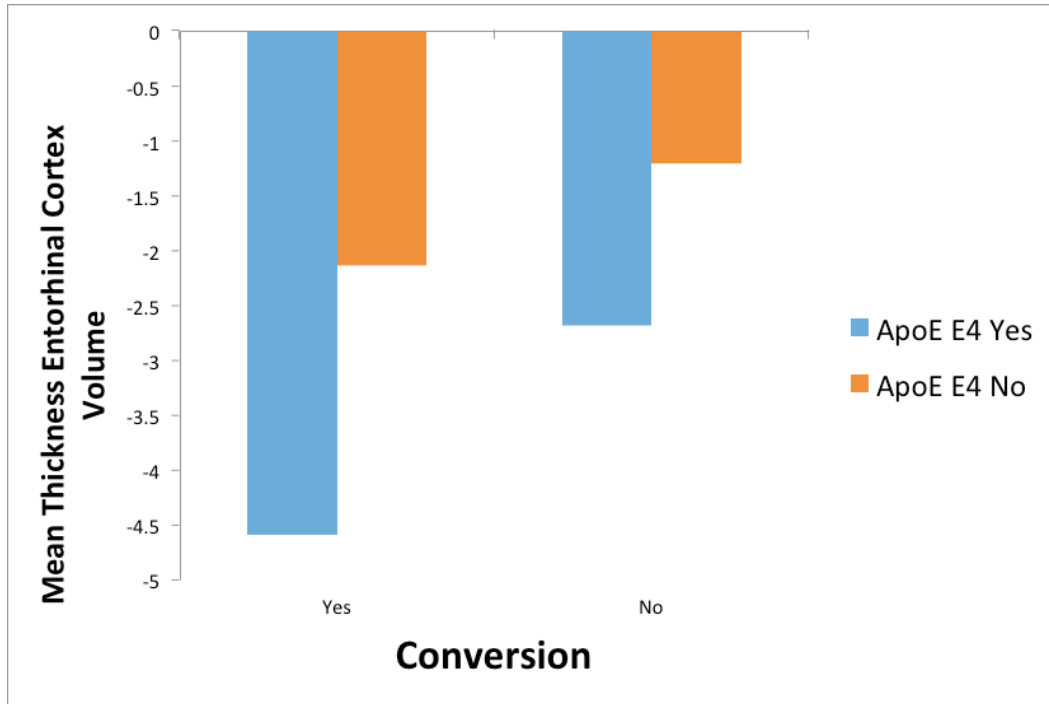


Figure 2. The effect of *APOE* ϵ 4 carrier status and Conversion on the Mean Annual Percent Change of Hippocampus Volume (in mm^3).

Results

The overall model evaluating the effect of conversion and *APOE* ϵ 4 carrier status on Annual Percent Change (APC) in hippocampal volume that included conversion status, *APOE* ϵ 4 carrier status, and the interaction between conversion and *APOE* ϵ 4 group, as well as age, handedness, education, and gender was significant ($F(7, 447) = 9.636, p < 0.001$). Specifically, significant independent main effects of both conversion status ($p = 0.003$) and *APOE* ϵ 4 carrier status ($p = 0.002$) were observed, but the interaction of *APOE* ϵ 4 group status by conversion status was non-significant ($p > 0.05$). A similar effect was seen on APC in entorhinal cortex thickness, with the overall model significant ($F(7, 447) = 14.428, p < 0.001$), and significant main effects of conversion status ($p = 0.001$) and *APOE* ϵ 4 group ($p = 0.002$), but no interaction ($p > 0.05$). Finally, the same pattern was observed when evaluating APC in cerebral cortex volume. The overall model was significant ($F(7, 447) = 9.478, p < 0.001$), with significant main effects of both conversion

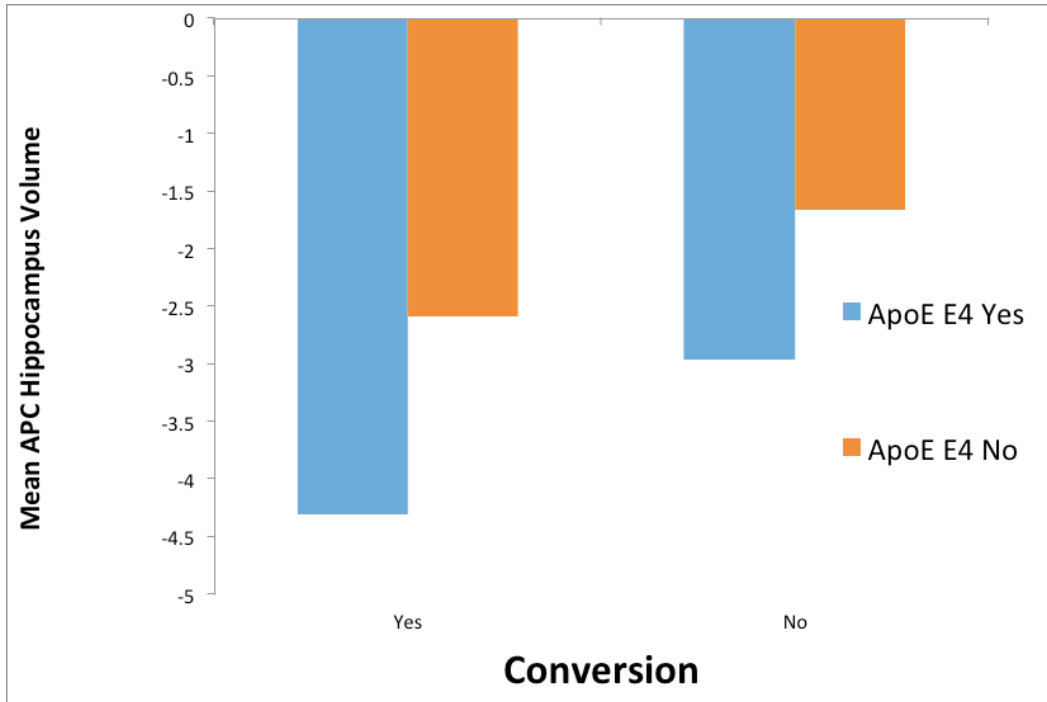


Figure 3. The effect of *APOE* ϵ 4 carrier status and Conversion on the Mean Thickness (in mm) Atrophy Rate of the Entorhinal Cortex.

status ($p = 0.007$) and *APOE* ϵ 4 group ($p = 0.008$), but no interaction ($p > 0.05$).

To see if *APOE* ϵ 4 carrier status was associated with conversion status independent of the APC in hippocampal volume, a logistic regression, covaried for education, handedness, baseline diagnostic group, age, and gender, was run. *APOE* ϵ 4 carrier group status was significantly associated with conversion status independent of the APC in hippocampal volume ($p = .007$, odds ratio (OR) = 1.926). The APC in hippocampal volume was also significantly associated with conversion status independent of the *APOE* ϵ 4 carrier status ($p < .001$, OR = 0.844). Similar analyses were run for the impact of *APOE* ϵ 4 carrier status and APC in entorhinal cortex and cerebral cortex volume. *APOE* ϵ 4 carrier status was significantly correlated with conversion status independent of the APC of entorhinal cortex thickness ($p = 0.028$, OR = 1.730). The APC in entorhinal cortex thickness was also significantly correlated with conversion status independent of the *APOE* ϵ 4 carrier status ($p < 0.001$, OR = 0.795). Finally, *APOE* ϵ 4 carrier status was significantly associated with conversion status independent of APC in

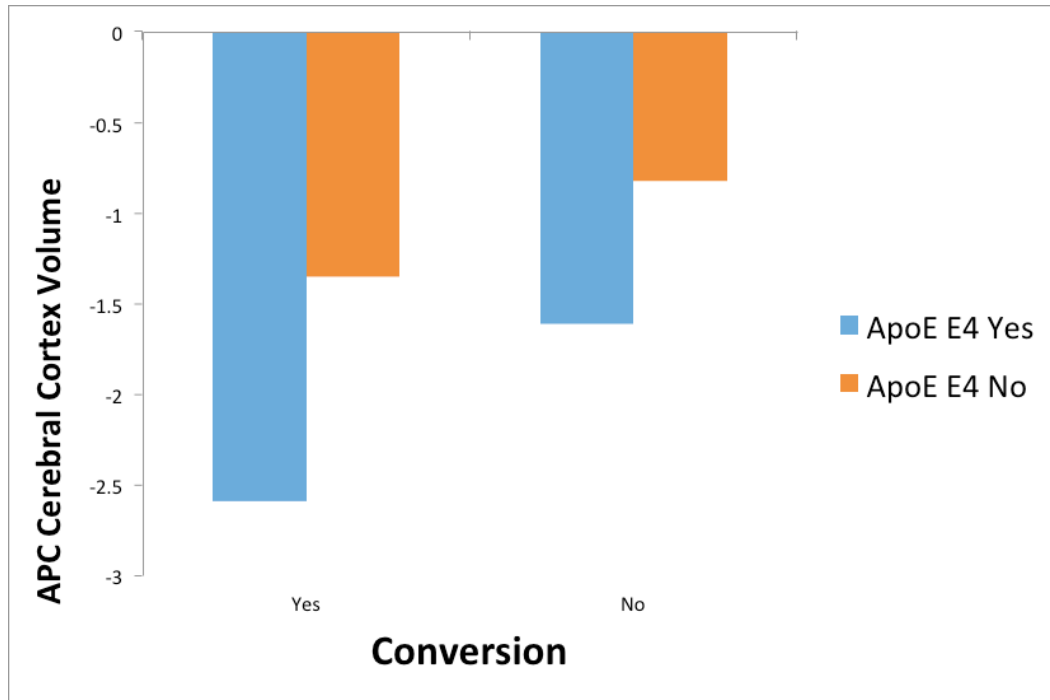


Figure 4. The effect of *APOE* ϵ 4 carrier status and Conversion on the Mean Annual Percent Change of Cerebral Cortex Volume (in mm^3).

cerebral cortex volume ($p = 0.005$, OR = 1.972). The APC in cerebral cortex volume was also significantly correlated with conversion status independent of the *APOE* ϵ 4 group status ($p < 0.001$, OR = 0.767).

Figure 2 shows that *APOE* ϵ 4 positive participants have a greater loss of hippocampal volume than *APOE* ϵ 4 negative participants, whether or not one converted to AD from MCI or not. In both conversion conditions (yes and no) the *APOE* ϵ 4 positive patients had significantly more loss of hippocampal volume than the *APOE* ϵ 4 negative patients. There was even a trend for slightly more loss of hippocampal volume in the *APOE* ϵ 4 group positive patients who did not convert to AD than those who converted to AD but were not *APOE* ϵ 4 carriers.

Figure 3 shows *APOE* ϵ 4 positive participant have a more significant loss of entorhinal cortex thickness than those negative for an *APOE* ϵ 4 allele in either of the conversion conditions. These results are even more pronounced than the ones seen for the hippocampus, with the differences between the *APOE* ϵ 4 conditions being even larger. Again, the patients who

tested positive for the APOE ϵ 4 group allele, and who did not convert to AD, still had a trend for slightly greater entorhinal cortex thickness atrophy rate than those who actually did convert to AD but who were APOE ϵ 4 negative.

Figure 4 shows again APOE ϵ 4 positive participants show more significant loss of cerebral cortex volume than those APOE ϵ 4 negative participants. Again, the APOE ϵ 4 positive patients who did not convert to AD had a trend for slightly more loss of cerebral cortex volume than the APOE ϵ 4 negative patients who did actually convert to AD.

Discussion & Conclusion

My hypothesis that APOE ϵ 4 positive MCI patients would exhibit greater atrophy in brain volume (hippocampus, cerebral cortex, and entorhinal cortex) regardless of conversion status was confirmed. There is greater neurodegeneration in both APOE ϵ 4 positive patients who acquire AD and APOE ϵ 4 positive patients who do not acquire AD than APOE ϵ 4 negative patients in either group. Further, my hypothesis that APOE ϵ 4 status was significantly associated with conversion status independent of neurodegeneration of brain regions was also confirmed. In fact, carrying an APOE ϵ 4 allele made you approximately two or more times more likely to convert to AD, independent of the significant effect of increased atrophy rate on conversion (more atrophy = greater rate of conversion). Overall, these findings are a prime example of the importance and, in this case, sad role that genetics plays in our health.

However, even though I have shown that carrying the APOE ϵ 4 allele does lead to greater neurodegeneration, the results do not tell us about the effects of non-genetic factors such as physical and mental exercise. Physical Exercise has already been shown to reduce one's likelihood of acquiring MCI (Geda *et al.*, 2010). Mental Exercise has also been shown to improve the episodic memory of MCI subjects (Belleville, Gilbert, Fontaine, Gagnon, Ménard, & Gauthier, 2006). However, there have not been many studies done on the potential varying levels of effects of physical and mental exercise on people who test positive for the APOE ϵ 4 allele versus those who test negative for it. Future studies could look to see if there is a greater decrease in brain atrophy with the physical and mental exercise intervention in those without the APOE ϵ 4 allele versus those who test positive for it.

This study was potentially limited by the fact that all the data came from people in the United States and Canada. A hot-button issue in modern

psychology is the fact that a lot of our data comes from WEIRD (Western, Educated people from Industrialized, Rich, and Democratic countries) populations. Whereas, a huge chunk of the world's population is not "WEIRD" (Henrich, Heine, & Norenzayan, 2010). Different cultures would likely vary with regard to non-genetic factors like levels of exercise, education, and general lifestyle. Due to the expensive nature of MRI machines, it makes sense that most people who have been tested come from wealthy countries. It would be interesting to see how these studies differ in potentially different populations.

These results also beg the question of whether or not MCI should be its own diagnosis or seen only as a precursor to AD. Prior literature lists MCI as both a syndrome, in and of itself, and also as a risk state for dementia (Gauthier *et al.*, 2006). I believe that these results are supportive of prior literature in the sense that MCI can be both its own stand-alone diagnosis and a risk state for dementia. Also, the fact that researchers are attempting to keep people at MCI and not allow it to progress to AD only reinforces the fact that people can stay at MCI. These diseases are certainly interconnected, but one should remain hesitant to claim that MCI is definitely going to result in AD until further research is done.

In sum, APOE $\epsilon 4$ positive MCI patients showed greater rates of neurodegeneration regardless of conversion status. Further, APOE $\epsilon 4$ positive MCI participants showed an approximately two-fold increased risk of conversion to AD over two years, independent from the effect of atrophy rate on conversion.

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SECURITY RISK AND SOCIAL PRESENCE IN E-COMMERCE

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Abstract

The object is to investigate the relationship between consumers' sense of security of a store and their purchasing intention from the store. This was investigated by evaluating how perceptions of security vary among pure play websites with no social presence on the one hand and with social presence on the other; and click and mortar websites with no social presence on the one hand, and social presence on the other. It was also investigated by evaluating how social presence might mitigate the risk of security perceived by consumers. The research method included a scenario given to each participant which requires them to walk through a shopping purchase on a given website. Then the participant was given a survey where the participant will evaluate their perceptions of the shopping experience in regards to security, social presence, and intention to purchase. While there have been studies conducted about perceptions of security, none of these studies have looked at how the type of store, either click and mortar or pure play, impact perceptions of security and how social presence might mitigate negative perceptions. Our study concluded that perceptions of security risk and intention to make a purchase are inversely related, that is that the more risk one feels, the less likely they will have an intention to make a purchase. Our study also found that the type of store does not influence perceptions of security or intention to make a purchase. Social presence was also not found to influence perceptions of security or intention to make a purchase. Online shopping experience was found to influence perceptions of risk.

Introduction

The internet has revolutionized many facets of life all around the world. One aspect of daily life that has changed is the way consumers buy and receive goods. This is referred to as electronic commerce, "the process of buying, selling, or exchanging products, services, or information via computer" (Turban, 2012). Many businesses have adapted to this new model, either adding an online website or creating an entirely new company only found online. Even today the internet is still dominated by the largest

retailers, even with new companies flooding the internet (Kolesar and Wayne, 2000). Currently, there are two main types of websites that sell goods. The first is a click and mortar website. This is a website that originally was just a physical retailer located in a place like a mall. Now this company can still be found in a physical store but also on the internet. Many companies have adapted to this business model in order to create two streams of revenue. The balance of these two forms of selling can be difficult to manage. Some companies choose to integrate the two worlds while others have two different systems for each stream of revenue (Turban, 2012). Companies must make sure that the creation of an online store front does not end up competing with their physical store fronts and must make sure that they are in accordance with one another. Some examples would be Walmart or Nordstrom. The other type of website for a typical consumer is referred to as a pure play website. This is a website that was created primarily for the internet. There is no physical store, just a website. These organizations generally have less overhead cost because it is much cheaper to have a virtual store front than a physical location. They can have just one warehouse that can ship directly to the customer instead of to a store first (Turban, 2012). Amazon is one of the most successful examples of a pure play store. Most companies have tried to enter the electronic commerce world, but for small boutiques it is sometimes very hard or impractical.

While both of these business models have proven to be profitable, they are perceived differently by consumers especially with trust. According to one of the senior vice presidents for UPS: "Consumers' expectations are rising, and online shoppers want to come as close as possible to getting the same kind of one-to-one personal attention they would receive at their favorite brick and mortar store." There are many forms of risk that can arise when a consumer makes an online purchase, including security risk, financial risk, and risk of spending too much time. (Flanagin et al., 2014). Perceptions of risk is part of the larger idea of trust. Trust is earned differently by online shopping rather than shopping in a store (Hernandez and Santos, 2010). An important risk that needs to be examined is security risk. Security risk has been a concern for consumers but this concern may vary by the type of website. The types of stores are different and people have different opportunities for interaction with the store. This may mean that customers may think of each store's security levels differently. Security risk is a real concern for online shoppers and is something that online websites should be concerned about. It is important to see what impacts security risk and what can mitigate risk so that online websites will know how to create a better shopping experience for consumers. However the perception of security risk

for a website might be mitigated by the introduction of social presence. Social presence is something on a website that is included to allow the consumer to have an actual, personal interaction with a salesperson on that website. (Zhang et al., 2011). This can include but is not limited to an online chat option or an avatar on the website. Intention to purchase is something that can be influenced by a variety of factors, including different risks (Chiu, 2014). Intention to purchase is ultimately what the online store desires from consumers and therefore its relation to risk is very important.

RESEARCH QUESTION

This study is to address the issue of the lack of research examining how type of online store, and social presence impact consumers' security perceptions, and whether it further influence the intent to purchase. A lot of research has been done to develop a framework for security risks and how that may impact purchase intention (Schmidt and Chen and Phan, 2009). However nothing has been done to look at how the type of store and the social presence together influence perceptions of security risk.

The research question for this study is: Is the intention to purchase while shopping online influenced by perceptions of security risk which vary based on the type of website that the consumer is shopping at and the social presence of the website?

Literature Review

E-COMMERCE TRUST

Trust is something that greatly affects where and how people buy their goods. In general trust can be hard to gain on the internet because there is a lack of assurance (Kolesar and Galbraith, 2000). Regardless of how often one uses the internet, they still have the same overall perception of e-commerce trust (Schmidt *et al*, 2009). However trust does have a very huge role in e-commerce (Manafi *et al*, 2011). A new customer will judge a website by its trustworthiness (Al-maghrabi *et al*, 2011). The development based model for trust is the best way to explain the aspect of trust in regards to the buyer-seller relationship (Hernandez and Santos, 2010). This development based model has three sub-contracts. They are calculus-based, knowledge-based and identification. Calculus-based trust is evaluating trust based on calculating costs versus benefits. Knowledge-based trust is trust that is built after numerous interactions between the user and the website. Identification-

based trust is trust in the other party because one knows what the other party wants and who they are. Trust can be hard to achieve in regards to electronic commerce, since trust used to be built on personal interactions and face-to-face encounters. This application of trust can also be extended to mobile online shopping. A positive trust towards a mobile online shopping experience will lead to a decrease in perceived risk of buying on-line (Shuiging *et al.*, 2015).

RISK IN RELATION TO E-COMMERCE

E-commerce risk is a part of a broader idea of consumer trust. E-commerce consumers' e-satisfaction is influenced by risk and emotional states, which then in turn creates loyalty to a specific website (Ltifi and Gharbi, 2012). Risk has two different levels that work together. One aspect of risk is the size of the problem that could be created and then how likely is it that this problem will actually happen (Dowling and Staelin, 1994). These two different dimensions work together to create either a high or low level of perceived risk. It is important to realize that risk is not one dimensional and is assessed differently by people. People will assign different magnitudes to each level risk and different probabilities of these risks.

Research has been done about a few types of risk that consumers face while engaging in online shopping. One risk that has been found to be very important is the risk of the loss of time. People do not want to waste their time on looking for something on a website. The point of shopping online is to find something quickly and easily. Additionally, it was found that in regards to e-satisfaction, financial risk was not a concern (Kim and Benbasat, 2010). People generally feel confident in the integrity of the company to deliver the product the way that they say they will, especially when the price is higher signifying quality. But financial risk does vary based on the consumer's wealth level. If the consumer does not value a minor monetary loss then financial risk will not be calculated into their overall risk level (Dowling and Staelin, 1994). Risk is also influenced by ratings about the website (Flanagin *et al.*, 2014). Consumers will do their research to look at average rating scores when evaluating the riskiness of a website. Further, in terms of the item being purchased, more risk is associated with sensory items (Sinha and Singh, 2014).

SECURITY RISK AS A RISK OF E-COMMERCE

In an e-commerce environment, there are many avenues for consumers to experience risk. One area of risk that is a cause of great concern is security risk. Security risk refers to the threat of a security breach of personal information that people submit online. Uncertainty is a major concern for shoppers and has an impact on the amount of potential profit for an online retailer (Joonkyum and Bumsoo, 2014). It has been shown that security issues regarding both personal and financial information are one of the top concerns of internet users (Miyazaki and Fernandez, 2001). This concern is highest when a country's population has just began to have the opportunity of e-commerce (Muhannad and Ahmed, 2014).

Information security can be defined as “protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction” (Turban, 2012). There are different perceptions of aspects of security based on the individual's usage of the internet. A light user is someone who uses the internet no more than 15 hours per week while a heavy user is anyone who uses the internet more than 15 hours per week. Light users are better with password practices, perhaps because they are in general more cautious because they do not have as much awareness. Heavy users in turn are more informed about risk awareness and phishing awareness and are better about updating antivirus software. (Schmidt *et al.*, 2009). However increase of usage does not decrease overall perceptions of security risk. In order for people to complete a purchase online, they need to feel secure and feel that the risk is relatively low. There are regulations applied by governing bodies about online security, and specifically the security of information people provide in regards to e-commerce. Many people are not satisfied with these laws and think that they are not strict enough to fully protect their confidential information (Knezevic and Jakovic and Strugar, 2014). The idea of information security is very important because buyers will not desire to make purchases online if there are uncertainty perceptions due to the risk of security (Pavlou, 2007). However, there may be one way for online websites to mitigate perceptions of security risk and that is through the use of a social presence tool.

SOCIAL PRESENCE

Companies utilizing e-commerce need to have alternatives to increase the consumers' trust and satisfaction compare to the traditional physical stores, because there are no face-to-face interactions. Online websites do not allow

for a customer to have an interaction with a real customer service representatives. However, there are certain ways for companies to recreate this physical interaction. One of these alternatives is social presence.

When a company uses real-time audio or audio-visual channels for communication, interpersonal trust will increase (Bente *et al.*, 2008). This would be something like providing an avatar or having a live online chat with a customer service representative. When a company specifically uses an avatar, a user will feel that there is a greater sense of social presence and purchase intention (Moon *et al.*, 2013). The avatar provides a real time conversation with the consumer and someone affiliated with the website. The use of a modern communication tool can help make the user experience more enjoyable (Al-maghrabi, *et al.*, 2011). Social presence can especially play an important role when examining consumer mood. Social presence can increase the mood of the customer which will then increase their intention to purchase (Zhang *et al.*, 2011). Social presence has been proven to greatly enhance the online shopping experience.

INTENTION TO PURCHASE

In terms of shopping, intention to purchase is very important. Companies exist because of people actually purchasing goods from that company. Intention to purchase can be influenced by a variety of things including trust, usefulness, satisfaction, and risk (Dash and Saji, 2007). Overall satisfaction and attitude are something that influence intention to purchase. When a consumer has a positive experience with the online website and is satisfied, they are more likely to make a purchase and then to make a repeat purchase as well (Abdul-Muhmin, 2011). Not only is satisfaction important during the purchase, it is also important for the post-purchase phase for repeat purchase intention (Claudia, 2012). Risk is something else that negatively affects intention to purchase. However the effect can vary based on how much the consumer shops online. When a consumer is a heavy online shopper, risk will not influence intention to purchase as heavily as when a consumer is a light online shopper (Chiu, 2014). Trust has been found to be a mitigating relationship for purchase intention. When a consumer feels like they can trust the website, maybe due to good visual design or a highly informative website, they are more likely to make a purchase.

RESEARCH FRAMEWORK

This study examines online consumers’ perceived security risks and intention to purchase in regard to different types of shopping experiences. It examines how perceptions vary in regards to the type of store that the online consumer is using. This study investigates whether online consumers have different perceptions of risk for pure play and click and mortar type of e-commerce stores, whether an online store has incorporated social presence and whether these affect the consumers’ purchase intentions. Below is the proposed model of the type of store impacts perceptions of security and then ultimately affect the intention to purchase. This relationship is proposed to be mitigated by the use of social presence by the online stores.

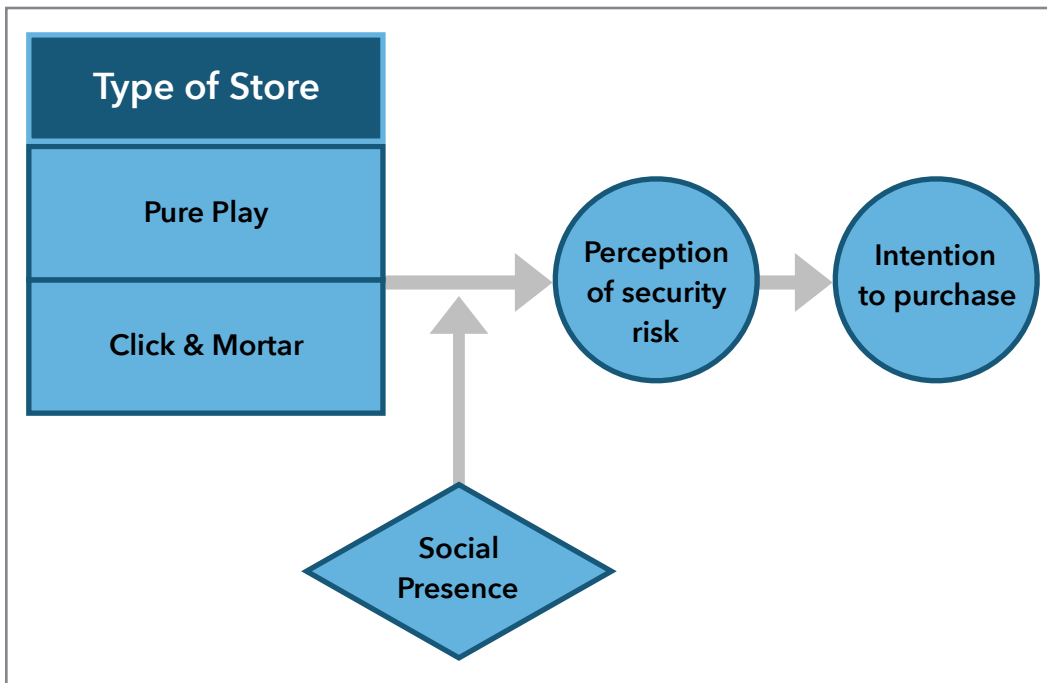


Figure 1. Proposed model for how store type impacts perceptions of security and intention to purchase and how social presence may mitigate this relationship.

To investigate online consumers’ perceptions of security, this study looks at differing perceptions based on the type of website. As mentioned earlier, the two main categories of websites people can buy goods at are pure

play and click and mortar. The type of store is proposed to influence the consumer's perception of security. More specifically, a consumer will perceive more security risk when shopping on a pure play website than shopping on a click and mortar website.

One moderating variable in the relation of type of website and perceived risk is social presence. Social presence is how a company creates a personal interaction through the internet. The addition of a social presence tool is proposed to mitigate security perceptions. Adding a tool that allows consumers to have a personal interaction with the store will lower perceptions of security risk.

Hypotheses

The following is a list of hypotheses derived from the research question and the research framework. Each of these hypotheses is discussed in details with supporting literature.

H1

There is a negative relationship between consumer perceptions about a website's security risk and their willingness to purchase a product from that website.

When an online shopping site has a higher perceived risk, the consumer might have a low intention to purchase on that website (Dash and Saji, 2007). Studies have found that if perceived uncertainty is high, then purchase intentions are negatively affected. If a consumer is buying something with a relatively high purchase involvement, then perceived uncertainty related to risk is higher, decreasing purchasing intentions even more (Pavlou *et al.*, 2007). Risk is an important issue consumers will think about before completing their purchase, with security risk being one of the aspects of risk. If there are security concerns, a buyer will not purchase online (Pavlou *et al.*, 2007). While there can be benefits to shopping online, there is also an aspect of increased risk, especially security risk because consumers can not personally see who is getting their information and what is being done with it.

Some stores online websites come after the presence of a physical store front, so a consumer may have been to the store at a mall and then he or she visits the website. However, online shopping is still a different experience

then shopping in a store. Research shows that if a company has perceived personal interaction, then they will have a lower perceived risk (Dash and Saji, 2007). Trust develops with touch, but in the world of e-commerce, there is no way for companies to provide a sense of touch. However, in terms of a click and mortar store, companies can offer “touch” through the physical store (Bente *et al.*, 2008). This perception of trust should extend to their online websites because customers may be able to recall a physical interaction previously encountered. Because of this, click and mortar sites might have a lower perceived security risk than pure-play stores. Finally, most pure play websites do not have any opportunity for social interaction. There is no opportunity for a face to face interaction and touch with the company. This might result in a high perception of security risk.

H2

The purchase intentions of a customer will be higher in a click and mortar store than a pure-play website.

Attitude about websites has a strong influence on a customer’s intention to make an initial purchase and it also affects the intention to make a repeat purchase (Abdul-Muhmin, 2011). According to a study done on virtual malls, which is another broad form of internet shopping involving virtual worlds, perceived security did influence customers’ attitudes and therefore their intentions (Shin and Shin, 2011). Customers were more likely to make a purchase at a virtual mall if they felt that there was a high level of security. As mentioned, it is hypothesized that perceptions security is higher for click and mortar stores, when customers have the opportunity to make a purchase in person or online. The lower perception of security might be associated with pure-play. It has been found that the use of various shopping activities can positively influence how comfortable they feel (Dowling and Staelin, 1994). Not all shopping experiences are perceived the same and people have differing views of risk depending on where they are doing their shopping.

H3

The addition of a social presence tool will mitigate security risk in online shopping. i.e. When there is a social presence tool on the website, perceived security risk will decrease.

One concept that might be relevant in understanding consumer perceptions of risk associated with e-commerce transactions is social

presence. Social presence helps lower a consumer's security risk (Pavlou *et al.*, 2007). Social presence is a way for companies to give customers a sense of personal interaction. A company with a high social presence can help that company provide a real life interaction with its customers. Social presence helps consumers feel like the information that a website reveals is true and an accurate representation of the product or service. It helps people feel more secure about their transaction. Perceived social presence has a direct impact on how customers perceive risk (Dash and Saji, 2007). Social presence helps with the moods of customers and purchase intention (Zhang *et al.*, 2011). Adding an online customer service opportunity is perceived as useful and can generally make the online shopping experience more enjoyable for the user (Al-maghrabi *et al.*, 2011).

Therefore, e-commerce companies can control social presence and help mitigate the problem of the lack of personal interactions on the internet. It has been found that consumers will feel that an online company has a higher social presence if the website offers a way for the customer to communicate directly with a customer service representative (Bente *et al.*, 2008). While e-commerce companies can offer an instant messaging system, another way to increase social presence is through the use of video or an avatar (Bente *et al.*, 2008) They could also use various online environments such as social media pages and virtual communities (Zhang *et al.*, 2012). The closer the website can get to recreate the personal interaction and the relationship established when people talk in person, the higher the social presence.

H4

When people perceive higher social presence, they will have higher purchase intentions. i.e. The use of a social presence tool on a website will lead to an increase in intention to make a purchase.

Social presence can not only impact perceptions of security risk but can also influence purchase intentions. As hypothesized earlier, security risk might have an inverse effect on intention to purchase. This study proposes that adding a social presence tool will therefore not only decrease perceived security risk but will also increase intention to purchase. As mentioned earlier, adding social presence has been found to decrease overall risk perceptions (Dash and Saji, 2007). Social presence has been found to positively influence trust and through positively influencing trust, intention to purchase has increased (Gefen and Straub, 2003). If companies want people to feel more comfortable, especially when there is no prior personal

interaction, they should look to add a line of communication. Companies can provide the opportunity for customers to feel a sense of social interaction with the help of social presence which will increase customer's intention to purchase.

Research Method

THE SURVEY

The research method used to collect data for this study was a survey questionnaire. A survey was used as this is the most common instrument used in studies about online shopping (Dash and Saji, 2011).

The survey included the descriptions of the different types of shopping experiences and questions regarding the survey respondents' feedback on that experience. This makes for a research design of random assignment to either manipulated independent variables or an experimental control. The sample population is college students. This group was chosen because the participants are very likely to have experience shopping online. Most surveys about online shopping use younger participants, generally college aged for their studies (Zhang *et al.*, 2011). College students often shop for themselves and most students are constantly connected to the internet. Also, college students are familiar with the concept of social presence because so much of what they do is online, and they have developed ways to decide if a website is trustworthy (Zhang *et al.*, 2011). Therefore, they are an acceptable group to survey. The group included a mix of females and males. It can be said with confidence that everyone in this group has at least minimal experience with shopping online, proven by survey answers.

Since this was an undergraduate research project, a convenience sample rather than a random sample is chosen. Students with different grades were asked to participate in the beginning of both lower and upper level classes as approved by their professors. Most of these surveys were completed during class time. Surveys were also completed at the end of various college student group meetings, including sorority and fraternity meetings. There was also an incentive to complete the survey. All students who completed the survey were entered into a drawing to win various gift cards to both Amazon and Starbucks.

This research involved 200 students at the researcher's institute, ranging in ages from 18 to 23 and grades freshmen to fifth-year senior. The

response rate was 90%, because most surveys were done in class and there was an incentive to complete the survey.

THE INSTRUMENT

The research tool was a structured questionnaire, with the questions coming from various surveys that have been conducted about the online shopping experiences. All the measurement items were adapted from other studies. The survey instrument was examined by an expert in the field, and subsequently pilot tested on college students to make sure the survey was understandable.

The researcher developed four different scenarios of online shopping. Each participant read one of the scenarios and then was given a questionnaire about the described shopping experience. The scenarios were each four pages long and included both text and screen shot pictures of a website that was described as one selling an electronic device. The survey instrument included a scenario that either represented a pure play website, a pure play website with social presence, a click and mortar website, or a click and mortar website with social presence. The scenarios were all the same except for slight variations describing the type of website. Electronics are something that everyone buys regardless of gender. It is easy to find variations for electronics to be purchased. The first scenario has the user shop at a store that only has an online website and has no personal customer service online portal. The second scenario describes a web site for a store that also has a physical location. This website does not have a way for the customer to interact with representatives. The third scenario features a pure play website that has a social presence, which is a way for the customer to interact with people in the store. The fourth situation is similar to the third but the website described as a place that includes an online customer service help line.

The social presence in the scenarios was designed as an online chat system. The scenario provided a description along with pictures chronicling an online chat experience with a real time employee. The scenario had the participant asking various questions about the product being purchased with the employee answering all of the questions in detail.

The scenario walked the participant through a complete online transaction. For each website description, the participant was told that they are purchasing the same specific computer on an electronics website. They were told that they are completing the purchase all the way up until payment

was demanded. These scenarios will be randomly assigned to each subject, either websites with social presence or without. The subjects are not aware what the other situations are and will be led to believe that everyone is given the same situation.

Once the participant read through the scenario, they were asked to fill out a survey that included questions about security risk, information security, social presence, intention to purchase and trust. Because it is unlikely that all customers would actually purchase the type of good from one of the stores described, the questions can only examine if the customer would be willing to make a purchase. The survey then ended with demographic questions. All of the questions in the questionnaires are the same.

In conclusion, each participant was given a short scenario description. Then the participant was asked the same set of questions regarding their views about the shopping experience described.

SURVEY QUESTIONS

Refer to the appendix for a listing of the survey questions used and an explanation as to how the questions were developed for the survey. All of the questions were adapted from previous studies. The questions are grouped together by the construct that is being tested to clarify what variable is being tested.

The survey concluded with a section asking questions about the participants' demographics. Age and gender are included on this survey like most other research study surveys. The next area asked about was internet usage. Because this survey is about online shopping it is important to ask how long the participant has been using the internet, how often they use the internet and why they use the internet. The final demographic questions were specific to online shopping experience and money spent online. It is important to examine the participants' experience with online shopping as this can influence their perceptions about the online shopping situation.

The scale used for the survey questions are a 5 likert scale which is a very common scale to use and the scale that was used for the questions originally. The five options were strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree, with 1 being strongly disagree and 5 being strongly agree.

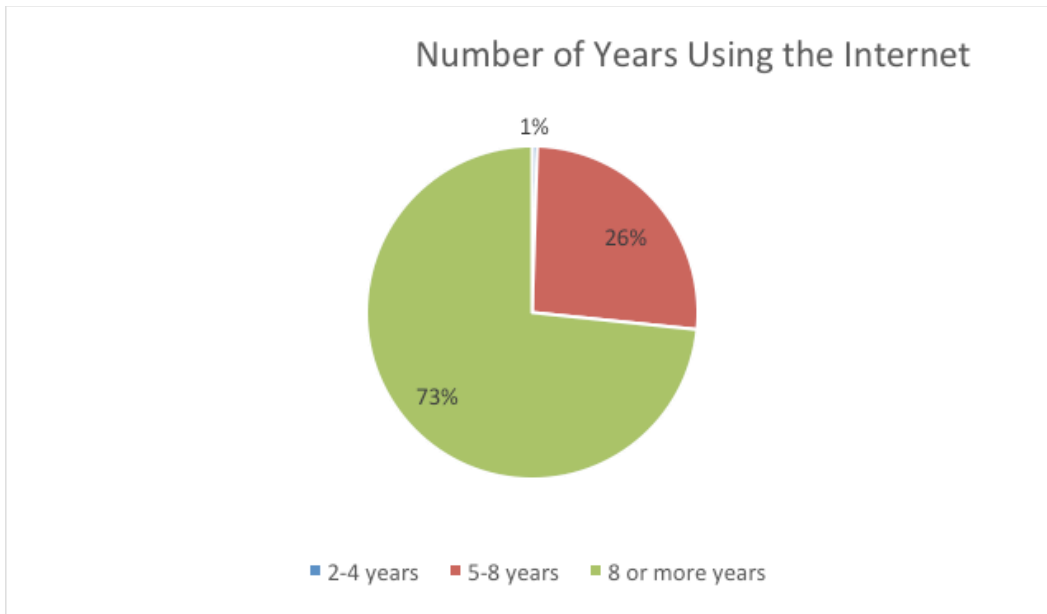


Chart 1. Comparison of the number of years participants have used the internet.

Data Analysis

DESCRIPTIVE ANALYSIS

Participants were asked to answer a variety of demographic data questions. These questions were used for inferential analysis and as possible control variables. 13% of the participants were 18 years old, 15% of the participant were 19, 16% of the participants were 20, 29% of the participants were 21 and the remaining 26% were either 22 or 23 years old. In terms of gender, 41% of participants were female and 59% were male.

145 participants have been using the internet for over 8 years. 0.5% of participants use the internet less than once a week, 67.7% of participant use the internet over 12 times a week, 5% use the internet two to five times a week, and 25% use the internet six to twelve times a week. The majority of participants could be classified as heavy internet users, using the internet more than once a day. 69% of participants use the internet for shopping, school, entertainment, social media, and personal reasons.

In terms of online shopping, the majority of participants have been shopping online for two to four years, with the average number of yearly purchases being one to eight products. .5% of participants make zero

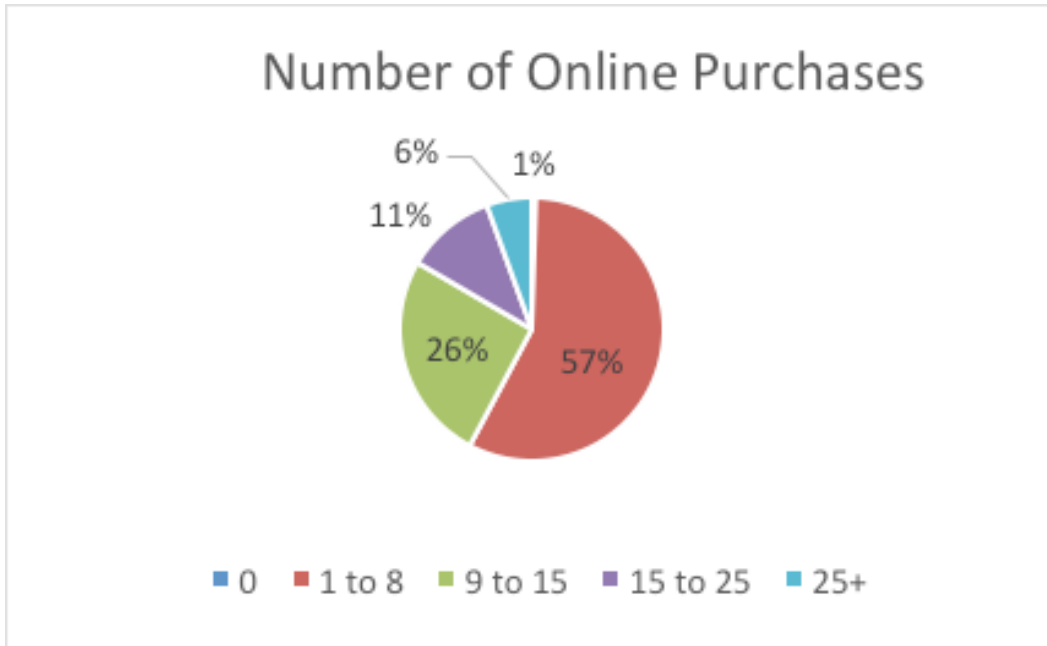


Chart 2. Comparison of the number of online purchases participants make yearly.

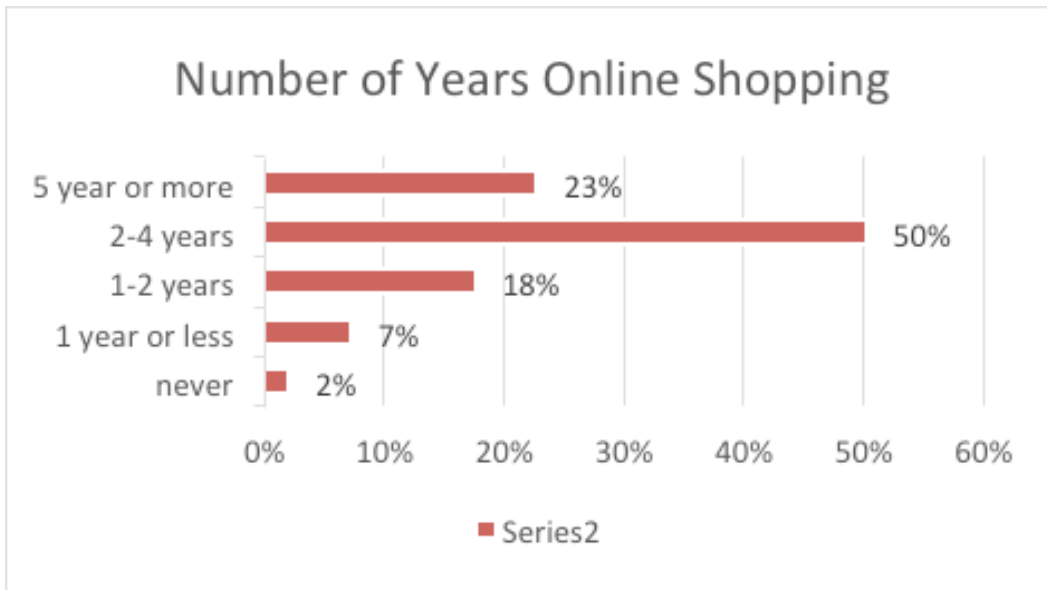


Chart 3. Comparison of the number of years participants have shopped online.

purchases per year, 57% of participants make one to eight purchases online per year, 25% of participants make 9 to 15 purchases per year, 11% of participants make 15 to 25 purchases online a year, and 5% make over 25 online purchases a year.

Another factor to consider about participants is their elastic income, or how much money they spend on items that are not a necessity. Participants who spend \$0 on unnecessary items represent 1%, participants who spend \$0-\$25 represent 21%, participants who spend \$25-\$50 represent 38%, participants who spend \$50-\$100 represent 24%, participants who spend \$100-\$250 represent 7.5%, participants who spend \$250-\$500 represent 8%, and participants who spend over 500 dollars represent 1.3%.

MANIPULATION CHECK

In order to make assumptions about the data, it is important to make sure that the variables measured are valid and reliable. The following section will explain various tests that were used to confirm the validity of the data. One important construct validation for the survey is that adding social presence does impact how people feel about the online shopping as this is one of the key moderating variables. In order to test this, ANOVA was run with the dependent variables being feelings about social presence, and the fixed factor being whether the website had social presence or did not have social presence. When an online chat feature was added to a website description, it was found that there was more of a feeling of human interaction with a p-value of .000. Significance was also found between a feeling of friendliness and the type of store had a significance of .000. This shows that the survey did accurately portray a social presence outlet for online shoppers through an online chat system.

Normality of the data was tested using descriptive statistics in SPSS. The first set of data tested was the dependent variables of trust, intention and security when compared with store type. The second set of data was the same dependent variables but this time they were compared with and without social presence. While the Kolmogorov-Smirnov statistic revealed that the data may violate the assumption of normality at .000, this is common for a large sample size (Pallant, 2005). The histograms revealed that the scores are normally distributed. The Normal Q-Q plots also are plotted in a reasonably straight line.

The data must also be tested for multicollinearity. This will be tested using regression to find the variance inflation factor (VIF). When intention to

	Intention 1	Intention 2	Intention 3
Intention_1			
Pearson Correlation	1	.717**	.807**
Sig (2-tailed)	—	.000	.000
Sum of squares and cross-products	161.343	110.955	130.000
Covariance	.807	.555	.650
N	201	201	201
Intention_2			
Pearson Correlation	.717**	1	.786**
Sig (2-tailed)	.000	—	.000
Sum of squares and cross-products	110.955	148.368	121.333
Covariance	.555	.742	.607
N	201	201	201
Intention_3			
Pearson Correlation	.807**	.786**	1
Sig (2-tailed)	.000	.000	—
Sum of squares and cross-products	130.000	121.333	160.667
Covariance	.650	.607	.803
N	201	201	201

Table 1. Correlation of intention questions using the Pearson Correlation.

purchase is the dependent variable the VIF for social presence is 1.001 and the VIF for type of store is also 1.001. The normal threshold for VIF is below three so there is found to be no correlation between the variables.

All of the questions that have been used to assess intention, security and trust were analyzed using the reliability analysis. The reliability of the

scale for security only was .747 based on the Pearson Correlation. The reliability of the scale for intention only was the highest at .910, meaning that this scale was the most reliable. After checking the reliability of the scale for all of the variables as they all used the same scale, it can be determined that the scale was reliable for the present sample because the value is above .7 at .753 (Pallant, 2005).

Ultimately, this study is examining the purchase intentions of online shoppers and how intention can be influenced. The survey included three different questions asking about different areas of purchase intention. In order to confirm that these questions were valid, a correlation test was performed. Using a bivariate correlation test, it was found that all three questions were highly correlated, all with a Pearson correlation of over .7.

INFERENTIAL ANALYSIS

The survey collected data about the participants and all these variables were tested to examine if they had an impact on risk and intention to purchase. Demographic questions were asked to accurately measure the population, and to see if there was any variance in demographic variables for any of the dependent variables. The inferential data analysis is used to further investigate additional relationships among the variables, and whether the results of this study could be applied to a larger population. The demographics tested were age, gender, experience with the internet, and experience with online shopping.

The only variable that was found to have an impact on risk and therefore intention to purchase was the online shopping experience of the participants. Online shopping experience was determined by the amount of years the participant has been conducting online shopping. When the number of years online shopping was the fixed factor and the dependent variable was trust, ANOVA analysis found that these two were not related. When the dependent variable was security risk, there was correlation between when the dependent variable was intention to purchase there was also correlation. This relationship will be explored later in this paper. Experience was also compared with both type of store and social presence in a MANOVA test. However there was not significant when looking at the impact on intention and trust.

Another type of experience with online shopping could be defined as the number of times one conducts online shopping. When number of online purchases per year is the fixed factor, there is a correlation between a

dependent variable of security risk as ANOVA analysis produces a p value of .006. However trust and intention are not affected by the number of purchases a participant has made online in the past year.

There was no significant difference between perceptions of male participants and female participants. ANOVA testing was run with gender being the factor. When trust was the dependent variable, the testing revealed a p value that was insignificant. When security risk was the dependent variable, ANOVA analysis produced non-significance for all security questions. Finally, when intention to purchase was the dependent variable, the p value was .134, therefore also insignificant.

There was no significant difference in perceptions of both trust, security and intention to purchase when age was the fixed factor in ANOVA analysis. The range of the participant's ages was quite small (18-24), which may have contributed to no significance. Grade was also tested to see if there was any significance. When grade was the fixed factor, there was no significance for both the dependent variables of security and intention with respective p -values of .420 and .695. Another test conducted was ANCOVA with age as the fixed factor and grade as the co-variate. With intention to purchase, age was still insignificant with a value of .787. With security, age was also still insignificant with a value of .191.

HYPOTHESIS TESTING

The survey collected data about the participants and all these variables were tested to examine if they had an impact on risk and intention to purchase. Demographic questions were asked to accurately measure the population, and to see if there was any variance in demographic variables for any of the dependent variables. The inferential data analysis is used to further investigate additional relationships among the variables, and whether the results of this study could be applied to a larger population. The demographics tested were age, gender, experience with the internet, and experience with online shopping.

This study proposed five different hypotheses. All of these hypotheses were tested and analyzed below based on the data collected through the questionnaire.

H1

There is a negative relationship between consumer perceptions about a website's security risk and their willingness to purchase a product from that website.

The first hypothesis was supported which states that there is a negative relationship between consumer perceptions about a website's security risk and their willingness to purchase a product from that website. In order to test this, the data was analyzed through ANOVA with intention to purchase as the dependent variable, with security perception being the fixed factor. With a significance value of .000, the null hypothesis is rejected. A Turkey post hoc test was performed to confirm the relationship. When comparing the intention to purchase of participants who felt the most security risk with participants who felt the least amount of security risk, the significance was .034, with the relationship being negative at a lower bound of the confidence interval of -2.8447 and an upper bound of -.0696. Therefore, the higher the risk, the lower the intention to purchase will be. Also, there is a relationship between the second lowest amount of security risk and the highest amount of security risk that had a significance value of .034. The lower bound is -2.3225 and the upper bound is -.1502. When people agree or strongly agree that their personal information is secure and there is no security risk, they do have a higher intention to purchase from the website. The perceived security of a website does heavily influence the intention to make a purchase on that website. Therefore, H1 one is accepted.

H2

The perception of security risk in a click and mortar store is lower than a pure play store.

According to H2, the perception of security risk in a click and mortar store is lower than a pure play store is the second hypothesis. These variables were also tested with ANOVA, with the ANOVA test using type of store as the dependent variable and the fixed factor of store type. This analysis resulted in a *p* value of .0792. Therefore, the second hypothesis is rejected. Type of store was not proven to have a significant effect on perceptions of security risk through ANOVA testing.

H3

The purchase intentions of a customer will be higher in a click and mortar store than a pure-play website.

As already described, the security risk does influence the purchase intentions. However the data showed that the perception of security risk is not influenced by the type of store. ANOVA testing was also completed to confirm whether intention to purchase also would not be influenced by type of store directly. When the type of store is the fixed factor and intention to purchase is the dependent variable, the p value is .111. This means that the relationship is not significant. Therefore store type was not found to influence a customer's intention to make a purchase on an online website. Hypothesis three is rejected

H4

The addition of a social presence tool will mitigate security risk in online shopping.

It was found that adding an online chat feature to a website does increase the feeling of human contact in the transaction through an ANOVA test of a fixed factor of social presence with a significance of .000. Specifically, a chat system gives the user a more personal feel of the with a significance value of .014 and also a sense of friendliness with a significance value of .000. Therefore, if websites are concerned with the lack of human contact in a typical online shopping transaction, adding a customer chat feature with customer service representatives can mitigate that issue. However adding social presence to the online store through an online chat feature does not have an impact on the perception of security. Hypothesis H4 states that security risk will be lower if there is a communication tool in place. When analyzing the data of the impact of adding social presence to an online retailer on the perception of risk, the null hypothesis was accepted with a p value of .559 and an r^2 value of .030, adjusted to .015. There is no relationship between security risk and social presence on an online shopping website. Because of this hypothesis four is rejected.

This relationship was also tested with the fixed factor of the type of store. When performing a MANOVA with the fixed factors of store type and social presence and the perception of security risk being the dependent variable, the p value is .096 causing the null hypothesis to be accepted. It is

therefore not significant what the type of store is or whether the store has social presence in terms of perceived security risk.

H5

When people perceive higher social presence, they will have higher purchase intentions.

Even though the addition of a social presence tool does not impact security risk, it was still tested to see if there was an impact on purchase intentions. An ANOVA test was run with social presence being the fixed factor and intention to purchase being the dependent variable. The results were a p value of .356 and F value of .855, meaning that the relationship is not significant. There is no relationship between social presence and intention to purchase just as there is no relationship between social presence and perceptions of security risk.

For this hypothesis, another data analysis done was MANOVA testing with the store type and the aspect of social presence as the fixed factors and intention to purchase being the dependent variable. It was hypothesized that these two dependent variables would ultimately affect the intention to make a purchase from an online website. The data analysis produced a p value of .320 causing the null hypothesis to be accepted. The data shows that intention to purchase is not influenced by the combination of the variables of store type and social presence.

ANCOVA was also conducted with social presence as the covariate and store type as the fixed factor. Intention to purchase was the dependent variable. It was hypothesized that the use of a social presence tool would change the intention to purchase so social presence will be the covariate variable to separate the variable out. Again, both store type and social presence were found to be insignificant with p values of .325 and .104 respectively.

Based on the results of the data analysis, a revised model is proposed in figure three. Neither the type of store, the use of social presence nor the combination of both has an impact on the perception of security by a customer. However, perception of security is significant when looking at intention to purchase as a dependent variable of security. Upon further analysis of other factors that may influence security and therefore intention, it was found that experience plays a role in intention to purchase. This has led to a new model that examines how experience is related to security risk and intention to purchase. This was tested using both ANOVA and ANCOVA.

As part of the general demographical information collected from the research, participants of the survey were asked to describe their experience with online shopping in terms of the years they have been online shopping for. With the dependent variable of security, the fixed factor of online shopping experience returns a p value of .016. Using Fishers Least Significant Difference (LSD) analysis, it shows that there is an inverse relationship between participants having the most years of online shopping experience and having either never shopped online or been shopping online for less than one year. With more online shopping experience, participants perceive higher level of security from online shopping.

More specifically, if someone has over five years of experience of online shopping, they are more likely to feel comfortable with the security on the website. Between a one (never online shop) and a five (shop over five years), the value was .012 and the lower bound of the confidence interval was negative. Between a two (less than one year shopping online) and a five (online shop over five years), the p value was .017 with the lower bound of the confidence interval negative.

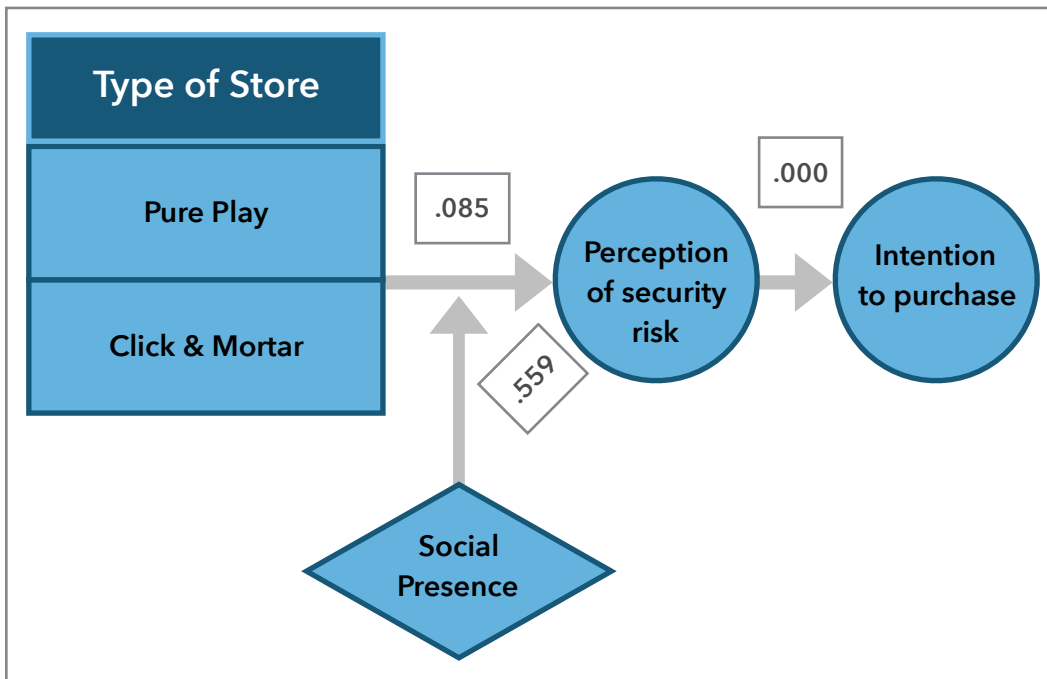


Figure 2. Proposed research model of online consumers’ perception of e-commerce security risk and consumers’ intent to purchase with ANOVA significance values.

ANCOVA analysis was also completed with online shopping experience as the covariate variable and the dependent variable of intention to purchase and the fixed factor of type of store. Online shopping experience was found to be significant with a value of .004. Also, the p -value for type of store decreased, therefore becoming more significant with a value of .081.

Discussion

From our data analysis, H2, H3, H4, and H5 were not supported, but H1 was supported. In addition, this modified research model includes a new variable of online shopping experience. Even though online shopping experience was not originally included in the research model and hypotheses, it was part of the important demographic information collected from the survey, as the possible control variables. This variable of online shopping experience was tested as a mediation possibility through ANOVA testing and was found to influence the perception of security risk different participants had, as discussed earlier.

Only the first hypothesis was found to be true, which stated that intention to purchase on a website will be negatively affected as the perception of security risk increases. Security risk is still a valid concern for online shoppers. This is important because it was found to influence whether a purchase will actually take place. Even though the internet has been around for many years now, security is still an issue. Data breaches are still just as common and still pose a legitimate threat to online shoppers. If someone does not feel comfortable with the security of an online website, they will not complete their purchase and will look to other sources to buy what they may be looking for. The greater the perceived security risk, the less likely a purchase will be made.

The type of store does not have influence on perceived security risk, or intention to purchase. The amount of online shopping experience has been proven to impact how people view their online shopping experience and ultimately can shape their intention to purchase. The results of this study indicated that the number of years of experience the survey participant has online shopping influences the perception of security risk of online shopping. This was confirmed by the use of ANOVA and ANCOVA statistical testing. This variable was originally left out of the hypothesis but is one that cannot be overlooked.

When it comes to online shopping, perceptions can be influenced by a variety of aspects. One of the main aspects is experience. Experience with the internet in general can affect security perceptions. The more experience one has with the internet, the fewer the concerns about information security will be (Miyazaki and Fernandez, 2001). People who have varying levels of experience shopping online look to different aspects of websites to decide if they would like to make a purchase on that particular website. In particular, those with less shopping experience value security more than those who have normal or high levels of experience (Bhatt and Bhatt, 2012).

One of the reasons that experience has influence in security perceptions is the theory of attitude formation, which explains that direct experience reinforces beliefs about a particular thing. In terms of online shopping, this attitude-intention relationship of making a purchase is strongest with the user has previous experience (Crespo *et al.*, 2009). Different studies have been done to decide how much experience is truly needed to say that the customer has experience with online shopping. It has been found that for the greatest impact, the customer should have at least four years of online shopping experience (Bertea and Zait, 2013).

Before conducting research, the hypotheses were formed in regards to prior research. The finding from some of these prior researches were not supported by the findings of this study for a variety of reasons. In the research done by Dash and Saji, they found that with a perceived personal interaction, a company will have better trust. This study involved an older age group, with most people being in their late twenties, but also having participants who were older than fifty years old. This study was also done almost ten years ago in 2007. This study took place in India, which has a very different culture than the United States, meaning participants likely have different views and experiences than those that participated in the study (Dash and Saji, 2007).

In research conducted by Bente, they found that adding avatars for customers to communicate with would increase perceived security by shoppers. However they found that adding actual video makes the most difference. This may be one of the reasons that adding a social presence component to websites did not show any difference in risk perceptions (Bente *et al.*, 2008).

In another related research done by Shin and Shin, it was found that social presence does mitigate security concerns. For their study, they actually constructed a real virtual mall. By having participants go through and

actually complete an online shopping transaction they were able to create a different user experience than a scenario reading, which is the research design of this study (Shin and Shin, 2011).

Another research study done by Zhang, Lu, Shi, Tang, and Zhao, did involve college students and found that social presence can affect consumers' moods and therefore affect intention to purchase. Social presence does seem to have a mitigating effect in some aspects of online shopping as found by this research. It helped with perceived benefit and purchase intention. Social presence was found to positively reinforce the relationship of both mood and purchase intention and mood and perceived benefit. However this study did not examine whether social presence plays a role in intention to purchase in regards to security risk. It does seem that social presence can affect online shopping intention but not in regards to security risk (Zhang *et al*, 2012).

A more recent study done in Croatia involving Croatian undergraduate students did an in-depth analysis of online shopping habits of individuals (Knezevic, Jakovic, and Strugar, 2014). One thing that was found was that one of the benefits of online shopping is that there is no physical interaction. In fact, people found it very important that there is no pushy salesperson online persuading one to make a purchase they really do not want to make.

Another study examined how privacy concerns affects customers purchase intention. This area of research is inclusive as previous research used in the literature review claimed that privacy does affect intention. However, a more recent study found the opposite. Two companies were used, one that asked for extensive personal information, therefore increasing perceptions security risk, and the other company required far less personal information, decreasing security risk. However, there was no difference in intention to purchase from these two companies. Even when consumers where asked to provide all of their personal information which should increase security risk, consumers still completed their transactions at the same rate as a less intrusive company (Preibusch, Kübler, and Beresford, 2013). Therefore security risk may not be as big of a concern for consumers as it used to be which may be why security risk was not influenced by factors like type of store or a social presence tool.

In conclusion, each study was done a little differently than the current one and this could be why the results are different.

When the internet first became available for public use, online shopping was not one of the main things people were using it for. But as time

went on, more and more people began to use the internet as part of their normal everyday life, and the e-commerce industry began to grow. With the growth of the e-commerce industry, a new type of store became popular. The pure play store, a store that was only found online. These stores at first might have been a cause for concern for some online shoppers as they were new and unfamiliar. Part of this concern had to do with security risk. People were not used to have to provide personal information on a website and might not feel comfortable with giving out their personal information through internet. But as time goes on, people seem to be getting used to the internet. Online shopping has become just as common as shopping in a mall. It seems that now the type of store has all been blended into people's daily experience. Whether the store is online only or has both a physical store and an online store does not seem to matter to online shoppers anymore. As time goes on, people are becoming more comfortable with online shopping in general, therefore the type of the website that they are shopping with becomes less important.

THEORETICAL IMPLICATION AND SUGGESTED FUTURE STUDIES

The theoretical implication of this study is to propose a research model for consumers perceived online shopping security risk and intent to purchase, and using imperial survey data to test and modify the research model. The finding of this study showed that type of store, either pure play or click and mortar, does not influence consumers' perceived online shopping security risk and does not influence intention to purchase. The idea of whether shopping on a click and mortar website or a pure play website influences risk perceptions is not one that has been tested before. The results from this study indicated that the type of store and social presence do not influence consumers' perceived online shopping security risk or influence intention to purchase. Regardless of the type of online store that someone is shopping on, the consumers' security risk perceptions seems to be the same. More studies could explore whether the type of store would impact some aspects of online shopping. While it may not influence consumers' security risk perceptions, it may influence other variables.

This study also examined the impact of social presence on online shopping perceptions. When social presence was included on an online shopping website through an online chat system, it was not found to impact security perceptions. However, social presence has been found to influence aspects of online shopping. This is a variable that could be explored more to

see what the true impact of adding social presence to an online shopping website is.

Consumers' perceived security risk has been found to influence online shopping by this study. When there is a high perception of security risk, the intention to purchase will be lower. However, the perception of security has not been well defined. More studies need to be done about how security risk is formed and how it can be mitigated. Studies should be done to examine how to decrease security risk as this is a barrier in the e-commerce industry. It is especially important in regards to intention to make a purchase. This relationship has been confirmed and therefore it is even more important to examine why certain security risk perceptions exist.

One important contribution of this study is that, the results of the study showed that consumers' online shopping experience influence the way that they perceive security risk. The longer someone has been shopping online, the less their perceptions of security will be. This means that as more and more people online shop, security risk will decrease overall. The relationship of online shopping experience and security risk could extend to other forms of risk as well and is something that should be explored.

PRACTICAL IMPLICATION

This study provides managers with important information about security risk in online shopping. A lot of retailers have started to add an online chat feature to add a way for customers to communicate with the store. Adding an online chat system can create a sense of social presence for the website. It can also add a sense of friendliness. This can help the reputation of the website and the store and helps take the place of a physical interaction that an online shopper may have in a physical store. But this does not affect consumers' perceived security risk. Therefore, if managers are concerned with how customers are feeling about security of their e-commerce website, adding an online chat system may not be solution for the issue. Adding a chat system can change the reputation of the website and make the online shopper feel more comfortable but it does not correlated with consumers' perceptions of the security risk.

Many types of pure play stores are available to the public and online shopping seems to be the way most people shop these days. People are now feeling more comfortable making online purchases, even if they are not familiar with the store. Because of this, more and more pure play stores will continue to be created. Even if people are less familiar with the store because

they do not have a personal interaction with the store, there is still a level of comfort with the online store. This is probably due the fact that people are getting used to online shopping as it has been around for a while now. As online shopping becomes more and more common, people will be more comfortable with all types of online websites. This will allow more pure play stores to be created and shows that online shopping will continue into the future.

LIMITATIONS

One of the main limitations was that this study used a convenient sample. The group was very selective and similar. It was not a random sample. Because this study took place on a college campus, it was more convenient to use students as the target sample. People from a rather small campus felt uncomfortable saying no to participate the survey, which led to a response rate of 90%. By not doing a random sample, the participants of the survey may have less representation to the real population of online shoppers. Also, with a high response rate, there could be potential for sampling bias.

For further study, a wider age group may be beneficial. College students have grown up with the internet and therefore have different perceptions than those who were introduced to the internet later in life. Other studies have found that online shopping is preferred in youth under the age of 30 (Bhatt and Bhatt, 2012). Another issue was that the way the online shopping experience was recreated was through a four page description complete with photos. Because of bias with certain websites, including past experiences with that website or information previously seen about that website, using an actual online store front did not seem practical. However, a store front could have been created to help the participant have a physical and live experience with the website. This would be rather time consuming to have to create a live website that accurately mimics a typical online shopping experience. If the research involved an actual physical experience, different results may have been provided as mentioned earlier by comparing results to other studies.

Conclusions

This research proposed a research model for consumer perceptions of security risk when shopping online and how that relates to intention to purchase. The model proposed that security risk was influenced by the type of store, either

pure play or click and mortar. The use of a social presence tool was proposed to mitigate security risk. The study used survey data to gather data. After data analysis was completed, the research model was modified by proposing that online shopping experience is the main determinant in how a consumer will perceive security risk and therefore will influence their intention to purchase.

One objective of this study to investigate whether there is a relationship between the type of online store and the consumers' perception of security risk. It was hypothesized that when a consumer shopped on a pure play website they would have a higher perception of security risk than when they shopped on a click and mortar store. When a store has a higher perceived security risk, the consumer is less likely to have intention to make a purchase. Another purpose of the study was to examine whether the use of social presence on an online shopping website has a mitigating effect on the perception of security risk and therefore have a positive effect on the intention to make a purchase from the website.

The research used a survey questionnaire to collect data. The survey was administered on a college campus, relying on a convenience sample. The response rate was 90%.

After collecting the result of the 200 survey participants, the data was analyzed. The data was analyzed through ANOVA and MANOVA and ANCOVA. Not only were the hypotheses tested, but descriptive analysis was completed along with an inferential analysis.

It was found that types of stores do not affect risk perception or purchase intention which could lead to the success of more online only shopping websites, the likes of Amazon.com or ebay.com. Social presence was also found to not have an impact on either perceptions of security risk or intention to purchase.

Experience is the main factor that was found to influence online shopper's security and risk concerns. It was found that intention for making an online shopping purchase has a direct relationship with security risk. If there is a lower perception of risk, there is more intention to make a purchase. Because of this finding, it may mean that online shopping will become more widely accepted in the years to come. As more and more people turn to the internet to buy an item that they may need, more people will have more experience. This should decrease perceptions of online shopping security risk in the future.

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Appendix A

SURVEY QUESTIONS

Construct		Measurement item	Adapted from
Risk	R1	I don't perceive any risk by sharing my personal information concerning my transaction with the online store.	Dash and Saji (2007)
	R2	I am confident that others cannot tamper with information concerning my transaction with the online store.	
	R3	I believe that advanced technology can certainly provide the desired security for my transaction with the online store.	
	R4	I don't think my money will get stolen whenever I transact with an online store.	
Information Security	IS1	I feel secure in providing sensitive information when transacting with electronics websites.	Pavlou et al. (2002)
	IS2	I would feel totally safe providing information about myself to electronics websites.	
	IS3	I would feel secure sending sensitive information to electronics websites.	
	IS4	The security issue of sensitive information was a major obstacle to my online purchases from electronics websites.	

	IS5	Overall, websites that sell electronics are a safe place to send sensitive information	
Social Presence	SP1	There is a sense of human contact in the website I visited.	Yeh et al. (2011)
	SP2	There is a sense of personal-ness in the website I visited.	
	SP3	There is a sense of human warmth in the website I visited.	
	SP4	There is a sense of human sensitivity in the website I visited.	
	SP5	There is always a possibility of social networking through the interaction with the online store.	Dash and Saji (2007)
	SP6	There was a sense of friendliness when I interacted with the online store.	
	SP7	There was a sense of belongingness when I interacted through the online store.	
Intention to Purchase	I1	I am likely to purchase the products on this site.	Zhang et al. (2012)
	I2	I am likely to recommend this site to my friends.	
	I3	I am likely to make another purchase from this site if I need the products I will buy.	
Trust	T1	The overall feeling of this website is trustworthy.	Dash and Saji (2007)
	T2	I trust this online shopping website because they keep my best interests in mind.	Shin and Shin (2011)
	T3	This online shopping website is one that keeps promises and commitments.	Dash and Saji (2007)
	T4	I do not think that things may go wrong with my transaction through my online store.	
	T5	I am confident that my transaction through my online store will always be transparent.	