

The image shows the cover of a journal. The background is a photograph of a modern, two-story building with a light-colored facade and large windows. The building has a sign that reads "FOUNDER'S HALL". In front of the building is a green lawn with some trees and a paved path. A large blue banner is overlaid on the right side of the image, containing the text "2013 Journal of Undergraduate Research".

2013

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Research**

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Letter from the President

5 March 2013

To the Cabrini College community,

Congratulations to the editor, editorial review board, students, faculty and staff who produced the fifth annual Cabrini College *Journal of Undergraduate Research*. This year's *Journal* continues to demonstrate the exemplary research and scholarship of Cabrini College's students who answered the College's call to "Do Something Extraordinary."

Undergraduate research is transformational to the academic and leadership development of students, which are hallmarks of the College's mission to provide an *Education of the Heart*. Countless studies have validated that through undergraduate research, students develop essential interdisciplinary skills in research design, data collection, comprehensive analysis and professional communication. As a pedagogical tool that complements classroom learning, undergraduate research connects the whiteboard with the real-world that surrounds students, inspiring deeper exploration and a more rigorous scholarly investigation of what most intrigues them. This experience enhances academic and leadership credentials for students to earn scholarships, awards and entry into top-flight graduate programs while preparing them to become leaders in their chosen field after graduation.

Equally, through undergraduate research, students gain self-confidence and intellectual independence, learning to trust their own abilities while becoming confident in sharing their conclusions with the world. Through the one-to-one rapport with faculty mentors, students can emulate how professional scholars conduct and present research. This is the very education we seek to offer students at Cabrini College – original research, scholarly inquiry, experiential learning experiences and personalized faculty relationships that develop a lifelong passion for learning.

This *Journal of Undergraduate Research* shines as an example of the blending of academic excellence and leadership development in a Cabrini College culture that encourages the extraordinary. I am deeply grateful to everyone who made this *Journal* a reality. Again, congratulations, and thank you for sharing it with the Cabrini College community.

In peace,



Marie Angelella George, Ph.D.

Editorial Statement

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

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

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

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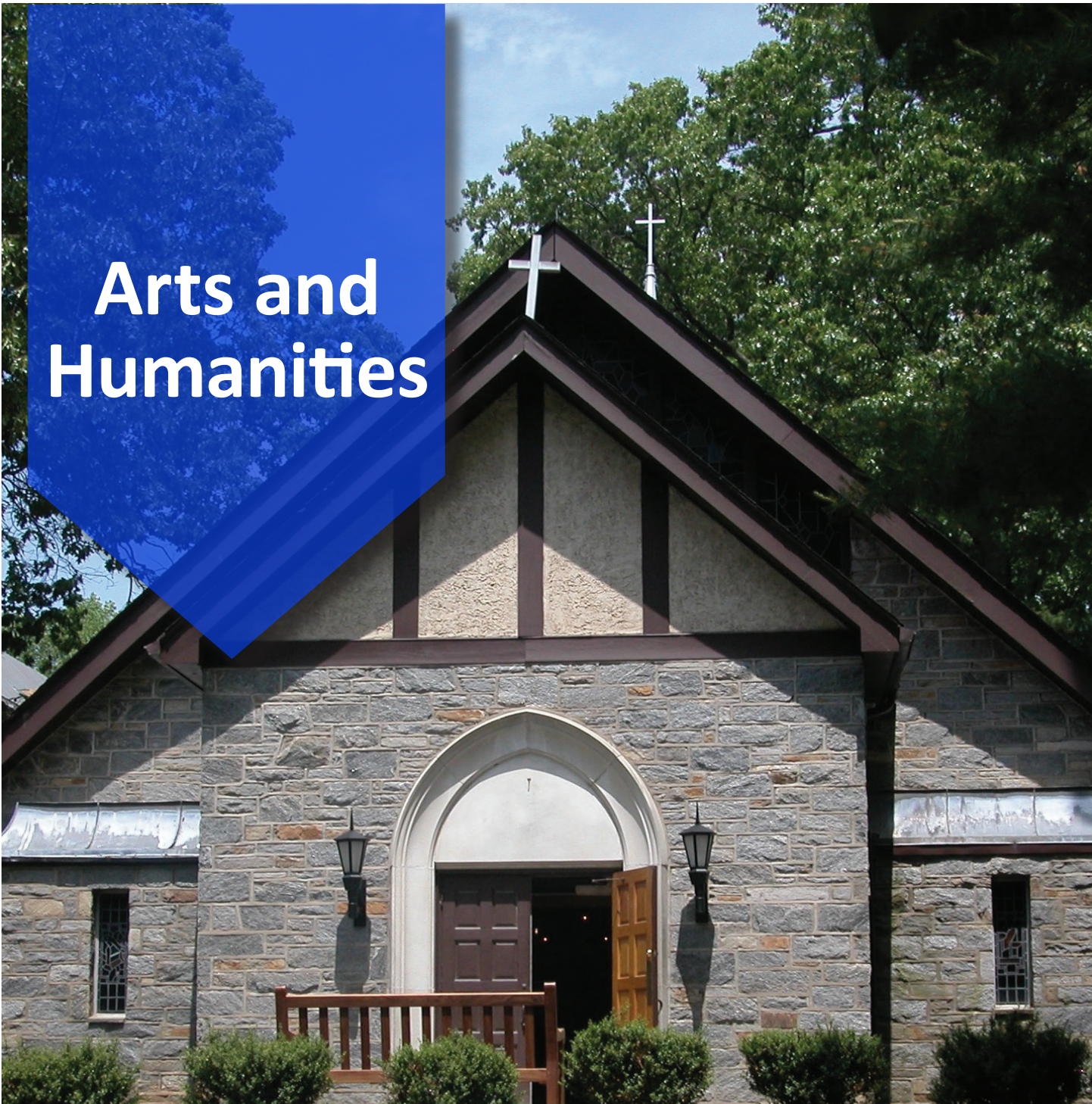
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La Supervivencia del Más Fuerte: Análisis Literario del *Lazarillo de Tormes*

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Languages and Literatures

Abstract

Lazarillo de Tormes is a novel written by an anonymous Spanish author at the beginning of the 16th century. This novel describes the different levels of the social class: the rich and the poor, revealing their most corrupt moral conditions. Struggling to find autonomy, these two social classes become astute, each in their own way, while abusing the other. This work shows the two sides of the coin--the rich and their moral decadency; and the poor, including Lazarillo, who falls victim to the same moral decay of the rich as he tries to survive in Spain's society. The survival of the fittest is the only way for him to persevere.

La novela *Lazarillo de Tormes* representa dos caras de la moneda de la sociedad española del siglo XVI. Estas dos caras son los indigentes y los pudientes viviendo en una decadencia moral. Lazarillo, el protagonista, es parte de esa cara de la moneda que se ve en la necesidad de sobrevivir. Él vive en una pobreza extrema la que lo lleva a sufrir hambre, burlas, engaños, y sobre todo, padece de maltrato infantil. Sin embargo, Lazarillo se resiste a todo eso y trata de sobresalir como si se tratase de la supervivencia del más fuerte, llevándolo a la predisposición de mentir, robar y hacer trampas. Por ello, ese niño mendigo aprende a ser un embustero y se ve forzado a hacer todo tipo de picardías con aquellos que quieren abusar de él.

La primera cara de la moneda son los pudientes como la nobleza y el clérigo. Ellos enseñan valores esenciales y exclusivos como el honor, la belleza, la castidad, el linaje y la cortesía. Sin embargo, esos valores dentro de esta sociedad ya habían decaído a

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tal grado que cada uno mentía y sólo era una ideología para aprovecharse del más débil y seguir en el poder. El protagonista lo afirma cuando dice: “No nos maravillemos de un clérigo ni fraile porque el uno hurta de los pobres, y el otro de casa para sus devotas y para ayuda de otro tanto....” (Mujica, 110). En la nobleza se ve el perfil de la corrupción y el abuso. Por ejemplo, los nobles se hacen pasar por personas *buenas* como el Comendador de la Magdalena, un noble que tiene bastante dinero, lo que le da prestigio y fama para aparentar y así, anhelar su buena conducta e influencia. Estas características atraen a personas indigentes como la madre de Lazarillo. No obstante, el Comendador se aprovecha de la ignorancia y falta de los recursos económicos de sus lacayos para así hacer más negocio en la encomienda. También les quita el sustento y les hace trabajar más de la cuenta. El protagonista narra:

Mi viuda madre, como sin marido y sin abrigo se viese, determinó arrimarse a los *buenos* por ser uno de ellos, y se vino a vivir a la ciudad, y alquiló una casilla, y se metió a guisar de comer a ciertos estudiantes, y lavaba la ropa a ciertos mozos de caballos del Comendador de la Magdalena. (Mujica, 109)

Otro ejemplo de los pudientes son los judíos conversos al cristianismo. Estos judíos adinerados eran unos tacaños o avaros y tenían la fama de ser muy religiosos. El ciego, uno de los amos de Lazarillo, se manifiesta así de ellos: “Más da el duro que el desnudo” (Mujica, 115). El ciego como los conocía tan bien, sabía que estos judíos conversos siempre daban un poco de dinero porque era parte de su religión y no querían caer en pecado, así que solamente compartían los sobrantes. Los desnudados por otra parte, eran los pobres o indigentes. Ellos no compartían ni las migajas porque era todo lo que tenían y era difícil compartir lo poco que les quedaba.

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En esta novela los pudientes representan una jerarquía que conlleva a la estratificación social, lo que origina una desigualdad e inestabilidad económica. Además de que personifican un declive moral, lo que hace que se vuelvan indiferentes hacia su prójimo. La otra cara son los pobres, los huérfanos e indigentes que sufren de hambre excesiva. Esto influye mucho en su comportamiento moral, emocional, económico y social. Por ejemplo, en la novela, el padre de Lazarillo era molinero por quince años, pero un día el padre fue acusado de un crimen, y por ende tuvo que salir de la familia. Durante esos quince años todo marcha bien ellos no sufrían de pobreza, pero en cuanto el padre de Lazarillo fue capturado y llevado a la cárcel la declinación económica empezó, dejando a Antona Pérez, madre, y Lazarillo sumidos en el infortunio. Esta discrepancia económica hizo que Lazarillo y su madre salieran del pueblo para poder conseguir algo de comer, por lo tanto se vieron forzados a salir de su pueblo para ir a vivir a la ciudad de Salamanca. En esa ciudad la madre de Lazarillo empezó a trabajar ganando poco dinero. Este proceso de adaptación económica la llevó a conocer a un hombre que la ayudaba económicamente, pero ella se enreda tanto que queda embarazada. Ahora la madre de Lazarillo tiene que mantener a dos pequeños. Sin embargo, no puede mantenerlos y se ve obligada a dar a uno de sus hijos a un ciego desconocido. Aquí se muestra este comportamiento moral y a la vez la falta de alimento. La madre de Lazarillo toma una fuerte decisión en desistirse de Lazarillo cuando dice:

Ella me encomendó a él diciéndole cómo era hijo de un buen hombre, el cual, por ensalzar la fe, había muerto en la de los Gelves y que ella confiaba en Dios no saldría peor hombre que mi padre, y que le rogaba me tratase bien y mirarse por mí, pues era huérfano. (Mujica, 110)

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Lazarillo, un niño, huérfano e inocente, fue aleccionado por el ciego. No obstante, el ciego lo hacía de una manera agresiva y burlesca. Como era de esperarse, Lazarillo tuvo su primera experiencia de maltrato infantil. Por ejemplo, el ciego no le daba de comer a Lazarillo e incluso había ocasiones que le pegaba por cualquier error que cometía. Lazarillo lo narra así:

Desde aquella hora quise mal al mal ciego; y aunque me quería y regalaba y me curaba, bien vi que se había holgado del cruel castigo. Me lavó con vino las roturas que con los pedazos del jarro me había hecho, y sonriéndose decía: ¿Qué te parece, Lázaro? Lo que te enfermó te sana y da salud. (Mujica, 114)

Lazarillo, aunque sufría no solamente de los malos tratos, también sufría de las burlas por parte de los habitantes del pueblo. El ambiente sórdido y ruin de esa sociedad española rebasaba los límites de crueldad e insensibilidad. La gente que estaba cerca de Lazarillo no demostraba compasión. A Lazarillo lo veían como una personita insignificante y despreciable. Esta decadencia ya era una maldad superada, ya nada importaba, sí fuese un niño inocente, desamparado e indefenso. La maldad de la sociedad decaía a un grado de indiferencia. Los sentimientos de otros ya no interesaban porque las burlas y las sospechas hacia ese niño eran demostradas con frialdad y apatía. El mismo Lazarillo manifiesta lo que decían: “¡Mirad quién pensara de un muchacho tan pequeño tal ruindad! Se reían mucho el artificio, y decían: —Castigadlo, castigadlo, que de Dios lo habréis. Y él, con aquello, nunca otra cosa hacía” (Mujica, 114).

Además de las burlas y maltratos, Lazarillo sufría de hambre exagerada e insaciable. Para él era urgente adquirir alimento, y para ello, tuvo que ingeniárselas desafiando todo tipo de situaciones para poder subsistir, ya que el amo no le daba de

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comer lo suficiente. Así el niño, con su sutileza y talento comete todo tipo de fraudes, al grado de robar y mentir para poder tener un poco de alimento en su pequeño estomago.

Él lo dice así:

Como me vi con apetito goloso, habiéndome puesto dentro el sabroso olor de la longaniza, no mirando qué me podría suceder, pospuesto todo el temor por cumplir con el deseo, en tanto que el ciego sacaba de la bolsa el dinero, saqué la longaniza, y, muy presto, metí el sobredicho nabo en el asador, el cual, mi amo dándome el dinero para el vino, tomó y comenzó a dar vueltas al fuego, queriendo asar al que de ser cocido, por sus deméritos había escapado. (Mujica, 116)

A pesar de su corta edad, Lazarillo se da cuenta que para poder sobrevivir y ser más sagaz tiene que reprimir su inocencia y declarar su habilidad para permanecer fuerte. Lazarillo ha cambiado su actitud hacia su amo, ahora él ha asimilado esa malicia por medio de la picardía. Él declara así:

Yo, que vi el aparejo a mi deseo, le saqué de bajo de los portales, y le llevé derecho a un pilar o poste de piedra que en la plaza estaba, sobre el cual y sobre todos cargaban saledizos de aquellas cosas y le digo: Tío, éste es el paso más angosto que en el arroyo hay. Ponme bien derecho y salta tú el arroyo. Yo le puse bien derecho enfrente del pilar, y doy un salto y me pongo detrás del poste, como quien espera tope de toro, y dije: ¡Sus, saltad todo lo que podáis! Aun apenas lo había acabado de decir, cuando se abalanza el pobre ciego como cabrón y de toda su fuerza arremete, salto, y da con la cabeza en el poste, que sonó tan recio como si diera con una gran calabaza. ¿Cómo, y olisteis la longaniza y no el poste? ¡Oled! ¡Oled! (Mujica, 118-119)

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Lázaro aprendió muy rápido sobre la malicia y la crueldad humana pero sobre todo como sobrevivir en ella.

En la obra literaria *Lazarillo de Tormes*, es evidente que la sociedad española del siglo XVI expone a los pudientes y a los indigentes como las dos caras de la moneda. Estas dos caras habían perdido su valor, cada una contaba con un declive de valores morales. La práctica del civismo en esta sociedad había dejado de existir. El carácter del protagonista anti-héroe, Lazarillo, demuestra el lado de los pobres, siempre tratando de sobrevivir con mucha dificultad, atravesando obstáculos, maltratos, burlas, e indolencias; mientras que los aristócratas y la nobleza, siempre abusando de los más vulnerables y disfrutando de su poder y nivel social. Sin duda alguna, la historia de *Lazarillo de Tormes* expone un comportamiento indecoroso de estas dos clases sociales. Lo provocador de todo esto es Lazarillo, apenas un niño, es expuesto a caer en el mismo deterioro moral, lo cual esta actitud se ha consolidado en él por causa de las experiencias negativas y el hambre excesiva que sufre en la sociedad española.

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Changes in Education and Advocacy for Latino Students

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Languages and Literatures

Abstract

The United States is experiencing significant change as it tries to adjust to economic, social, and cultural transformation. The arrival of Latino immigrants is one of those challenges, and some sectors of society are mobilizing in many areas to respond to the demands of adequately educating a new generation of recent arrivals. Many changes must be implemented to meet the needs of the most vulnerable youth in a growing number of states around the country. American citizens must promote the common good by advocating for all students so that all have equal opportunities for growth and development.

Introduction

The entire world seems to be experiencing change. In some places, the change is political renewal; in others, it is fundamental adjustments because of economic turmoil. The United States is also undergoing significant change as it comes to grips with a fast-changing demographic shift. This is because of the arrival of Latino immigrants who have come to this country in the last three decades in search of a better life. Their presence demands that society evaluate the education of Latino youth, who will someday play a key role in our own future. The changes must take place at the national, state, and district level to be effective. The schools must engage with Latino students by making an effort to understand their culture. They will also must rid themselves of negative practices and promote positive practices. Many important researchers have identified how to start this process so that education will be more equitable. However, they all agree that an

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important part of that challenge remains the promotion of advocacy efforts to support these vulnerable youth.

Changing the Education System

The education of the Latino youth must be evaluated and revamped because society needs the contribution of all its youth to secure its future. That being the issue, many changes are necessary to improve the country's educational system as a whole. At the outset, schools must review standards and educational programming. In addition, states, districts, schools, teachers and administrators must remain open and acknowledge the need for these fundamental changes. It is their duty as educators and leaders of future generations to recognize this urgency. Valverde (2006) stressed this urgency repetitively. When discussing how young students learn, Valverde (2006) encouraged Americans "to strive for the better by enriching the country's schools, making them more inviting, equipped and successful for these new students of various backgrounds" (pp. 3–17). This is a crucial mission to be acted upon immediately.

Inefficiencies in the Education System

In the last 50 years, a considerable amount of research has been conducted on the inefficiencies in programming, performance, and execution of American school practices. For example, Huerta and Brittain (2010) examined these inefficiencies and indicated that four changes must be made in today's school systems. First, schools should no longer be run the way societies are run (i.e., where lines are drawn between the haves and the have-nots, pushing the gap further and further apart). Second, students must be challenged at an earlier age. Third, the idea of bilingualism should be welcomed and not shunned in all schools, as it has already been proven more effective in the overall preparation of the

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students. Fourth, non-Latino teachers must become more aware and more knowledgeable of these expectations because as educators, they are the pillars of this building stage.

Policy Changes Through the No Child Left Behind Act

Looking back at the last 10 years, policy changes in education have had a dramatic effect on Latino learning outcomes. The introduction of the No Child Left Behind Act (NCLB) of 2004 had a negative effect on this population. Some researchers have expressed a complete disregard for the law, claiming that it simply “did more harm than good” in dealing with matters of education. One individual who expressed this notion was Tinajero (2010) who supported the statement with the idea that NCLB places a great strain on the education process. Finally, it puts unnecessary and ineffective stress on the teachers (Tinajero, 2010, pp. 3–30). Most importantly, students from different cultures or English Language Learners (ELLs) are not assisted properly through NCLB. It is appropriate that every child be included and encouraged to succeed, but only in specific and comfortable ways that best suit the individual, not merely in broad ways through standards. The impact of the NCLB must be recognized and its purpose today should be reconsidered because it is clearly having a negative impact on the learning outcomes of Latino and other students of diverse heritage.

Promoting Bilingualism

As has been demonstrated through the research over the past 40 years, the promotion of bilingualism is a practice that educators have suggested and have proven to be effective for the enhancement of education in the 21st century. Again, Tinajero (2010) presented evidence of success from school districts near the Mexican border where the Latino population is prevalent. There, diverse classroom settings are fostered and bilingual practices are incorporated regularly. These two ideas are the most effective and,

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through various case studies performed, research has shown that bilingualism improves literacy. Additionally, it is proven that expanding language competency in all students makes them not only more marketable, but also more comfortable in different cultural settings. For example, according to Tinajero (2010), “As a whole, native Spanish-speaking children learn to perform better in English in an environment that respects their native language and provides continued growth in that language” (p. 499). That being the model, all schools and individual classrooms should be more welcoming to diverse student populations. It is the teacher’s duty to make sure that all cultures are recognized and validated. This practice will ultimately contribute to a student’s healthy cultural development, and will increase his or her knowledge and application of another language. Another important bilingual concept has been the two-way, dual language approach, which not only benefits Latino students, but also benefits non-English language learners. Izquierdo (2011) highlighted the many benefits of being bilingual or at least being familiar with a second language. First, bilingualism eliminates the social segregation that is often present in schools and classrooms. Instilling bilingualism in students at an early age will prepare them best for the challenges that they will face in life. In addition, students learn the most from one another so bilingualism should be practiced at all times, even outside the school setting. With this skill, all children will learn to respect, to help, and to learn from their peers. The notion that speaking two languages represents an advantage at the national level—and an asset from a global perspective—can no longer be disputed. To have the most prepared future leaders, these already successful practices of bilingualism must be advanced beyond the norm.

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Teachers as Teachers of Leaders

Much research has exposed the specific practices of improvements that (one hopes) will contribute to the preparedness of future leaders from diverse populations. Valverde (2006) believes the creation of new and improved mindsets should be prepared and advanced through improvements in staff development and leadership in the schools and districts. Teachers must be reminded that they are the leaders in the classrooms, and that this urgent change must come from them. Additionally, according to Valverde (2006),

Leaders strengthen, improve, and build up. An analogy that relates well to this concept is one in which educational leaders should view the glass to be half full, not only adding more water so more can drink, but also find ways to enrich the water with healthy minerals so that those who drink are better for it. (p. 129)

This comparison between good educational leadership and a glass half full portrays a clear rationalization for why appropriate leadership for Latino students encourages them to be interested and engaged as their cultures, differences, or struggles are recognized. In addition, the parents of these students must become more involved in their children's lives. This is the only way the youth, who are the future of our country, will succeed. In addition, communities must get more involved, showing more support. At this time, this is imperative because, to feel part of their community, students must feel that they are a part of their school because the school is the cornerstone of a community. In Valverde (2006), this notion was referenced back to the Accountability Movement in the 1990's when all students were incorporated and not isolated from their schools and communities. There was a fair balance of interest and support (Valverde,

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2006, pp. 21–22). With strong leadership and strengthened community engagement, the educational preparation of future leaders will be most apparent and effective.

Overcoming Ethnic Stereotypes in the Classroom

For Latino and learners of diverse cultures to thrive in the classroom it is important to eliminate the typical stereotypes placed in today's classrooms. This elimination should stem from the teacher or leader facilitating the class. From research on shared experiences and the understanding of mentors, it is known that students are affected by their teachers' lack of concern and interest in their success. As a result, the mindset of teachers must change to match the mindset of the children they teach. Adding to the elimination of stereotypes, Valencia (2011) noted another instance that must be addressed in today's schools is the consistency factor, which is absent for most Chicano students with regard to their education. Rumberger and Rodriguez (2011) reported a 21.5% dropout rate for Latino students in 2007 (p. 76). They also mentioned the reasons why this trend is popular and offered some possible solutions. The most compelling reason that Rumberger and Rodriguez (2011) noted was that

teachers need to gain these students' interests from the start, that way the boys and girls will make school an ultimate priority rather than not at all. Dropout rates will tend to decrease rather than increase and the norm will be switched. (p. 92)

In short, more intentional effort must be made to achieve the desired outcome.

Advocating for Latino Students

Therefore, as research indicates, the way that individuals succeed is through consistency in the amount of interest and support, and through the advocacy opportunities offered to them. Fortunately, these resources are on the rise. Today's advocates are willing to engage with these diverse learners regularly and positively. The goal is to

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achieve bright futures for Latino students through worthwhile educational experiences. Supporting the importance of advocacy for the oppressed, Ratts (2007) stated, “Because all members of this world have a special obligation to the poor and vulnerable, everyone must do their part to contribute to the Common Good. The Catholic vision is to be all inclusive” (p. 94). These values should guide the advocate’s faith and expectations as citizens. Eventually, appropriate outcomes will result and examples will be recognized and imitated by others for the good of Latino students. Ultimately, society today must be prepared to welcome tomorrow’s changes, especially the dramatic rise of the Latino population in the United States.

Conclusion

In conclusion, many key researchers, including Clark (2003) ascribe to the notion that improvement supports the commonly accepted American Dream ideal, in which anything is possible in the United States. From this knowledge, it is understood now that an individual can indeed achieve his or her dreams if he or she is nourished initially, and supported properly and respectfully. Education is the key. Therefore, why not set the tone for change in American schooling earlier? This certainly should include Latino learners. This new vision includes needed changes in the country’s schools regarding rulings and expectations, the manner in which teachers and leaders operate in specific settings, and finally, the ways that extra assistance or advocacy can be the most productive. Most importantly, changes must meet the challenges already present. It is all about preparing today’s youths to be tomorrow’s prominent leaders. Every individual is deserving of that opportunity.

CHANGES IN EDUCATION AND ADVOCACY FOR LATINO STUDENTS

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Latino Students in the American School System

By Donald Powell, Cabrini College

Faculty Mentor: Raquel A. Green, Ph.D., Department of Romance

Languages and Literatures

Abstract

As opportunities diminish in many parts of the world because of an uneven distribution of wealth, people are forced to migrate in search of a better life for themselves and their families. The United States continues to be a refuge for those who seek new opportunities or who seek asylum from political oppression. The proximity of the United States to Central and South America has contributed to a constant migratory flow of Latino immigrants, many of whom risk their lives in search of the American Dream. In communities around the country, Latino immigrants make significant contributions to our local economies. This diverse population is growing; therefore, schools are facing many challenges, and it is essential that we find solutions to continue building a skilled workforce and a strong economic future.

The “American Dream” is a value that people continue to uphold and it has endured over time. It not only involves material well-being (usually a house, at least two cars, and the ability to pay for higher education), but also climbing the social ladder. The “American Dream,” like any other dream, is something that can never be actually reached; in other words, it is intangible. The mysterious lure of the “American Dream,” and the diminishing opportunities and conditions in much of the underdeveloped world, are two contributing factors toward the persistent migration of people affected by these challenges. Immigration is a worldwide epidemic and has a significant impact on the countries that are used as refuge, especially the United States. Because of its close proximity to much of the Spanish-speaking world, the United States has become a safe haven for Latino immigrants who desperately yearn for a better life. The presence of these immigrants is very critical today, as they are responsible for much of the “behind-

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the-scenes” work required for the proper functioning of our everyday American way of life. The immigrant population of America can best be observed by looking within the schools of the country: it is predicted that immigrant children make up 50% of the school population in many states. Having such a large number of students who primarily speak Spanish has caused many problems, not only within the school systems themselves, but also within the Latino communities.

The heavy influx of Latino immigrants has resulted in an increased number of Latino students into the American school system. This presence has forced schools to re-evaluate the way they do their teaching from year to year. Schools in the United States were originally developed under a system that fostered the needs of a homogenous group, with the goal of molding together perfectly well-rounded individuals. Unfortunately, this type of design is very much outdated because not only are students today more diverse, but also the demands and expectations of an American-educated person have changed. The traditional school system was designed for a predominantly Caucasian population, during a time when students were expected to graduate with knowledge of the basic subjects, mathematics, history, English, and science. However, in today’s society a student needs to have much more than this basic knowledge to function properly. Aside from curricular issues, the educational system of our nation fails to hire and train culturally qualified teachers.

The school curriculum might be completely reinvented, but the outcome of how and what children learn will remain unchanged unless a shift occurs in the attitudes and experiences of the teachers. The changes should ultimately begin with the teachers, who need to become more culturally aware of the lives of their students outside the school

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walls. Seven attributes have been identified as making a teacher a culturally competent individual. These attributes include (a) being bilingual in both English and Spanish, (b) having the ability to transform lesson plans so that they are more easily understood or more relevant to the Latino students, (c) being educated on the sociocultural aspects of the Latino community, (d) being knowledgeable about the process of second language acquisition, (e) being able to educate and model appropriate behaviors to administrators and colleagues, (f) being able to involve family and community with class work and other school activities, and finally, (g) being able and willing to develop skills by attending courses and workshops. If a teacher has all of the attributes listed above, studies have proven he or she is more likely to affect positively Latino students' educational experience and their lives in general (Valverde, 2006, pp. 35–43).

However, having these specific attributes alone does not automatically result in instant success for the students. For these attributes to work to their fullest potential, the reinvented curriculum and culturally enhanced teachers must work in close partnership with the community to ensure total student support.

It is clear that many Latino immigrants continue to misinterpret the reality concerning the opportunities awaiting them when they come to the United States. Many immigrants come to our country with the mistaken notion that America is “the land of the free,” full of easy opportunities protected by the wording of our Nation’s Bill of Rights. So many of our citizens today have ancestors who once immigrated here themselves; therefore, it is easy for a new immigrant to expect to achieve the same level of success of previous generations and quickly fall under the false hopes of the American Dream (Clark, 2003, p. 9). The possibility of a Latino immigrant succeeding in America is not impossible, but for the majority, it is a very difficulty process. Success is often not

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attained, not because of a lack of determination or because of their unwillingness to complete the necessary tasks. It must be noted that often success is not possible for many of the Latino youths because large numbers of them go on without a proper education. For any person living in America (legal or undocumented) to build a future, it is highly essential to be fully educated, not only in the subjects of general education, but most importantly, on the topics of America itself.

The problem with educating Latino students is not that schooling is unavailable; rather the problem is that proper resources and efficient programs have yet to be established. When Latino immigrants come to our country and enroll in our public school system, they begin the process of acculturation: designed to mold them slowly into “regular” Americans, and washing away any ties to their Latin origin. This process does not go over well with the immigrant students and they begin to shut down and ignore any information that is projected to them during school hours. This means that any educational efforts made by our school administrators and teachers goes unheard. Without proper educational background, immigrant youth live without hope of ever achieving that “American Dream” for which they have sacrificed so much.

In conclusion, it is primarily in the area of advocacy of the Latino students to improve their educational experience that the Cabrini mentoring program, through its partnership with the Norristown Area School District (NASD), makes its most significant impact. In our role as mentors, we are a bridge between the school and the Latino students and, more importantly, we play a part in bringing about positives changes in the student–teacher–parent climate (Ratts DeKruyf, & Chen-Hayes, 2007, p. 93). The advocacy work the Cabrini mentors do with the Latino youth is highly significant because these students relate to us more, and they sense that we understand and care

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about what they are going through. As part of our training to be effective advocates in the community, we maximize all opportunities to assist the Latino students in academic and social areas and endeavor to strengthen a program that seeks to support the needs of diverse students who enter the halls of the Norristown Area High School.

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Education and the Latino Community

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Languages and Literatures

Abstract

At the present time, foreign-born students make up the largest population in many public schools around the country. For this reason, it is important to examine the factors that determine the access to education and support for all students in the United States. It is also essential that we evaluate a wide range of factors affecting the education of Latino populations in the United States, such as the qualities of effective and culturally responsive teachers, the strategies that can be applied to increase the efficacy of current programs of study, and the importance of advocacy for a disadvantaged population of young, bright minds. Each of these elements will be applied to Cabrini's work mentoring young Spanish-speaking students at the Norristown Area High School.

At times, it can be very challenging being a college student. The responsibilities, assignments, classes, professors, exams, and papers can be extremely overwhelming. It is not uncommon for students to ask themselves why they had even bothered spending so much money to knowingly subject themselves to that pain. However, one answer, and one only silences all doubt in any student's mind concerning attending college: the promise of a better future. Education becomes a part of us, something that no one can ever diminish or take away. The importance of an education, which is something so many people view as a right, is not as easily accessible for a large segment of the population of the United States. Foreign-born students of Latino heritage are among this segment, which comprises a significant percentage of the population of children in public schools around the country. In today's extremely competitive world, education is a necessity, but it is only attainable for a child who also has the right nourishment and resources to be

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able to learn and grow. This paper will evaluate a number of factors affecting the education of Latino populations, qualities of effective and culturally responsive teachers, strategies for changing programs of study, and advocacy for a disadvantaged population of young bright minds. Each of these elements can directly be applied to our work at the Norristown Area High School mentoring Spanish-speaking students.

In America today, the population of Latinos is rapidly growing, and this influx of immigration is causing problems in many school districts, which are being populated with children who are learning English as a second language. In the past, the attitudes about immigration and assimilation in this country were extremely one-sided. In the minds of many Americans, those who want to come to the United States should learn to speak English if they wish to prosper and become successful in our country. This idea is simply inadequate because of the new wave of immigrants who are native speakers of Spanish who come from Mexico and other Central American and South American countries. Today, we understand that suppressing immigrant cultures is detrimental to the future of a healthy society. It is important to make sure that people of different cultures come together in harmony and live productive and culturally rich lives.

School district administrators appear to be unable to accept the issue of immigration; therefore, they are not prepared to make the necessary changes to accommodate Latino students; therefore, they place them at a significant disadvantage from other children in schools. Research has shown that their education continues to be seriously compromised by ill-prepared teachers and inadequate curricula. This inadequacy not only affects the education of the Latino population, but that of the entire country. The population of Latinos in the United States is not expected to decrease in the next decade; in fact, it will continue to dramatically increase in the coming years. These

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changes in demographics will have to be reflected in the long-term curricular programming of schools if the country has any intention of succeeding in the 21st century.

Many factors must be taken into consideration to succeed in the education of Latino populations. First, it is imperative that schools recognize the need for supportive, prepared, well-educated, and culturally sensitive teachers and administrators. Teachers and administrators are the backbone of education in the United States, and should be held accountable for the progress of the students in their classes. Next is the urgency for improved educational techniques for teachers to use because of the unique needs of their students and school districts. Many strategies have been used and tested in schools across America that have proven successful in helping English learners acquire a second language and make the most out of their educational experience.

Huerta and Brittain (2010) discussed qualities of effective teachers of Latino students, following their observations of communities deeply committed to bilingual education. Effective teachers must combine these three nontraditional practices in the classroom: highly interactive, student-centered, and collaborative (p. 383). According to Huerta and Brittain, and many other researchers, the most effective teachers are bilingual, knowledgeable of the subject matter that they teach, and knowledgeable of the sociocultural aspects of students' lives. They understand the second language acquisition process, have the ability to draw parents into the classroom to be partners in education, and are constantly updating their skills to provide the best possible education to their students (pp. 383–384). Huerta and Brittain (2010) also discussed a few characteristics that distinguish culturally responsive teachers:

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1. Socioculturally conscious, meaning the teachers are aware of and respect cultural differences among students.
2. A constructivist approach to teaching where students use their personal knowledge and beliefs toward obtaining goals in the learning process.
3. Knowledge of the culture of the students; an affirming attitude; use of appropriate instructional strategies in developing language among other skills.
4. Advocacy for all students. (p. 387)

The most important quality of any effective teacher of Latino children is the ability to recognize students as individuals who have the right to learn and the ability to achieve (p. 397).

Tinajero, Munter, and Araujo (2010) discussed different strategies to establish within schools to educate better all children. First, the Sheltered Instruction Observation Protocol (SIOP) model is based on the principle that language acquisition is enhanced by social and cultural contexts through meaningful application and interaction. The SIOP model needs strong background knowledge and linking to personal experiences of the students (p. 494). One and Two-Way Dual Language Instruction programs are different ways to implement language instruction into the curriculum. Two-way programs include both the language minority and majority, where one-way caters only to the minority populations (p. 494–495). This approach to language education is a stronger and more effective practice because both groups of students are second language learners and are therefore equals. This article also discusses the importance of the role of the native language of the students, family involvement, and diverse contexts included in language instruction (p. 499). Izquierdo discusses not only the value of bilingual education, but also the many benefits of this unique style. Communities that implement this type of

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instruction understand that multilingualism is an asset to all members of the community and a necessity in a growing global environment. Not only do the students benefit from this type of education, but also it broadens the spectrum of opportunities for the entire community that supports the application of this educational practice.

In application to our experiences in Norristown, a large factor in the issues the students face is the inability to communicate and develop strong relationships with their teachers. The teachers in Norristown must exhibit the same qualities that Huerta (2010) discussed. At times, it seems like many of the students lack a strong relationship with their teachers, who also feel they are unable to connect because of various differences among students. Having experienced so far only a few weeks of consistent mentorship this year, I have already developed a friendly and open relationship with a few students, and I can see that they really do want to succeed in everything that they do.

All of the factors discussed within the context of this paper (i.e., qualities of effective teachers, and strategies for new programs of study, etc.) are extremely important when attempting to reach the population of Spanish-speaking students at the Norristown Area High School. However, advocacy is the final portion of our mission in helping these students. It should also be the mission of those who wish to improve schooling for the future leaders of the United States, the children. Advocacy for these students and their needs will help to bring about cultural awareness and hopefully even a policy that will assist in improving schools. In turn, this can improve graduation rates, grades, and language proficiency in Latino populations. It is our duty as humans to be advocates for those who need us, and the education of Latino populations is a vital factor in the future of our country. As Americans, and as human beings, we should be open and prepared for changes in the world, not trying to hide from them or cover them up. Advocating for a

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cause has the unique ability to bring people together, which is exactly what needs to be done to succeed in achieving equality in education for Latino students.

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Voices from Mt. Pleasant, 2012

Presented by Cabrini College students:

Alicia Barringer

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Brendan Burke

Krista Callaghan

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Donald Irons, III

Matthew Juliano

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Abstract

“Voices from Mt. Pleasant” presents selections from longer oral histories gathered by the class ECG 200:

Democracy and Diversity. Mt. Pleasant, a small neighborhood within walking distance of Cabrini College,

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represents several kinds of diversity within the larger suburban context of Wayne. It differs from the rest of Wayne in its demographics, its history, and its physical appearance. The community is mostly, but not entirely, African American. Many of its current residents are descendents of people who settled here in the early 1900's and several large extended families still live here. Many of the people have lived in Mt. Pleasant all of their lives and are now retired. They have seen many changes over their lifetimes. The houses themselves are older than in most of the neighboring communities, closer to the street, smaller and closer together. The oral history excerpts presented here tell much about race on the Main Line, today and in the past. They also present a picture of current pressures and changes. "Voices" tries to capture some of the history of this Cabrini neighbor and some of the issues that its residents face.

Introduction

Many of us did not even know what Mt. Pleasant was when the semester began in January. In the course ECG 200: Democracy and Diversity, each student is assigned to interview someone who lives in Mt. Pleasant. Mt. Pleasant is the story of a dying community that we knew nothing about. Mt. Pleasant is a small community that is predominantly African American and that has many issues. We learned that investors have been buying houses and renting them to college students and that many residents there are older now and don't have the ability to take care of their homes. The people who live in Mt. Pleasant come from many different backgrounds, but they all have one thing in common: they would like everyone to get along together. Mt. Pleasant is a community that many families call home and have been calling home for many generations. Mt. Pleasant can be described as a caring community where everybody is like family.

We went as pairs to interview the residents of Mt. Pleasant, to learn their histories and the histories of their families and their community. We also wanted to learn about their issues with absentee landlords and the student renters, many of whom are Cabrini

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College students. The excerpts that are transcribed here are a small part of the oral histories we gathered. These oral histories can be found online at <http://rmcp.dcollege.net/playlists/23126/html>. Our goal as ECG 200 students was to give voice to the residents of Mt. Pleasant whose voices are not often heard. Further, we wanted to preserve these voices for posterity. These are their words, not ours.

Bryan Baynard,

a political activist and younger resident

On his relationship with the police in Mt. Pleasant:

All the time, the police were not friends of the community. As I got older, I pushed... I got, not in trouble, but pulled over a lot up until like '95. I didn't get tickets, they were like routine checks. They searched my car and did a lot of damage to it and ripped up my carpeting and stuff... \$5,000 worth of damage, but I gave them probable cause to search my car. I reached under my seat [to grab my wallet]... four more police cars came and they had me stretched out over the hood as they searched my car.

On what is happening currently to Mt. Pleasant:

Mt. Pleasant is gone. There will not be a Mt. Pleasant. As the people of Mt. Pleasant get older, the kids don't stay. They'll get tired and frustrated, they move on. They'll move out of the house and a lot of times they don't come back. Like if their parents pass away... they're living somewhere else. They sell the homes. They contact the realtor. The realtors don't always put it on the market. They call one of the developers they're friends with and then that house is now gone. The houses get sold before we even know they are on the market. We don't know they're for sale until the sold signs.

[Oral history collected by Brendan Burke and Christopher Musante]

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Allen Brown,

a long-term resident who is now retired

On life in Mt. Pleasant:

My brother, my sister, we all graduated from Conestoga, but at that time Conestoga didn't have any black folks. It was predominately white. This used to be the school right here. This office building [on Upper Gulph]. My brother went to that one.... But I can't say that.... Everyone was friendly. Still you can leave your stuff outside. Nobody will ever take it. You may get a little something now and then, somebody straggles into town. But I will say one thing, when the grandmothers and grandfathers started to die it dropped down quite a few notches. They're the ones that kept things going. Kids today now, they grow up [and] they don't want to work. They want to rap. They don't want to go to school because they get in trouble—they can't go to school 'cause they get in trouble before they get out of school. It's hard.

On life as a retired person in Mt. Pleasant:

It takes a lot of money to survive here. Taxes are getting more and more expensive. You got to upkeep. Sooner or later the man may come through here and say "You gotta have codes, you gotta be up to codes." What happens then? You gotta change the electric. Sooner or later that's gonna come too. That's for your safety to keep your house from catching on fire.

All the older folks are gonna die and the kids aren't gonna stay here. They're not like the older folks. People don't like to work anymore. They think someone's gonna give them something. It's not like that anymore. They say good things come to those who wait. Good things now come to those who reach out and grab. Can't wait no more, and you got

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to have a job, you have to want to work... You got to have a job. You gotta have an outlook on life, too.

[Oral history collected by Matt Juliano and Patrick Wehring]

Jackie Byrd,

a long-time resident whose extended family is the largest family grouping in Mt. Pleasant

On the current generation of college students living in Mt. Pleasant:

It depends on the individual. You can't target any individual in an age bracket because they are all different individuals and their perspective on life is different from maybe yours to his. Your thought patterns may run a little similar, but you're humans and you're all different. So being different that is what makes things go around. There are some that are different and when they get away....and go to college, they forget their upcoming. When you were home with mom, dad, grand mom, you know, you had rules. It's a not targeted to any individual, it's their perception or their individuality and how they do things. The only big concern I have right now is the cars...they are so fast and they don't have any regard for children. They could be going almost 40-50mph from the bottom of that hill to the top to that stop sign. What if a kid darts in the street? What if an animal darts in the street? What if, you know? It's a speed issue for me, nobody wants to drive slow, everyone is in a hurry to get out of a dead end street.

On community in Mt. Pleasant:

You must respect yourself, and respecting yourself will help you respect those around you. Be a mentor to somebody who needs mentoring, because not everyone is as privileged as you. Somebody along the line, or some kid along the line, might just need to see a smile on your face, and not the seriousness of business or school. School can be fun.

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School is a challenge. School is work. But never forget who you are, where you came from. Never forget your roots; don't ever forget your roots, because they are important, because you can pass on your grandmother to your children. The history is within yourself. So within yourself you need to be true to yourself, and remember those teachings. Some of those ways—they may not be as you would like them to be, but remember the love of it, remember it was all done in love, and in projection of that love, you give the love.

[Oral history collected by Gregory Robinson and Matthew DiDonato]

Stephanie Carol-Wells,

a mother of two children, who grew up in Mt. Pleasant moved away, and then moved back with her own family

On why she came back to live in Mt. Pleasant:

I had to get a place to live. Definitely, you have to have something stable, ya know, in your life, so you can build from that. So you start with a house and build outward or over. It's important to have consistency and values and things of that nature so that you can keep those things in place, so that you can keep yourself grounded and your kids grounded. So I would start there.

Family is important. Without that it's very hard. To me, those who don't have family to depend on often have friends ..., friends that they consider family, so once again you're back to the same thing, you always have "family." I think if you have your family, it's not everything, but it's pretty good. I think it makes things easier. Because it's an older area and there are instances where people do just leave things and don't take care of them or the people who do acquire them do nothing with them. It's tough. It's one of

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those; you can't control what you have no control over. You can only do what you can do. Those of us that are left do the best that we can. We try to keep a close-knit family and keep the peace, and try to keep our families safe. And when people do move in we try to keep the lines of communication open and try to establish a relationship right off the bat. I think there's that bond [here] ... that you just can't get rid of. I mean, you were born and raised here, you know the people here, and you like it here. I mean, I think they like it here. We love it here. The thing to do is come back to where your roots are. So like I said, I plan on staying here no matter who is on either side of me. I mean, the people that are on the side of me and across from me would definitely pass down to family members so I don't think I would have an issue....

On the neighborhood in Mt. Pleasant:

I don't know if I would change [anything]. I guess I would change the relationship of the, I guess the residents and the college students. I really think there should be a program in place so that we can bond a little bit better. Not that we don't, but I don't know them. And it's not your fault either, because you're here for a semester or two and you move on. That's just the college life, so I can't really think of anything that needs to be improved. Right? Some people just don't have time and others just don't have a desire. Some people don't have a problem with it; they're comfortable with the way things are. A few college kids—they just don't care. It's not that they don't care. Care isn't the right word. I guess it's that they just don't [want to] get involved and they just don't. Not that there isn't a concern, you know what I mean? It's like if it's not broke, why fix it?

[Oral history collected by Jenifer Boyle and Krista Callahan]

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Linda Grant,

*a long-time resident of Mt. Pleasant, now the interim lay leader of the
local Baptist church*

On the history of African Americans in Wayne:

It goes back to history. African Americans have been here [in Tredyffrin Township] 300 years. We have lived here for 300 years in this suburban area. The [Baptist] Church in the Great Valley [on Valley Forge Road] has African Americans in their graveyard. If you want to go research some history, go down there. They'll be glad to show [you] who is down there. This slave, she wasn't a slave she was born on a slave ship, but set free because some people intervened on that ship, and she worked off her servitude like some people in England work off servitude. You know, like service and she's buried there and a few, maybe another. But we've been here 300 years and a lot of people coming from maybe other states, other areas, they don't understand. They don't even know about that, that we've been here 300 years. It is not new, and there are older people who were born and raised, they were born in homes in Bryn Mawr or wherever they lived, They were born in their homes, maybe not Bryn Mawr Hospital like I was and my sisters, but they were born in the area. There were at least three medical doctors, three black medical doctors, one in Wayne, two or three in Bryn Mawr, and two in Ardmore. A black dentist in Bryn Mawr and they had various businesses all throughout—cleaning, dry-cleaning, all of that. And they were all connected. I think they were all internists. They weren't just medical doctors, you know, that's when doctors—you guys don't remember this, doctors went to your home if you were sick, and they did house calls. They don't do house calls anymore.

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On buying a home in the 1970s in Mt. Pleasant:

When my husband and I purchased our first home in Ardmore, there was a Quaker woman and, I can't remember her name, and she helped middleclass blacks find homes with a flashlight. She would show the homes in the dark with a flashlight and said this is what it looks like, so none of the Caucasian neighbors could see who was coming in. Then she would offer financing, so we got our home even though it was a predominantly bla—I mean, white neighborhood. We went to a lot of homes, okay? I found out later from a church member that they had—they lived in King of Prussia, they still live in King of Prussia, that's how they got their home, too. This Quaker lady [named Margaret Collins} was a friend of Ms. Hall [Mazie B. Hall] and she worked for Suburban Fair Housing. That's what it was called and they financed the homes. They backed the financing for the homes for middleclass blacks. And so a lot of middleclass blacks, when they start selling here, that's how they got their homes.

We couldn't go to a regular bank and get a loan. We got our loan from conventional mortgages. Or, in the beginning, our first house we got because a Quaker couple put the money down for us. My husband got out of Vietnam—you know the war, and we had to have money down, even though it was a VA loan and they placed the money down for the house. So we had to go around [the road blocks] and it was for our faith. If it wasn't for the Lord just changing those things around at those times, nothing would have got done.

On the lots in the community, owned by developers, sitting vacant in Mt. Pleasant:

The landowners [who own the vacant lots in Mt. Pleasant], I think they want [to build] residential, but they want high end. And so there goes red lining all that kinda thing....It doesn't have to follow the [current] style, but I think the plan is to drive out the

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minorities, so that the style home would be, you know, the town houses that are all going up [all over]. So that leaves no land; trees are gone. [Like} what happened beside me: the hole. What we [used to] call the forest or the woods back there—it's all been cut down. And when I was a child we could walk through there, and if you had a project at school, you didn't have to worry about leaves or finding rocks or whatever...geodes. Those kinds of things. There were snakes there. There was a creek that ran through it. You could drink out of it if you got thirsty or just stay in the woods to get cool. There's nothing like that [now] and the wildlife is endangered. You know, it's just not fair. And so it's how many homes can we get into one space? I have a problem with cutting down the trees; I have a problem with trying to move out a certain level income of people.... You know, at the time that I was growing up, no one wanted to be where we are. Now all of a sudden, hey, this is valuable property. We'll give you X amount of dollars. Take it and run. And you really can't buy an affordable, decent place for the money that's being paid. Your best bet is to stay there if you want to rebuild and invest. But the children are not; their children are not interested in staying in the community, so they just sell it and move on.

[Oral history collected by Alicia Barringer and Brian Donahue]

Lillian McKethan,

a long time resident, retired schoolteacher, and college administrator at Eastern College

On how she arrived in Mt. Pleasant:

I intended to stay in Philadelphia all of my life, but the Housing Authority came and through eminent domain took our home. We really wanted to stay in Philadelphia, but this was around a time of housing discrimination. I didn't want to leave my mother in a place where she would be uncomfortable. All the places that they took us to, the real

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estate people took us to, were either dilapidated or, if we went to like Delaware County, the people wouldn't even let us in the house to look at it.... When we came here, we were traveling back and forth to Philadelphia to our church, but it just got to be too much. So we joined a church in Bryn Mawr Saint Memorial Baptist Church. And I can't even think why we did that, maybe because there was not enough room in that little old church. Cause, like I said, it's a family community and once you get the family in that church, there's no room for anybody else. So I think that's why. We were used to a larger church also. [My house is] peace, absolute Peace, seclusion, I don't know if you went by my house, but we live about 250 feet away from the street, so even in the summer time I don't hear the noise. It was really good for me because, at that time, I was teaching; I was driving to Philadelphia through the hassle of coming back home and all I wanted was peace and quiet when I got home and that's what I got and that's what I still have.

On her teaching experience:

I knew I was going to be a teacher when I was in second grade. And I never veered from that, but I moved into special education. I was director of special education at Eastern College for about 14 years. I moved into [special] education when I was teaching elementary school at Lambertton Elementary School, 75th and Woodbine in Philadelphia. I had a class where I think they were 14, 15, 16 kids in the class. And I thought I had died and gone to heaven because most people had 25 or 30 kids. But these were kids that had all sorts of challenges that I had never met before. I might have seen one or two in a regular classroom. But when you get a whole classroom they stand out because there's nothing else you can compare them with. And that made me go into special ed.

[Oral history collected by Rory Cooper and Mackenzie Feiner]

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Joan Redmond,

a long-time resident and successful business woman

On raising children in Mt. Pleasant:

I went to TE [Junior High School] and then Conestoga [High School]. My husband, too. It was great. Played a lot of sports. Basketball, hockey – field hockey – and tennis. I played basketball varsity freshman year. That’s the first it ever happened. I’m suffering for it now. Knees are bad. It was great. I didn’t go to college. I went out into the world. I ran one of the biggest stores. Company called Nan Duskin. Your parents probably heard about it. I managed sales and then I moved up to management. You know where Adolf Bieker in Wayne is? Next to McDonalds? That used to be Nan Duskin and I ran that store for 23 years. High end fashion. I would run back and forth to New York with them.

[In the old days] ...all the parents looked out for everyone’s children. If they saw a child misbehaving, they spoke to them and I did the same with their children. So there was never any problems. But you can’t do that today. It’s a different world. I have three grown children, Eric, Mark, and Derek. They were good kids. Never had a problem with them. But it takes two parents to do it, I think. You have to....you can’t be a friends. You have to be a parent and let them know who’s the boss, and we never had any problems. Never had a drug problem with them, thank God. I always worried about that. We both did and they said to me one day, they said, “Mom, you don’t have to worry because we don’t want you to be bothered by us. We don’t do the same things the others are doing, so you don’t have to worry about that.” And after that, I never did. I guess I was lucky. As

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my mother used to say, you did something right. You raised three good [kids]. I don't know any of the children today. Before, I knew every child.

On life in the past and present in Mt. Pleasant:

I have lived in Mt. Pleasant since 1958, same house my husband was born in. His mother and father bought this house when they were married, so it's an old house, about 150 years old. My mother was a maid and my father did catering. They were from Berwyn. Everyone knew each other. We never had to worry about locking our doors. I never locked the doors until we went to bed at night. But things have changed. Things have changed. There is a blend of kinds of people here now. When I was, when I moved here, I think that there were two white families. And now there is quite a few. My next-door neighbor and then two doors down. Well, she rents. My friend rents to them because her daughter got a promotion and moved to Florida. That's where they are now. New people moving in—you don't know who they are. A lot of people have passed away. Jobs have taken some to other areas in different states, but other than that, a lot of college kids are moving in. They don't behave themselves too well! There's a good group up there now. We haven't had any problems. I don't see much of them. A couple of years ago, we had a problem with a group of them that was a couple houses down. They would be drunk and loud. Up all night. I know they don't live [at home] the way they do—the way they act here, I know they don't get away with it at home. They don't empty their trash. At one point, they had girls' underwear lined up on the front area. You know that's disgraceful. And they had a trash can sitting on one of the roofs. We had to... somebody had go down and speak to them about moving the..., you know. They don't come from homes like that.

[Oral history collected by Josh Sutterfield and Erick Martin]

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Larry Shipman,

who grew up in Mt. Pleasant as one of the five children of Deacon Joe Shipman

On troubleshooting college students' parties in Mt. Pleasant:

There's nothing wrong with a party, but in this neighborhood I grew up, you have your parties in the afternoon. When the sun goes down, noise goes down... but you know you still have a good time. And seeing that in this world we're 21, there are plenty of bars and clubs you can go to. But now, a lot of the young ladies are coming back home or with young infants, and now you got the good old rock and roll going. It's a little too noisy. We're the block captains [my wife Donna and I]. Just like, if there is a problem, they call us and we check it out. Like when things get a little too rowdy with the college students they call up Donna and we call the police or they handle it themselves by them calling the police, but most of them notify us about the situation.

[Oral history collected by Rebecca Pierce and Don Irons]

Tom Traun,

*a carpenter and a Cabrini College graduate who taught elementary education before
returning to carpentry*

On owning a home and raising children in Mt. Pleasant:

I guess what I'm talking about is when [I was] moving in here...there was Alex Baghorn, who was an old white guy that worked at West Chester University or the West Chester government as a prothonatory, whatever that is. Then there was me—and the blacks, if I can say that. It fit good. They were really friendly, but we all came from

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different lives.... I didn't just grow up in a house with three generations of families in the same house—like some of these fine people did. So it was kinda different, in a way. But a lot of people were really accepting. The guy next door [even] came over with his wheel barrow.

When I bought this place, it was \$16,000. I [had] had a house in the city, so I moved here because it was a good school district, [like] good private schools, for my three daughters. The people were working class and really got along well. And when the crack came in a little bit, it screwed things. People got a little bit bitterer, that this whitey is doing good. He has this big addition [to his house] and things, so we have to throw an egg at his house or something. [But] since I've been here, more and more people are becoming more educated and solid middle class as opposed to the working class. But some have moved out and some have cleaned up their houses and have stayed on.

On his college student neighbors in Mt. Pleasant:

What I think about the college kids? You don't own your own property, so you're removed. If you look out into the yard—I don't know what way the wind blew today—but you'll see cups and things around here. Littering is a problem. What that comes from, growing up in upper middle class? It doesn't really fit. I don't know what the disconnect is. I don't know. After 18 years of being sheltered, you're getting the freedom to experiment with sex, drugs, and rock and roll. You know Dad's not there saying, "Okay, it's 10 o'clock. You gotta go to bed." You gotta learn how to do that. When there is interaction, it's nice. It's like when I lived here for all these years. I noticed I would just say "hi" because I recognized [someone's] car and I would never talk to them again until the next time we would bump into each other on the street and talk for a half hour and then go on with our normal lives. I think that's the same thing with the students. You're

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pretty much doing your own thing and you're in your own world. You just happen to share the neighborhood together....Sometime I would go to a few houses up [the street] and tell 'em, "Hey, can you turn it down a bit?" And the guy would say, "Yeah, sure." Or a few times I had them come here and ask if it's too loud and I think that's what you need. To reach out and talk to them—like, "Can you not burn the trash. It smells," or something. Just talk to them. You don't have to come up and say, "Hey, how's your mom doing today?" But some conversation is good to have. But be considerate because, you know, it's 2 a.m. and you're drunk and you're screaming....I know it's hard to control when you have been pounding beers and inhaled and you're feeling really good—but the sound travels!

[Oral history collected by Anthony Sestito and Ray Britton]

La Sirena: Un Cuento de Horror al Estilo de Gustavo Adolfo Bécquer

By Matthew F. Whetzel, Cabrini College

Faculty Advisor: Cynthia Halpern, Ph.D., Department of Romance Languages and Literatures

Abstract

Given the success and popularity of supernatural fiction in the present day, this original work takes a step back in time as a creative examination of the beginnings of this genre in the writings of the Spanish Post Romantic writer Gustavo Adolfo Bécquer. *La Sirena* is a short story that is told in the style of Bécquer's *Leyendas* or "Legends," and was composed after studying, both in and out of the classroom, three of these legends: *El monte de las ánimas*, *El gnomo*, and *La cruz del diablo*.

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Las canciones de los pájaros llenaban el aire mientras yo trataba de escribir este cuento. Ellos me recordaban de los bosques y montes de mi hermoso país. Y, por eso, me acordé de una leyenda de mi juventud, sobre un hombre que había seguido una canción misteriosa y descubierto los fantasmas de nuestro pasado distante.

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El aire fresco de la noche helaba su piel mientras Benjamín caminaba por el bosque. El joven estaba perdido y no podía ver nada en la oscuridad. El follaje había ocultado la luz de la luna y él sólo contaba con los sentidos del tacto y del oído para hacer su camino por el sendero estrecho. Ya había caminado por cuatro horas en el bosque y estaba muy cansado, emocionado, y preocupado.

Tenía casi treinta años y no le gustaba salir al aire libre. Pero, más temprano en el día, había tenido una discusión con su novia y necesitaba ir a un lugar tranquilo para pensar. Con el acaloramiento del momento no había pensado en coger una linterna ni una

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chaqueta porque no se dio cuenta de la distancia que él caminaría. Un poco después, se sintió perdido sin una luz y hacía mucho frío.

Unos minutos más pasaron mientras él caminaba antes que el silencio de la noche fuera roto por el sonido de un canto. — ¡Finalmente!—pensó, y decidió seguir la canción con la esperanza de ser salvado. Pero, aunque la música sonaba muy cerca, continuó caminando una media hora más antes de entrar en un claro del bosque donde parecía brotar la canción.

El claro era pequeño pero tenía señales de vida. En un rincón del claro había un granerito viejo y en el otro lado había un cementerio vallado. En el centro, había una casita muy sencilla que parecía abandonada. A diferencia del bosque, no había sonidos ni de los animales, ni de los insectos. Solamente la canción misteriosa que emanaba de la casita y colmaba la noche.

Lleno de curiosidad, Benjamín caminó hacia el cementerio. Cinco lápidas estaban ordenadas en una fila de tres y una fila de dos. No tuvo miedo de este lugar, pero tampoco se sentía cómodo. La quietud del claro era desconcertante. La canción, sin embargo, lo llenó con el deseo de quedarse allí y él estaba muy contento de ver la luz de la luna llena y las estrellas en el cielo.

Entonces, respiró profundamente e intentó leer las inscripciones en las lápidas, pero sin éxito. Cada vez que él se movía más cerca a las lápidas a leerlas, la música se hacía más intensa y él puso su atención al claro vacío cerca de él. Este continuaba un poco más adelante, hasta que el joven vio una luz que emanaba de las ventanas de la casita y prestó atención a la figura de una mujer joven, casi de la misma edad que salió de la casa y lo miró.

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Llegas tarde—ella dijo con una voz muy dulce y suave— ¿Dónde has estado? Te esperaba.

Benjamín no entendía sus palabras porque no la conocía. Pero, al mismo tiempo, tenía una atracción a la mujer y sus características bellas y quería conocerla más.

Ella tenía pelo moreno muy largo y bello y su piel pálida se acentuada por la luz de la luna. Pero, más que su figura, la dulzura de su voz le hizo perder todas sus aprensiones.

Después de un momento de silencio, ella sonrió y le indicó seguirla adentro de la casa. Por una fuerza extraña, él lo hizo y la buscó en el interior de la casita. El interior era sólo un cuarto con una chimenea, una mesa con sillas en el centro, y una cama en el otro lado. Había una olla en la chimenea con una sopa que olía rico y en la mesa había un tazón y una cuchara. Benjamín admiró la simplicidad de la casita y, con la luz, pudo distinguir que la mujer tenía ojos morenos.

Ven—ella mandó—come.

Por la misma fuerza impulsiva, el hombre se sentó en una silla y empezó a comer la sopa. El sabor era picante pero muy delicioso. Y, mientras comía, la mujer empezó a canturrear una canción y bailó cerca del cuarto. Pronto, él empezó a seguir el ritmo con su pie, marcando la melodía de la canción.

Baila conmigo—ella dijo, y el joven se levantó y se unió a su danza.

Benjamín se perdió a sí mismo cuando el zumbido de ella se transformó en una canción. Los dos jóvenes bailaban cerca del cuarto por mucho tiempo y él se olvidó todo—su novia, su trabajo, su vida—estaba en éxtasis y no quería interrumpir la danza ni quería separarse de los brazos de la mujer.

¿Cómo te llamas?—él le preguntó—dime por favor.

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Silvia—respondió—me llamo Silvia. — Y, entonces, sin más conversación, los dos continuaron la danza y la canción siguió seduciendo al hombre.

Una hora había pasado antes de que la canción terminara de nuevo y la danza entre el hombre y la mujer se suspendiera. —Bésame—ella mandó y el hombre, sin pensar, unió sus labios a los labios de ella. Fue como si una descarga de electricidad pasara por su cuerpo y Benjamín no tuvo fuerzas para resistir la fuerza magnética que lo llevaba hacia la mujer encantadora. Todas sus características le atraían a ella: sus labios suaves y flexibles, el aroma de su perfume, la sensación de su piel contra su propio cuerpo.

Era como si él estuviera hechizado y después de separarse de su abrazo, se sentía como emborrachado. Fue entonces que él se cayó en la cama y se durmió en los brazos de Silvia.

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Benjamín se levantó con el sol en su rostro y las canciones de los pájaros todavía resonando la canción de Silvia. Con mucha sorpresa, descubrió que no sólo estaba en el cementerio, sino que durmiendo sobre una tumba.

¿Era un sueño?—se preguntó, pero cuando se levantó, leyó el nombre en la lápida. La inscripción decía, AQUÍ DESCANSA SILVIA PÉREZ ÁLVAREZ, 1755-1785.

El temor se apoderó de su corazón. Todavía podía sentir la suavidad de sus labios en los suyos. Y tenía mucho miedo cuando se dio cuenta que la casita había desaparecido. En el claro sólo estaban el cementerio y el granerito. Era como si la casita nunca hubiera existido porque no podía ver ningún cimiento y el césped estaba descuidado.

Con gran temor, Benjamín corrió. Él corrió y no paró hasta que estuvo de regreso en su cabaña y con su novia. Cuando le relató a ella su cuento, su novia no lo pudo creer.

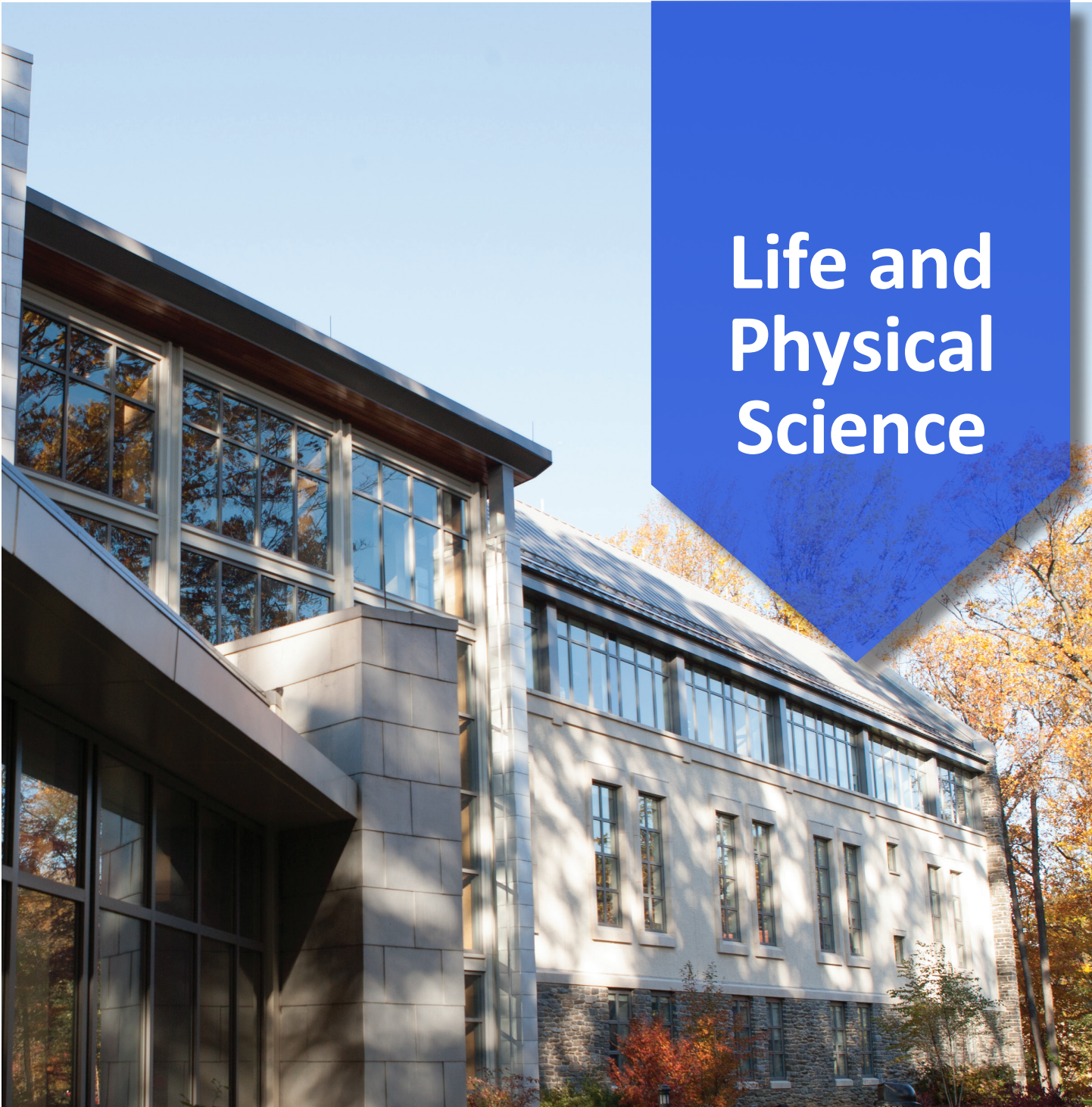
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Nadie le creyó lo que había pasado, aun menos un anciano quien había experimentado la misma experiencia hacía muchos años...

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Por esta razón, te doy este cuento como lo oí de Benjamín. Todavía, él advierte a todos sobre esa noche: la noche que él pasó en el Bosque de la Sirena. Y, hasta ahora, él nunca volvió a entrar en el bosque.

Life and Physical Science



Effects of Pathogen-Associated Molecular Patterns on the Prophenoloxidase Pathway in *Eisenia hortensis*

By Janice Brown and Sheryl L. Fuller-Espie, Ph.D., DIC, Cabrini College

Faculty Advisor: Sheryl L. Fuller-Espie, Ph.D., DIC, Department of Biology

Abstract

The main objective of this research was to determine whether coelomocytes of the earthworm *Eisenia hortensis* have the capacity to activate the prophenoloxidase (PPO) cascade as part of a humoral mechanism of innate immunity upon stimulation by pathogen-associated molecular patterns (PAMPs). The PAMPs used included lipopolysaccharide, β -1,3-glucan, and peptidoglycan, all of which are associated with bacterial and fungal pathogens encountered in the natural habitat of *E. hortensis*. Enzyme activity was measured after 24 or 48 h using the substrates L-3,4-dihydroxyphenylalanine (L-DOPA) (diphenolase activity) and hydroquinine monomethyl ether (4HA) (monophenolase activity). The chromogenic nucleophile, 3-methyl-2-benzothiazolinone hydrazone (MBTH), was used to measure spectrophotometric absorbance at 490 nm at 15 min intervals for 2 h. We observed that upon incubation of the coelomocytes with all of the PAMPs, PPO was converted to phenoloxidase, an effect that was enhanced when acellular coelomic fluid was included during the incubation period. These results confirm that the PAMPs selected for this *in vitro* study induced the activation of the PPO cascade in earthworm coelomocytes; however, interassay consistency proved problematic.

Introduction

Invertebrates lack the ability to make antibodies that are an important aspect of adaptive humoral immune responses. However, they do have very effective nonadaptive innate responses that help them fight against a variety of infectious microorganisms.¹

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These innate responses include both cellular and humoral components. The cellular response of invertebrates includes phagocytosis, encapsulation, and nodule formation, while the humoral response includes cytotoxic molecules, lectins, and enzymatic cascades such as the prophenoloxidase pathway.¹

Pattern recognition receptors (PRRs) are used by vertebrates and invertebrates to recognize pathogens by the pathogen-associated molecular patterns (PAMPs) that they express. The PPO pathway is activated when PRRs bind to PAMPs such as β -1,3-glucan found on fungi and yeast, peptidoglycan, and lipopolysaccharide.¹

The PPO pathway involves a protease cascade similar to that found in the complement system found in humans. Research in the past shows that prophenoloxidase is stored in the granules of certain blood cells, which eventually is released and activated.^{3,5} Previous studies also demonstrated that β -1,3-glucans have strong stimulating capabilities in a variety of species including earthworms.³

The PPO pathway is particularly important in invertebrates as a defense mechanism. Upon recognition of PAMPs such as β -1,3 glucan, lipopolysaccharide, and peptidoglycan, proteases cleave prophenoloxidase. This cleavage forms phenoloxidase, the active form of the enzyme, which serves as a catalyst for the melanization reaction. This reaction results in melanin production, which is involved in wound healing.⁶ Melanin also has cytotoxic and antimicrobial properties, and it participates in phagocytosis-opsionization, encapsulation-nodule formation, and degranulation. Previously, PO activity detection was limited to certain species; however, more recently, L-3,4-dihydroxyphenylalanine (L-DOPA) was detected in the coelomic fluid of earthworms and has been shown to activate the PPO pathway.² In addition, a protein present in earthworms has been identified that specifically binds to β -1,3-glucan and

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research shows that this pattern recognition protein gets degraded by serine proteases. This specific degradation is thought to be an important step in the activation of the PPO pathway.⁸ The prophenoloxidase cascade has been studied greatly in arthropods, but information is lacking on whether other invertebrates (e.g., earthworms) depend on this cascade as an innate defense mechanism.⁶

In our study, we were interested in determining whether selected PAMPs have the capacity to activate the PPO pathway in the earthworm *E. hortensis*. A spectrophotometric assay was used to measure the production of active phenoloxidase upon *in vitro* exposure of earthworm leukocytes to a variety of PAMPs, including β -1,3 glucan (laminarin), lipopolysaccharide, and peptidoglycan, which have never before been studied in this invertebrate model. Enzyme activity was measured using the substrates L-3,4-dihydroxyphenylalanine (L-DOPA) (diphenolase activity) and hydroquinine monomethyl ether (4HA) (monophenolase activity).

Materials and Methods

Earthworm Husbandry

European night crawlers, also known as *E. hortensis*, were purchased from Vermitechnology (Tel: 352-591-1111, www.vermitechnology.com). Upon arrival, the earthworms were placed on a bed of autoclaved pine chips covered with moistened shredded paper to maintain a humid environment, and kept in a dark room. GerberTM baby food of a variety of flavors was also added to the pine chips to provide a food source for the earthworms.

Extrusion of Coelomocytes

One day prior to extrusion, the earthworms were placed in a Petri dish with paper towels that have been soaked with FungizoneTM. The solution allows the worms to

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defecate and removes any surface fungi to limit contamination. On the extrusion day, each earthworm was removed from the Petri dish and placed in a sterile trough containing 3 ml of FACSflow buffer.⁴ Once in the buffer, the earthworms began to extrude the components of their coelomic cavity through its dorsal pores. The extrusion was then collected and placed in a 15 ml conical test tube containing 0.5 ml of Accumax™. Each earthworm was extruded individually in a new sterile trough. Once all of the earthworms had been extruded, they were incubated in Accumax™ at room temperature for 5 min to dissociate aggregated cells. After 5 min, phosphate buffer saline (PBS) was added to each tube, and then the tubes were subjected to centrifugation at 800 RPM at 4°C for 5 min. After the spin, the supernatant was decanted and the pellets were resuspended in phenol-free super Dulbeccos Modified Eagle Medium (SDMEM) according to Fuller-Espie et al.⁴ The samples were enumerated using a hemocytometer to choose which earthworm extruded higher numbers of coelomocytes. It should be noted that nine assays were run and the amount of PBS used to dilute the samples collected varied from 3–5 ml. Similarly, the amount of phenol-free SDMEM used in the assays varied from 0.5–1.0 ml.

Preparation of Coelomic Fluid

Four sterile troughs were prepared, each with 2.5 ml of phenol free SDMEM. Six earthworms were placed in each trough and were shocked approximately 5 times each using a 9V battery. The fluid from the troughs were then collected into four 15 ml conical test tubes and spun at 1500 RPMs for 5 min at 4°C. After centrifugation, the supernatant of each tube was filtered (0.4µM) placed into freezing vials and stored at –20°C until the day of the assay.

EFFECTS OF PATHOGEN-ASSOCIATED MOLECULAR PATTERNS ON THE PROPHENOLOXIDASE PATHWAY IN *EISENIA HORTENSIS*

Reagents

Laminarin (β -1,3-glucan) is a storage glucan found in algae. The laminarin used in this research was ordered from Sigma-Aldrich, which was isolated from *Laminaria digitata*. A stock solution of 10 mg/ml, was made using endotoxin free H₂O. The mixture was then placed in 10 freezing vials, at 50 μ l per vial.

Lipopolysaccharides (LPS) are molecules found on the outer membrane of gram negative bacteria. LPS was ordered from Sigma-Aldrich and the substance was isolated from *Salmonella enterica*. 1 mg of the powder was added to 100 μ l of endotoxin free H₂O to achieve a stock solution 10 mg/ml. 25 μ l aliquots were placed in 4 freezing vials.

Peptidoglycan (PTG) is found in the cell wall of gram-positive bacteria. For this research, PTG was ordered from Invitrogen, in which the powder was isolated from *Bacillus subtilis*. A stock solution of 10 mg/ml, was made using endotoxin free H₂O. The mixture was then stored in 10 freezing vials, with 50 μ l of the mixture in each.

Sodium dodecyl sulfate (SDS) was prepared using 4g of sodium lauryl sulfate and 100 ml of Biotech H₂O, creating a 4% SDS solution. After the mixture was made, the bottle was autoclaved for 15 min at 15 psi and 120–125°C.

L-3,4-dihydroxyphenylalanine (L-DOPA), 3-Methyl-2-benzothiazolinone hydrazine (MBTH), and 4-methoxyphenol (4-HA) were prepared on the same day of the assay because of previous research indicating it should be prepared fresh. On the day of the assay, these substrates were prepared using the formula:

$$\# \text{ of wells needed } \times \text{ amount of substrate per well } = \text{ amount of substrate needed}$$

$$\text{Amount of substrate needed } \times \text{ concentration of substrate } = \text{ amount of substrate powder needed}$$

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Once the powder was weighed out, the weight was divided by the concentration of the substrate to determine how much PBS would be added to the powder.

Example: $12.7 \text{ mg} \div 6 \text{ mg/ml} = 2.12 \text{ ml of PBS}$

After Assay 1, the MBTH was prepared first and then transferred to either the vial containing L-DOPA or the vial containing 4-HA. The proper solution was made by dividing the amount of MBTH powder weighed by the desired concentration.

Amount of MBTH measured \div concentration of MBTH = amount of PBS
added to powder

Once the MBTH solution was made, the amounts of L-DOPA and/or 4-HA was then measured. The aliquot of MBTH to be added to L-DOPA or 4-HA depended on the amount of powder that was actually weighed out for each. This method of preparing MBTH was adapted from Aladaileh et al.¹

3-methyl-2-benzothiazolinone hydrazone (MBTH), was used to measure spectrophotometric absorbance at 490 nm using a BioRad UltraMark plate reader (available at Cabrini College) according to the procedure described by Aladaileh et al. (2007).¹ Specifically, 100 μ L of coelomocytes collected from batches of earthworm donors, adjusted to 2×10^6 cells/ml⁻¹, was added to each well of a 96-well plate. Each well was then treated with either 100 μ L of L-DOPA or 100 μ L of 4-HA, both of which contain 1mM of MBTH.¹ Absorbance was measured immediately after adding the substrates. The 96-well plates were incubated at room temperature and additional absorbance measurements were taken at 15 min intervals up to 2 h. To determine the phenoloxidase activity in each sample, the readings from untreated (media) samples were subtracted from PAMP-treated samples, and this value was divided by the methanol-treated samples (total PO activity) to obtain %PO activity.⁷

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Phenylmethylsulfonyl fluoride (PMSF) is a serine protease inhibitor that was used in this study to prevent any unspecific breakdown during the assay. A PMSF solution was prepared using isopropanol and was frozen until the day of the assay. To achieve a final concentration of 0.01%, the PMSF solution was diluted with PBS after thawing. 10 μ l was then added to each well prior to placing the plate into the spectrophotometer.

Spectrophotometry

Upon proper incubation times (24 or 48 h), the 96 well plates were removed from the incubator, substrates were added accordingly, MeOH was added to the appropriate wells, and PMSF was added to all wells. Immediately after PMSF was added to all wells, the plates were placed in the spectrophotometer and readings were taken at 490nm every 15 min for 2 h. In between readings, the plates were stored at room temperature in the dark.

Results

Assay 1

In Assay 1, two 96 well plates were set up accordingly to produce duplicate results. One plate was treated with L-DOPA and MBTH and the other with 4-HA and MBTH. There were no significant results in this assay. Absorbance readings continued to increase in all wells, including the wells that only contained media and were supposed to serve as controls. This may have been due to the presence of phenol-red in the SDMEM. The increase of pH resulted in increase of color, which might have caused the fluctuation in the readings. A new batch of SDMEM was made without phenol-red for the rest of the assays.

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Assay 2

Four plates were set up for this assay accordingly to produce duplicate results. Two plates were prepared using earthworms #2 and #6 and the other two plates were prepared from cells isolated from earthworms #8 and #11. Two plates were incubated for 24 h while the other two were incubated for 48 h. On each day, each plate was treated with either L-DOPA and MBTH or 4-HA and MBTH. The results of the assay were similar to that of Assay 1 in which there was a continuous increase in absorbance in all the wells.

Assay 3

In this assay, whole cells were used as well as coelomic fluid. MeOH was also used as a control and PMSF was added to all wells. This 96-well plate was set up differently from the previous assays. Four different earthworms were used on the same 96 well plate, each treated with the same concentrations of PAMPs and MeOH. This assay showed expected results. The column containing MeOH treated wells showed to increase and decrease from one reading to the next showing stabilization. LPS, laminarin, and PTG all showed a greater increase in %PO over time when combined with CF. Figure 1 shows the %PO of the wells treated with LPS with and without coelomic fluid. With coelomic fluid, the %PO started at 54.18% and continued to increase to 82.77% after 2 h. Figure 2 resembles the %PO activity with the cells treated with laminarin. As seen with LPS, the presence of coelomic fluid increases PO activity. The results of the treatment with PTG can be seen in Figures 3 and 4. Figure 3 shows that in the course of 2 h, PO activity increased with or without coelomic fluid at generally the same rate; however, more PO was detected when coelomic fluid was present. Figure 4 is a graph showing the average percent PO activity over time for PTG. The error bars were inserted to show the

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range between the different earthworms used. When setting up this assay, the PMSF final concentration was only 0.0034% instead of 0.01%, which is 1/3 less than the desired concentration due to pipetting errors. In the next assay, 0.01% PMSF was used.

Assay 4

In this assay, the effect of PTG on triggering the PO cascade was the focus. Two different concentrations were used in this assay (100 µg/ml and 20 µg/ml). Coelomic fluid, MeOH and PMSF (0.01%) were still used and the assay was carried out in duplicates. Results were not significant for the high concentration but were for the low concentration. There was a power outage experienced during the spectrophotometric readings of this assay, therefore this assay was repeated.

Assay 5

PTG was still the focus, this time testing 3 concentrations (100 µg/ml, 20 µg/ml and 4 µg/ml). In this assay, the extrusions were batched together. Cells were combined depending on cell count and quality. Upon batching of the cells, the 96 well plates were set up accordingly to produce duplicate results for each of the four batches. One of the plates followed the same protocol as the first five assays; however, the second plate was subject to a freeze-thaw cycle to assist with rupturing of the cells and release of intracellular phenoloxidase. Once the plate was removed from the incubator, it was placed in the -85°C freezer. After 15 min, the plate was removed and allowed to thaw at 30°C for 20 min. Once the plate thawed, it was spun at 1200 RPMs for 10 min at 4°C. The supernatant was then transferred to a new 96 well plate. Figure 5 shows a graph of Batch 2 treated with different concentrations of PTG, without coelomic fluid. In a 2 h period, absorbance readings continued to increase proportionally, with the cells treated with the high concentration of PTG having the highest absorbance readings. ANOVA

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analysis was performed on the results of this assay and can be seen in Figure 6. ANOVA (analysis of variance) was used to determine whether there was a significant difference between concentrations. According to the p value seen in Figure 6, there was a significant difference in the wells that did not contain coelomic fluid.

Assay 6

For this assay and future assays, the same batching technique was employed. In addition, the same concentrations of PTG as in Assay 5 was repeated. One plate was set up as in Assay 5; however, this time the freeze–thaw method was not used. For unknown reasons, the results of this assay were not significant and did not resemble results seen in Assay 5. Errors could have been made in pipetting as well as in measuring substrates. The next assay continued to investigate PTG while paying closer attention when setting up the assay to minimize pipetting errors.

Assay 7

In this assay, the effect of PTG at a concentration of 200 $\mu\text{g/ml}$ and 50 $\mu\text{g/ml}$ was examined. This time, the assay was set up in a “v” shaped 96 well plate for 24 h and the 96-well plate was set up to produce triplicate results for four batches. After the incubation period, the plate was removed from the incubator and centrifuged at 800 RPMs for 7 min at 4°C. After centrifugation, 100 μl were transferred from each well to a new, flat bottom, 96 well plate, and then the substrates were added. Unfortunately, there was no significant data to present from this assay.

Assay 8

In this assay, Assay 7 was repeated; however, the concentrations of PTG was lowered to 10 $\mu\text{g/ml}$ and 1 $\mu\text{g/ml}$. In addition, the plate was set up and incubated for 48 h as opposed to 24 h in Assay 7. The plate was set up exactly as Assay 7. Figure 7 is a

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graph, showing Batch 3, treated with PTG without coelomic fluid. The graph shows that over a 2 h period, absorbance readings continued to increase, but the PAMP-treated cells did not come close to those treated with MeOH, which was expected. However, the wells containing only media had higher PO activity than the wells treated with the low concentration of PTG. A student *t* test paired two sample for means was used to analyze this assay; however, no significance was seen. This assay was repeated. However, there were still no significant results.

Conclusions

The PPO pathway is an important mechanism in the survival of species that lack the ability to produce antibodies in response to exposure to microorganisms. This mechanism has been studied in many animal models including invertebrates; however, it has yet to be researched in earthworms such as *E. hortensis*. Earthworms have coelomocytes that serve as their white blood cells that help to combat infections. Present on these cells are pattern recognition receptors that allow the cells to recognize PAMPs. Upon recognition, the PPO cascade is activated in which prophenoloxidase is cleaved to phenoloxidase, its active form. This enzyme in turn catalyzes the formation of melanin. Melanin has cytotoxic and antimicrobial properties and participates in phagocytosis, opsonization and encapsulation of the pathogen.

The results of this research thus far have varied. Assay 1 did not show any significant results as in Assay 2. Results from Assay 3 showed expected values; however, it was not possible to produce these results again in the time available for this research. Problems such as a power outage caused the results from Assay 4 to be compromised. Assay 5 presented expected results and an ANOVA analysis proved that there was significance between concentrations of PTG when the cells were treated with the PAMP

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in the absence of coelomic fluid. However, it was problematic to reproduce these results.

Assays 6, 7, and 8 did not show any significant results.

Depending on other research conducted in this field, improvements of the protocol were attempted, but not with reproducibility. In the future, continued research investigating alternative PPO assays conducted on other invertebrates will be undertaken with the hope of combining and refining protocols to achieve one that is best suited for earthworms.

Future Directions

A future direction for this study would involve refining the technical specifications to achieve interassay consistency. This would include investigating alternative protocols for measuring PO activation. A way to normalize data should also be explored, for example, obtaining measurements at a wavelength where PO is not expected to be detected. In the future, other PAMPs including flagellin and lipoteichoic acid should also be explored for their ability to activate the PPO pathway.

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⁷Wells, K. L. (2008). *Bioscience Horizons*, 1, 122–127.

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The Journal of Biological Chemistry, 278, 42072–42079

Appendix

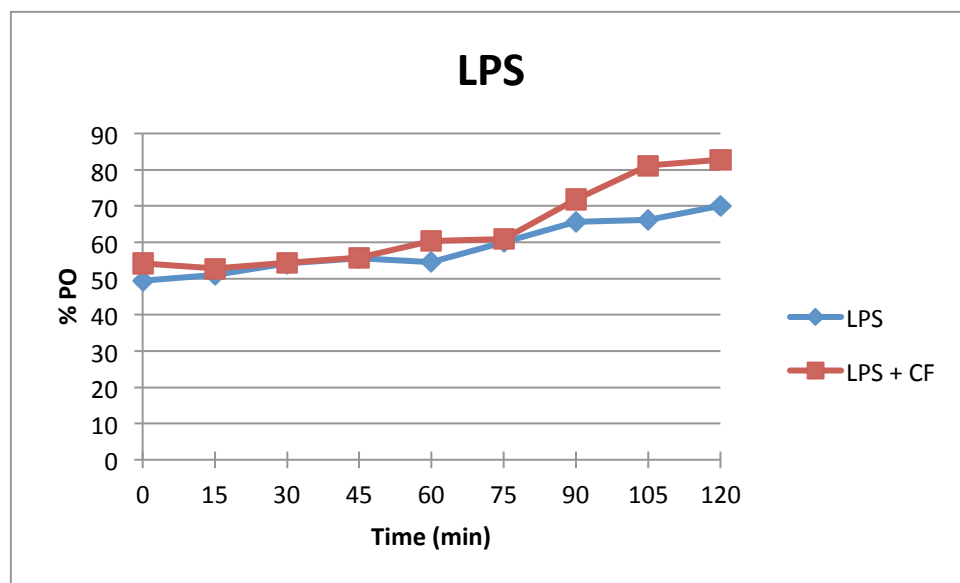


Figure 1. Overall percent phenoloxidase production induced by LPS. This graph was generated from the results obtained in Assay 3. This graph shows that in a 2 h period, the % PO continued to increase, but the overall amount was greater in the samples containing coelomic fluid.

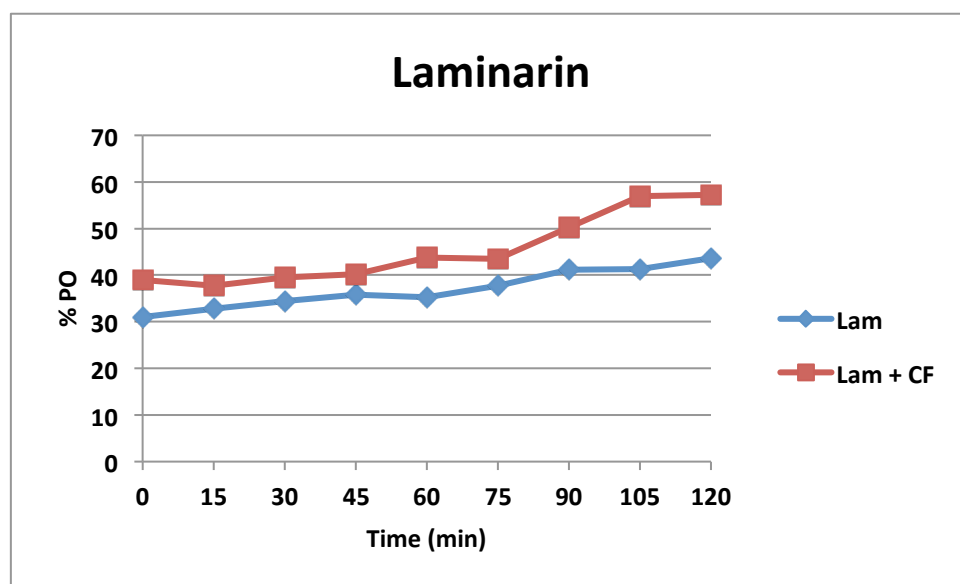


Figure 2. Overall percent phenoloxidase production induced by Laminarin. This graph shows the effect of laminarin in activating the PPO cascade. The sample that contained

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coelomic fluid and treated with laminarin showed to increase, but the overall amount was greater in the samples containing coelomic fluid.

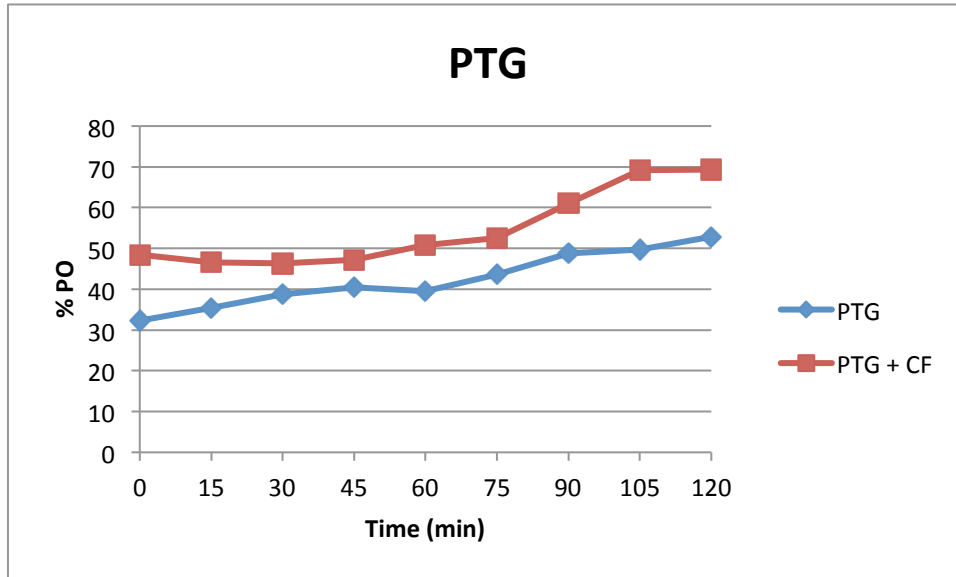


Figure 3. Overall percent phenoloxidase production induced by PTG. This graph shows the results of the coelomocytes treated with PTG. In Assay 3, all PAMPs showed to have a greater increase in PO activity in the presence of CF, but the highest production of PO was seen in the treatments with PTG.

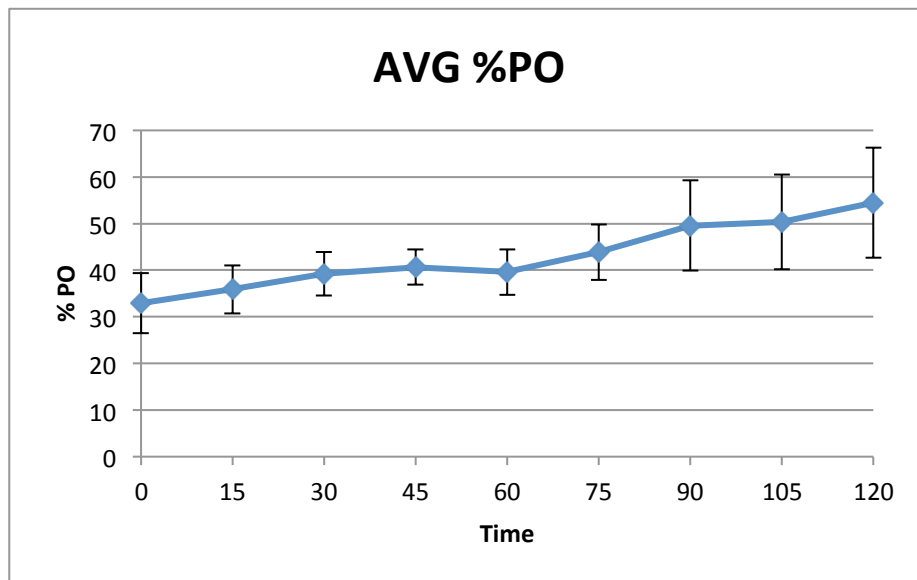


Figure 4. Average phenoloxidase production. This graph shows the average percent PO produced in the 2 h period. These results were obtained by calculating the averages and standard deviations. The error bars represent the range of values of the other earthworms during those time periods.

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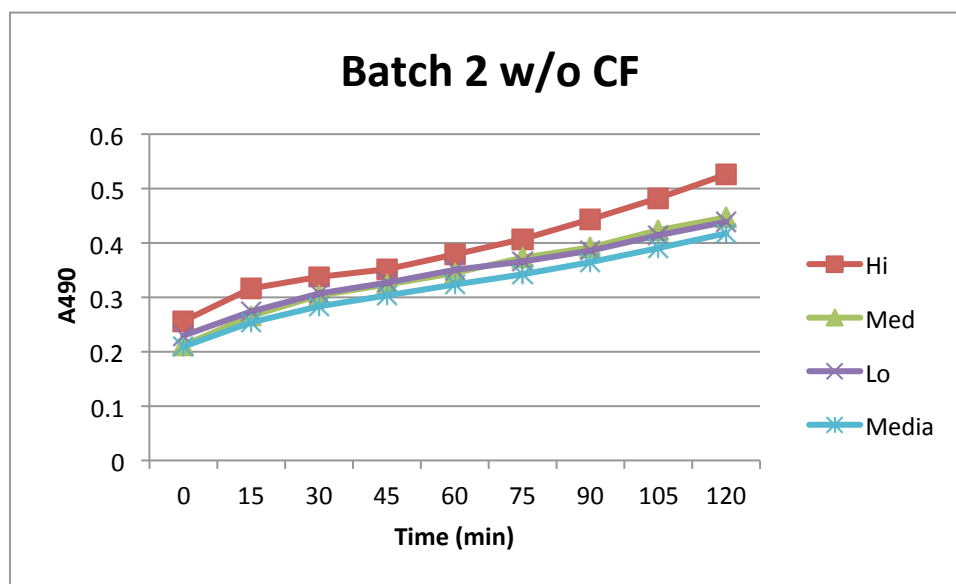


Figure 5. Phenoloxidase production of whole cells treated with PTG. This line graph was generated using the results obtained from Assay 5. For Batch 2 without coelomic fluid, treated with PTG, results show that the higher concentration triggered a greater response than the medium and low concentrations. More importantly, the cells containing only media created a baseline for the absorbance readings.

ANOVA to compare the concentrations						
Anova: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
High	36	14.721	0.408917	0.012435		
Medium	36	17.9345	0.498181	0.046808		
Low	36	16.1	0.447222	0.025247		
Control	36	13.1355	0.364875	0.010783		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.346709	3	0.11557	4.852157	0.003048	2.669256
Within Groups	3.334548	140	0.023818			
Total	3.681257	143				

Figure 6. Statistical analysis of the effect of different PAMP concentrations. This table shows the results of an ANOVA analysis done on the values obtained from Assay 5.

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The p value is less than 0.05 resembling a significant difference between concentrations.

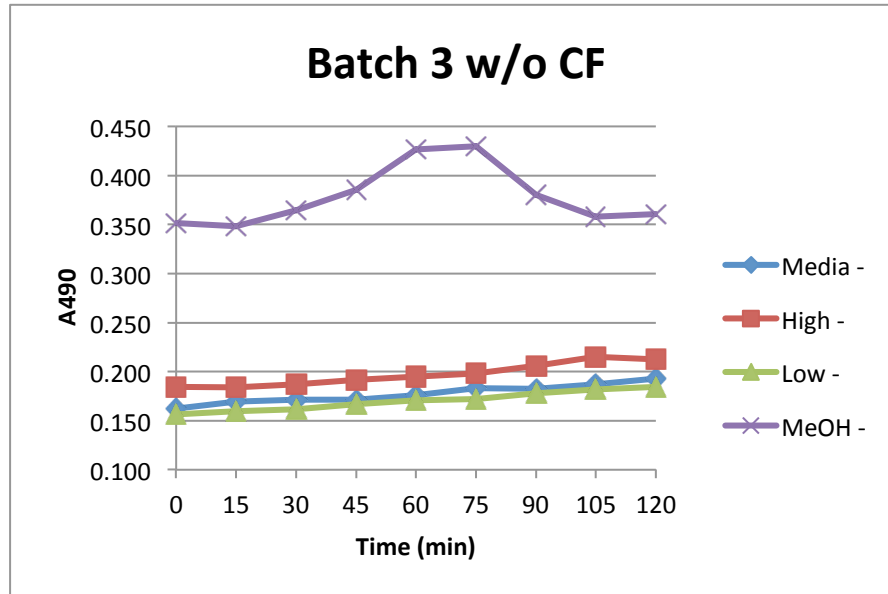


Figure 7. Phenoloxidase production by whole cells treated with PTG. This line graph was generated using the results obtained from Assay 8. Batch 3 without coelomic fluid was treated with two different concentrations of PTG and MeOH. The MeOH clearly shows the total PO that could be produced. The line graph shows that the higher concentration produced a greater amount of PO as compared to the low and the media. However, the low is seen below the media line because the concentration might have been too low to invoke a response.

Identification of Mycobacteriophage Marvin Virion Structural Proteome Through Mass Spectrometry

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Abstract

Within the biosphere, bacteriophages are the most numerous and diverse biological entities. Among this diverse and broad group are the mycobacteriophages that infect mycobacterial species such as *Mycobacteria tuberculosis* and *Mycobacteria leprae*, the causative agents of tuberculosis and leprosy, respectively. Here we describe a method that elucidates the structural proteome from virion particles isolated by a CsCl density gradient to ultrapurify and analyze the mycobacteriophage Marvin proteome in this study. Mycobacteriophage Marvin is a novel bacteriophage that was isolated at Cabrini College in 2009, during the Honors Biology 101 Laboratory. Its genome has been analyzed using bioinformatics software Apollo, Glimmer, and GeneMark. Despite the extensive analysis of its genome, little evidence has been acquired for proteome analysis. Thus, using the ion mobility separation and data-independent acquisition (MSE-IMS) method, the structural proteome is not only determined semiquantitatively, but also compared *in silico* with the bioinformatic gene prediction tools.

Introduction

Bioinformatic tools are critical to the identification of bacteriophage virions; therefore, researchers must be comprehensive in their approach. Despite the success of the bioinformatic software, mass spectrometry provides a new level of comprehension of bacteriophage structural proteins—the proteins that form the physical make-up of the virus—and their function in the phage life cycle. In most cases, the genes that yield the structural proteins are found on the left-hand side of the phage's genome. A compilation of mass spectrometry MS and bioinformatic analysis reveals that structural protein genes compose 20–30% of a phage genome.⁵ The use of a sodium dodecylsulfate

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polyacrylamide gel electrophoresis (SDS-PAGE) is a common method to separate phage structural proteins by mass. The SDS-PAGE method involves protein separation along a polyacrylamide gel for visualization depending on molecular weight. The band resolution is helpful in determining the amount of protein detected. Although beneficial to the identification of structural proteins, the SDS-PAGE method does not allow the identification of proteins present in lower concentrations.⁵ For example, when the structural proteins of phage ϕ YS40 were identified via SDS-PAGE, two protein bands were visualized. MS results, however, revealed 35 hypothetical structural proteins. Many of these proteins were novel; therefore, they were not found in bioinformatic analysis.⁸ MS, on the contrary, involves the digestion of proteins via trypsin to break the structural proteins into peptides. These peptides are then detected by the mass spectrometer, and matched to the expected amino acid sequence of the protein based on the previous genome analysis. Likewise, mycobacteriophage Marvin, a novel mycobacteriophage with several unusual aspects to its genome isolated at Cabrini College campus in 2009, underwent both SDS- PAGE and MS analysis.⁷ Marvin's unique genome includes a displacement of some of the structural proteins from their typical location. An electron micrograph of Marvin can be seen in Figure 1. The MS data revealed 17 hypothetical structural proteins using data dependent acquisition (DDA), MS^2 , MS^E , and ion mobility spectrometry (IMS). Each method differs slightly, and MS^E and IMS are highlighted in this study as methods that will allow increased accuracy in the identification of structural proteins of viruses.

Methods and Instruments

Ultrapurification of Phage Particles

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A large volume of a high concentration of phage stock was obtained by plating a known amount of phage particles on a lawn of *M. smegmatis* mc² 155 over 30–150 mm diameter Petri dishes. To do this, an empirical titer was done by serial diluting the phage particles from the original stock in phage buffer (10 mM Tris-HCl [pH 7.5], 10 mM MgSO₄, 1 mM CaCl₂, 68.5 mM NaCl). A 10 µL aliquot of these dilutions was added to 0.5 mL of saturated *M. smegmatis* mc² 155 for 20 minutes at room temperature and plated with 4.5 mL of Middlebrook 7H9 1X Top agar supplemented with 1mM CaCl₂ (7H9 broth base, Difco Laboratories, Detroit, MI) and incubated for 48–72 hours at 37°C until plaques were visible. The dilution showing almost complete lysis was chosen for the 30-plate procedure to large-scale amplify the phage.

Once the appropriate dilution was found, 600 µL of that dilution was used to infect 30 mL of the same saturated *M. smegmatis* mc² 155 culture used previously for 20 minutes at room temperature. After the incubation period, 270 mL of 7H9 1X Middlebrook Top Agar supplemented with 1mM CaCl₂ was added to the bacteria and phage mixture and quickly added 10 mL at a time to all 30 plates. After these were allowed to set for at least an hour they incubated for 72 hours at 37°C until “web patterns” formed indicating most bacterial cells had lysed and phage had proliferated. To these plates, 10 mL of phage buffer was added to each and allowed to incubate overnight at 4°C. After this incubation step, the plates were aspirated and the phage-containing lysate was centrifuged for 10 minutes at 3,800 rpm to pellet debris. Once debris had been separated, NaCl and polyethylene glycol 8000 was added to a final concentration of 1M and 10% respectively. This was then incubated overnight at 4°C and pelleted the next day at 3,800 rpm for 10 minutes. Pellets were pooled and resuspended in 1.67 mL of phage

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buffer per pellet and tilted overnight at 4°C to homogenize the pellet and diffuse the phage. This was again centrifuged at 3,800 rpm for 10 minutes, the supernatant saved in a test tube, and the pellet resuspended again in an equal volume of phage buffer as previously used when resuspending the pellets initially. This second “rebuffered” pellet was tilted overnight at 4°C again and the next day centrifuged at 3,800 rpm for 10 minutes after which the supernatant is decanted and saved in a tube similar to the tube used for the original supernatant.

Subsequently these supernatants were then equilibrated to a refractive index between 1.3807 and 1.3822 with molecular biology grade cesium chloride (MP Biomedicals, LLC). Once the solutions were at the proper refractive index, two 8.5 mL Beckman ultracentrifuge tubes were filled with the separate phage samples and spun at 38,000 rpm for 16 hours at 15°C in the Beckman Ti 55 rotor. Phage bands were extracted the next day by piercing the plastic tubes with a #20 gauge syringe needle and injected into a Slide-A-Lyzer dialysis Cassette using a cutoff of 10K MW (Thermo Scientific) and dialyzed against 750 mL of phage buffer in a beaker with a stir bar at 4°C for 2 hours and then again with fresh buffer overnight at 4°C. This dialyzed sample was used as the raw material for proteome extraction.

Protein Extraction From Phage Particles

To further concentrate the phage particles for protein extraction, 1 mL of the dialyzed phage sample was centrifuged at 4°C for 15 minutes at 14,000 rpm. The supernatant was aspirated and the pellet resuspended in 400 µL of proteomics lysis buffer (50 mM Tris [pH 7.5], 150 mM NaCl, 0.3% SDS, protease inhibitors) with a total amount of 0.1 units of benzonase (Sigma). This mixture was incubated at 37°C for 30 minutes to degrade the genomic DNA. Next, 600 µL of chloroform and 150 µL of methanol were

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added to the sample, vortexed for one minute and spun at 5,000 rpm at room temperature to separate the phases. Between the top phase containing methanol and water and the bottom phase containing the chloroform, the protein will appear as a lacy disk. After carefully aspirating the top layer, 225 μL of methanol was added and the solution mixed very gently to precipitate the protein. This was then centrifuged again at 14,000 rpm for 5 minutes. All of the supernatant was then aspirated leaving behind the phage structural proteome. To this, 20 μL of Rapigest buffer (50 mM NH_4HCO_3 , 0.1% Rapigest SF Surfactant (Waters Corporation)) was added and gently mixed in the microcentrifuge tube. This tube was then sonicated at room temperature for 5 minutes, boiled for 5 minutes, and finally placed on ice. Protein concentration was read with the nanodrop spectrophotometer and adjusted to a final concentration between 2–10 $\mu\text{g}/\mu\text{L}$ with more Rapigest buffer. This was then placed in the -80°C freezer until the samples were shipped to the Columbia University Proteomics Laboratory. All reagents and buffers were made using Fisher brand Optima LC/MS grade water (Fisher Scientific).

Proteomic Analysis

All proteomic work was done at Columbia University's proteomics laboratory in New York, New York. Samples were trypsinized with a Symmetry C18 Trap column and separated by a 120-minute chromatogram using an acetonitrile/formic acid gradient. Spectra were recorded by positive ion mode Synapt G2 quadrupole-time-of-flight HDMS mass spectrometer (Waters Corp.). Data-dependent acquisition (DDA) was also used to analyze the peptides. Spectra were analyzed with ProteinLynx Global Server (Vers. 2.5, RC9) (Waters Corp.) for data-independent MS^E acquisition. The data obtained thus far was then searched and compared to the NCBI database for mycobacteriophage Marvin

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and *M. smegmatis* mc² 155 protein sequences. The protein sequence quantities were determined by adding internal standards of yeast alcohol dehydrogenase (Uniprot accession P00330) to measure spectra intensities. DDA analyses were performed using PLGS software.

Results

Following mass spectrometry (MS) using both DDA and MS^E-IMS methods, a total of 17 hypothetical structural proteins was revealed. MS^E-IMS and DDA, showed the presence of two proteins not previously found through the use of other methods. These proteins, gp41 and gp89 (where gp signifies gene product), were predicted by bioinformatic analysis to be structural proteins. Likewise, gp52 and gp64 were scarcely detected in several trials, and were therefore not part of the list of proteins identified using MS^E-IMS and DDA. The three most abundant proteins were the major capsid, major tail, and head decoration proteins. This reflects what was found via SDS-PAGE analysis of Marvin's structural proteome. Along with the virion structural protein genes, proteins from the host bacterium, *M. smegmatis*, were also detected. These proteins were not included in the final protein list. Figure 2 shows a pie chart, based on stoichiometry, of mycobacteriophage Marvin's structural proteins.

Conclusion

The previously explained method provides an ideal means of identifying bacteriophage structural proteins, and can be used to confirm bioinformatics analysis. Although advantageous and fast, this method does not detect covalent cross-linking. Covalent cross-linking is common in phage capsid proteins.^{1-3,9} On the contrary, this approach may also be used to identify putative proteins ignored in bioinformatics analysis

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due to displacement from their typical location or their lack of homology with other proteins. Other methods may not identify proteins found in low abundance, whereas this technique is sensitive enough to do so. Overall, this method seems most sensitive and powerful in the identification of virion structural proteins.

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IDENTIFICATION OF MYCOBACTERIOPHAGE MARVIN VIRION STRUCTURAL PROTEOME THROUGH MASS SPECTROMETRY

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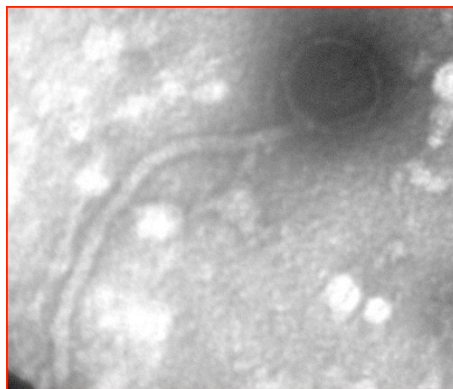


Figure 1. An electron microscopic image of phage Marvin. Marvin's capsid, or head, is 58nm in diameter, and its tail is 250nm in length (Mageeney, 2011).

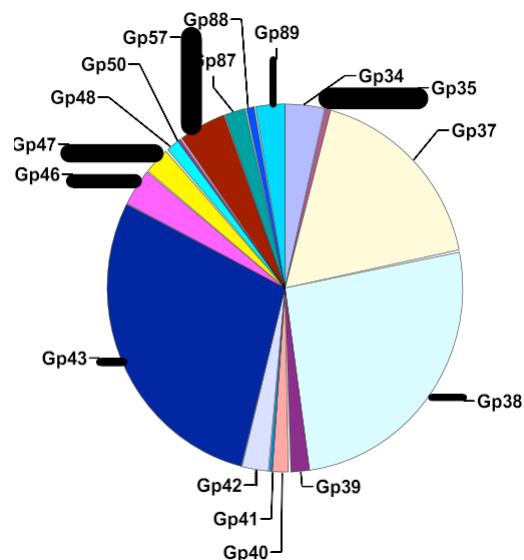


Figure 2. The relative proportions of mycobacteriophage Marvin's structural proteins (gene products) in comparison to each other. This chart was produced using MS^E-IMS mass spectrometry. The three most abundant proteins were the major capsid, major tail, and head decoration protein, confirming previous bioinformatics analysis.

Annotation of Fosmid 39 and Fosmid 18 of

***Drosophila erecta* Through the Genomics Education Partnership**

By Ben Danner and Nikie McCabe, Cabrini College

Faculty Advisor: David Dunbar, Ph.D., Professor of Biology

Abstract

Two fosmid were annotated on the 3L chromosome of *Drosophila erecta* by using a variety of comparative genomic tools. Annotation of the 3L chromosome of *D. erecta* serves as a control region for the study of the dot chromosome and provides further data for the analysis of gene evolution within the *Drosophila species*. Fosmids 39 and 18 from the January 2008 (Genomics Education Partnership [GEP]/3L extended) assembly of *D. erecta* were annotated and multiple protein coding genes were identified. These genes demonstrated a high syntenic relationship because they were similar in exon amount, relative orientation, and chromosome position as their orthologs in *Drosophila melanogaster*. Further comparative analysis of both genes was performed through a sequence alignment of the genes in *D. erecta* to their orthologs in *D. melanogaster*. The results showed highly conserved regions indicating that these genes might code for proteins necessary for survival.

Introduction

The genomes of eukaryotic organisms are packaged into two major types of chromatin: euchromatin contains many genes and has a diffused appearance during interphase, while heterochromatin contains few genes and remains densely packaged throughout the cell cycle. The distal 1.2 Mb arm of the fourth chromosome of *Drosophila melanogaster*, known as the dot chromosome is unusual in exhibiting a combination of heterochromatic (e.g., dense staining, late replication, no meiotic combination, association with high levels of HP1 and H3K9me3) and euchromatic properties (e.g., gene rich, replication during polytenization). The dot chromosome domain has a gene density that is similar to the other three autosomes in fruit flies. However, this region

appears heterochromatic by many other criteria, including late replication and low levels of meiotic recombination.¹ To understand this unique domain and to examine the evolution of a region with very low levels of recombination, the dot chromosomes of *D. virilis*, *D. grimshawi*, *D. erecta*, and *D. mojavensis*, as well as large segments of the autosomal arms of *D. erecta* and *D. mojavensis* must be examined.²

Review of Current Research

By using the power of the modern computer and various gene prediction algorithms, genomic level studies can be accomplished in a relatively short amount of time. Unfortunately, these gene-prediction algorithms are not entirely accurate because of complex signaling elements and splicing mechanisms in eukaryotes. Human curation is necessary to annotate accurately the genetic data, and is a process that can be time consuming depending on the size of the genetic data in question. To study the genomes of a variety of *Drosophila* species might take a decade to complete by an individual lab of skilled annotaters; however, by combining multiple labs it is possible to hand-curate large sections of genomic information in a shorter amount of time. The GEP, a science education initiative developed by faculty of the Genome Center, The Department of Computer Science, and the Department of Biology at Washington University in St. Louis, would form to harness the power of multiple labs and to introduce and train students in bioinformatics techniques from primarily undergraduate institutions.² The GEP has grown from a highly successful research lab course (Research Explorations in Genomics, Bio 4342) started at the Washington University in St. Louis to a consortium of 86 partnering colleges and universities throughout the United States, Canada, the Virgin Islands, and Puerto Rico.^{2,3} The goal of the GEP is to provide opportunities for undergraduate students to participate in genomic research through an introduction to

ANNOTATION OF FOSMID 39 AND FOSMID 18 OF *DROSOPHILA ERECTA* THROUGH THE GENOMICS EDUCATION PARTNERSHIP

basic bioinformatics techniques and analysis strategies. Through a neural network of undergraduate students collaborating on a particular set of genes and genomes, the GEP is able to accomplish projects that could take individual scientists years to complete. Currently the hand-curated annotation of various subspecies of *Drosophila* is the primary research initiative.

Method

The goal of annotation is to locate and characterize genes and protein-coding genes within an improved sequence for later structural and functional analysis. The process starts by sequencing the genetic data from the target organism. The genetic data must be improved by making corrections to errors in the sequence and by resequencing areas of low-quality data to determine the most accurate sequence through a process called *finishing*. Once the sequence has been *finished*, it is ready to upload to a server that stores the genetic information known as the *claim system*. The improved fosmid sequence that is typically 40 kb is placed onto the Genomics Education Partnership claim system for instructors or students with permission to access. The sequence is downloaded as a FASTA file, the common text-based file type used to transport large sequences of alphabetic information. The FASTA files have been previously uploaded into the GEP's custom installed version of the University of California, Santa Cruz, genome browser that allows visualization of the sequence data when run through various gene algorithms.⁴ The results from genome browse and the examination of established gene models in *D. melanogaster* (FlyBase.org) help to identify putative start and stop sites as well as intron and exon boundaries. Isoforms, or variant genetic sequences with similar function that arise out of alternative splicing, were predicted by using well-annotated mRNA/cDNA data from the *D. melanogaster* genome as well as gene model algorithms. Annotation is

not a simple, calculated, pedagogical process, but is instead complex, random, and disorderly. The data from *ab initio* gene finders is usually inadequate for making accurate descriptions of the gene model, so a certain level of conflicting observations must be reconciled to determine what is “most” correct before “calling” a gene. Once a gene has been called and all isoforms and exon and intron boundaries have been recorded, the data is loaded into the Gene Model Checker a custom GEP designed program that checks start and stop sites, exon and intron boundaries, and provides alerts for suspicious findings such as different exon amount than in the ortholog of *D. melanogaster*. When the data has been verified and accepted by the Gene Model Checker, the user has a choice to create a dot plot comparing their custom-model gene to the ortholog in *D. melanogaster*. The Gene Model Checker also creates a transcript file, peptide file, and extracted coding exons file, which will be compiled by the user and sent to the GEP for further analysis by experienced faculty aids and faculty members. This process of user analysis and submission to GEP was performed for both Fosmid 18 and Fosmid 39. After completion of analysis by the GEP the user submissions will be combined into a final annotated model for the chromosomal region in question. Information obtained from the Universal Protein Resource (UnitProt.org) provided gene function information.

Results

Fosmid 18

Fosmid 18 was 40,001 bp in length and contained three genes (CG10566, CG10565, and Ac78C). Each gene had two isoforms. Gene CG10566 was a three-exon gene. Gene 10565 was a three-exon gene. The first isoform of Ac78C labeled “PB” contained 20 exons and the second isoform of AC78C labeled “PC” contained 15 exons, making these relatively large genes.

ANNOTATION OF FOSMID 39 AND FOSMID 18 OF *DROSOPHILA ERECTA* THROUGH THE GENOMICS EDUCATION PARTNERSHIP

Fosmid 39

Fosmid 39 was 40,001 bp in length and contained three genes (CG4858, Rcd2, and CG13250). Each gene had one isoform. Many regions of genes CG4858 and Rcd2 were highly conserved regions of other genes (CG17904, CG3262 and CG34105, CG12491, respectively) in the *Drosophila melanogaster* reference sequence. Gene CG4858 contained three exons, gene Rcd2 contained two exons, and Gene 13250 contained three exons. The location of gene CG13250 is special as it lies in the intron of gene Rcd2. We believe this special location of CG13250 is further evidence of the efficiency of cellular genetics. These genes were relatively small and appear to be important for the survival of the organism as they contain many highly conserved regions.

Conclusions

Synteny

We expected a high syntenic relationship depending on the close evolutionary proximity of *D. erecta* to *D. melanogaster* (See figure 3). Both Fosmid 18 and Fosmid 39 demonstrated high conservation as every gene and isoform was located at the same position (chromosome 3L) and demonstrated the same gene orientation and isoform amount as their respective orthologs. Further support for high homology was evident in the dot plots comparing sequence base pair similarity (see Figures 4 and 5).

Fosmid 18 Gene Function

The 40 kb region of Fosmid 18 that was annotated contained three genes (CG10566, CG10565, and Ac78C) that each had two isoforms (see Figure 1). The molecular function of CG10566 (accession number: Q9VP78) in *D. melanogaster* is inferred to be involved in protein domain specific binding (UnitProt.org, InterPro). The

molecular functions of CG10565 (accession number: Q9VP77) in *D. melanogaster* is inferred to play a role in DNA binding and heat shock protein binding.^{5, 6} The molecular function of Ac78C (accession number: Q9VP76) in *D. melanogaster* is a lysase, an enzyme that catalyzes the cleavage of bonds.⁵ Unlike the other two genes in Fosmid 18, Ac78C has been studied in an experiment that suggests that it is involved in the detection of chemical stimulus involved in sensory perception of sweet taste such as a sucrose or trehalose stimulus.⁷ The study was performed in *D. melanogaster*, but its close evolutionary proximity to *D. erecta* (the organism in this study) suggested that the gene might have a similar function.

Fosmid 39 Gene Function

The Fosmid 39 region that was annotated contained three genes (CG4858, Rcd2, CG13250) that each had one isoform (see Figure 2). The molecular function of CG4858 (accession number: Q9VPD2) in *D. melanogaster* is inferred to be required for iron-sulfur (Fe/S) protein assembly. Sequences that belong to Mrp/NBP35 ATP-binding protein family and the NUBP2/CFD1 subfamily also showed similarity to CG4858.⁵ The molecular function of Rcd2 (accession number: Q8SXY5) in *D. melanogaster* has been determined from a mutant phenotype experiment to be indirectly involved in centriole duplication.⁸ Rcd2 is an extraordinary gene as it possesses a human homologue named Crim1.⁸ The Crim1 gene produces a cysteine-rich repeat protein that is involved in CNS development possibly by growth factor binding.⁹ Again, human curated genes that have been studied *in vitro* are the exception. The gene CG13250 (accession number: Q9VPD0) currently has no genetic data matching any other sequences in the UniProt database making it unclassifiable until wet-lab studies are performed.⁵

ANNOTATION OF FOSMID 39 AND FOSMID 18 OF *DROSOPHILA ERECTA* THROUGH THE GENOMICS EDUCATION PARTNERSHIP

Future Directions

We hope to analyze further the synteny of Fosmid 18 and Fosmid 39 by using repeat density tools and statistical pair-wise alignment algorithms. Some of the genes we annotated had no prior experimentation to determine their functionality and structure. We would like to use online protein residue databases to compare our custom-model peptide sequences to known peptides to elucidate further the properties of these genes. If resources permit, a wet-lab study of CG13250 might have novel implications because this gene demonstrates no sequence similarity to genes in the UniProt Database.

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Appendix

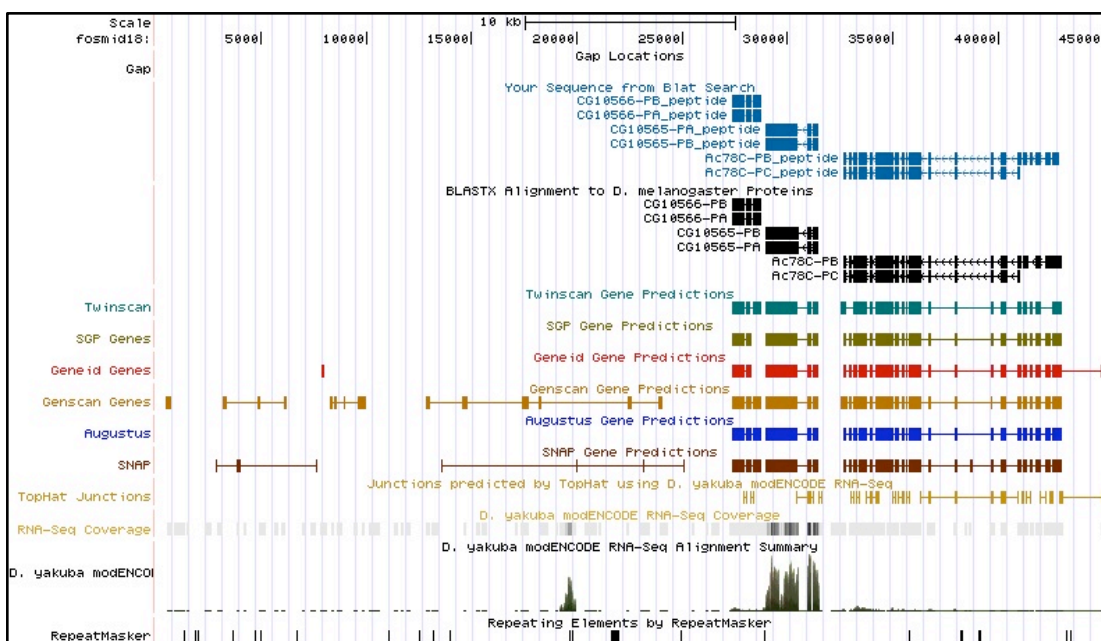


Figure 1. Fosmid 18 custom gene model. A screenshot of the UCSC genome browser used by GEP for visualizing gene candidates. The top track (blue) contains our custom gene model for Fosmid 18 of *D. erecta* January 2008 (GEP/3L extended). The d/mel proteins track (black) represents the BLASTX alignment of the Fosmid 18 sequence data to that of *Drosophila melanogaster*. The other tracks are gene predicting algorithms and tools to predict the borders of exons and introns. Three genes (CG10566, CG10565, and Ac78C) were annotated in this fosmid.

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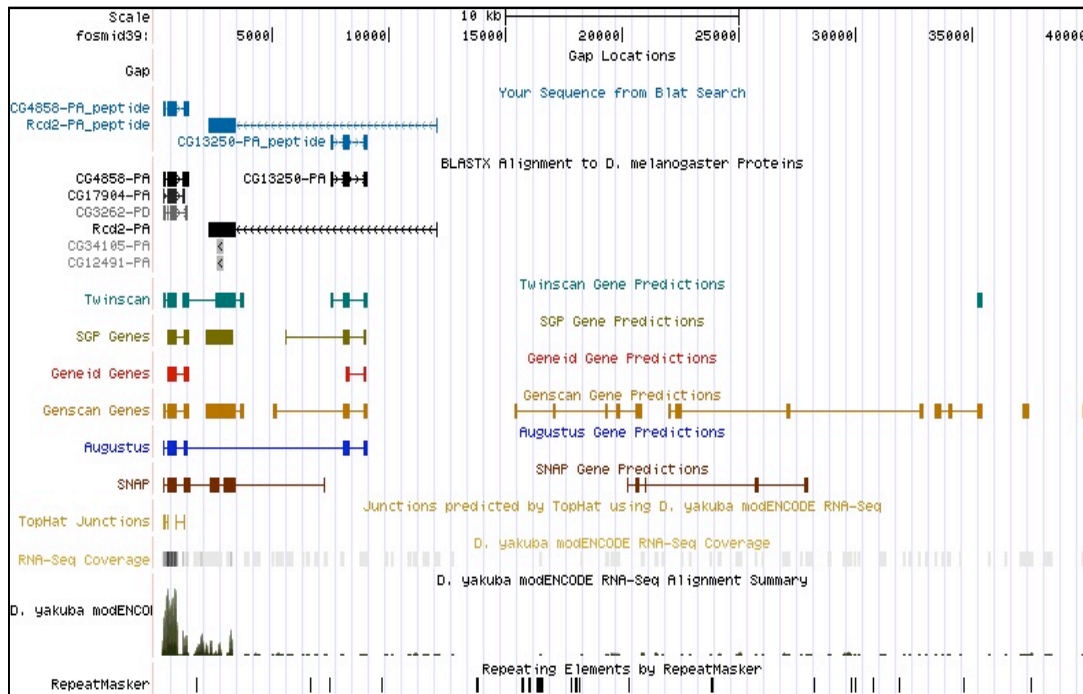


Figure 2. Fosmid 39 custom gene model. A screenshot of the UCSC genome browser used by GEP for visualizing gene candidates. The top track (blue) contains our custom gene model for Fosmid 39 of *D. erecta* January 2008 (GEP/3L extended). The *d/mel* proteins track (black) represents the BLASTX alignment of the Fosmid 18 sequence data to that of *Drosophila melanogaster*. The other tracks are gene predicting algorithms and tools to predict the borders of exons and introns. Three genes (CG4858, Rcd2, and CG13250) were annotated in this fosmid.

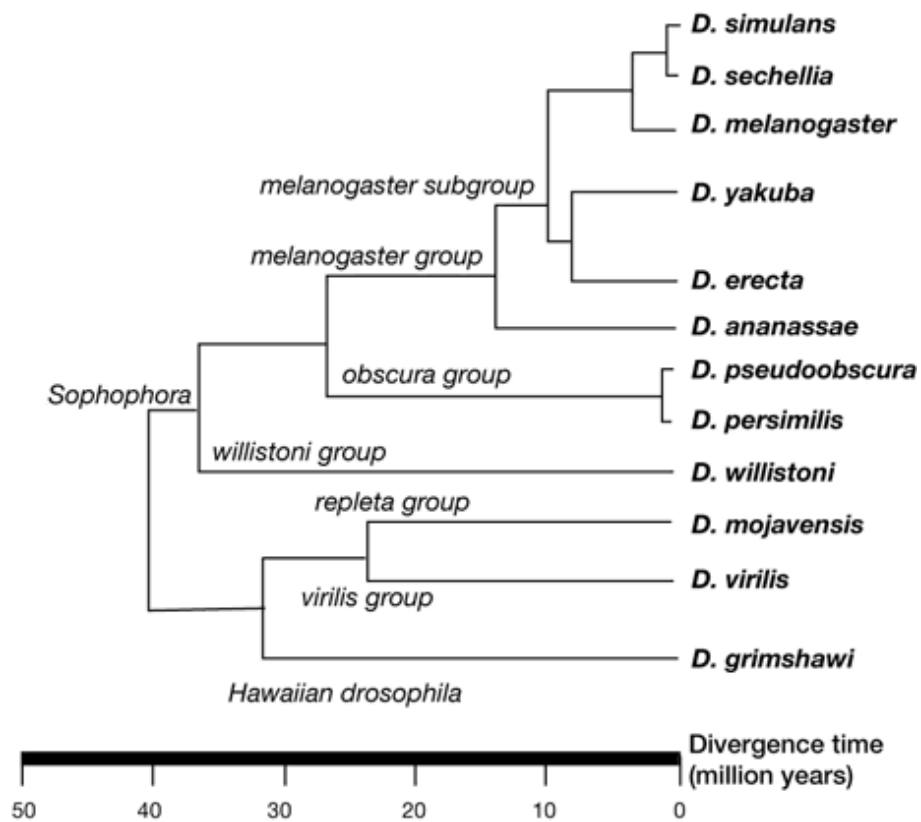


Figure 3. Phylogenetic tree of subgenus *Sophophora* of the genus *Drosophila* from *The Dot Chromosomes of Drosophila* [PowerPoint slides]. Elgin, S. C. (2010). Retrieved from Washington University in St. Louis Genomics Education Partnership at <http://gep.wustl.edu>

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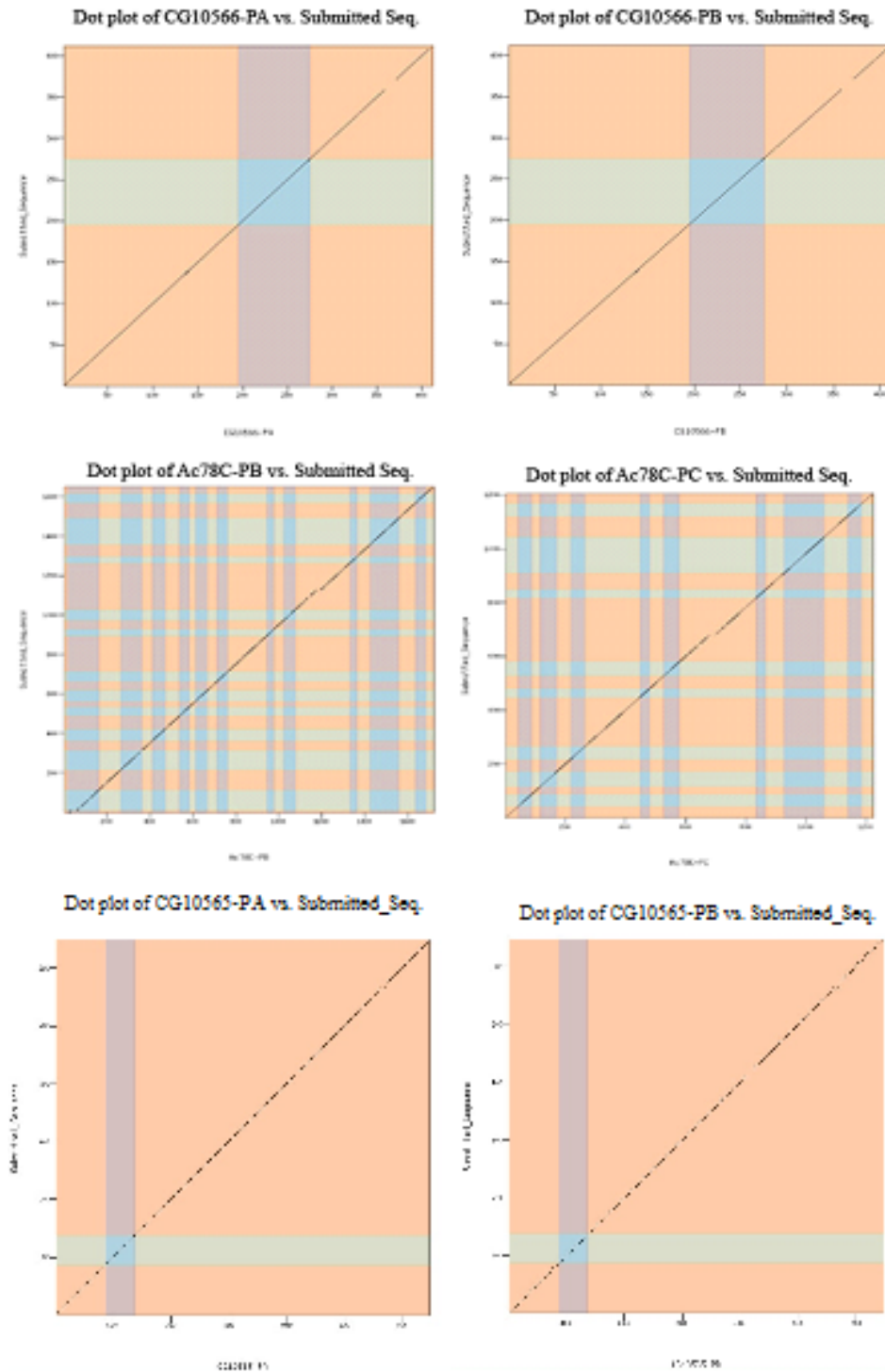


Figure 4. Fosmid 18 gene synteny. Six dot plots of genes (CG10566, Ac78C, and CG10565), showing a comparison of sequence homology (2 isoforms per gene) in Fosmid 18 versus their respective orthologs in *D. melanogaster*.

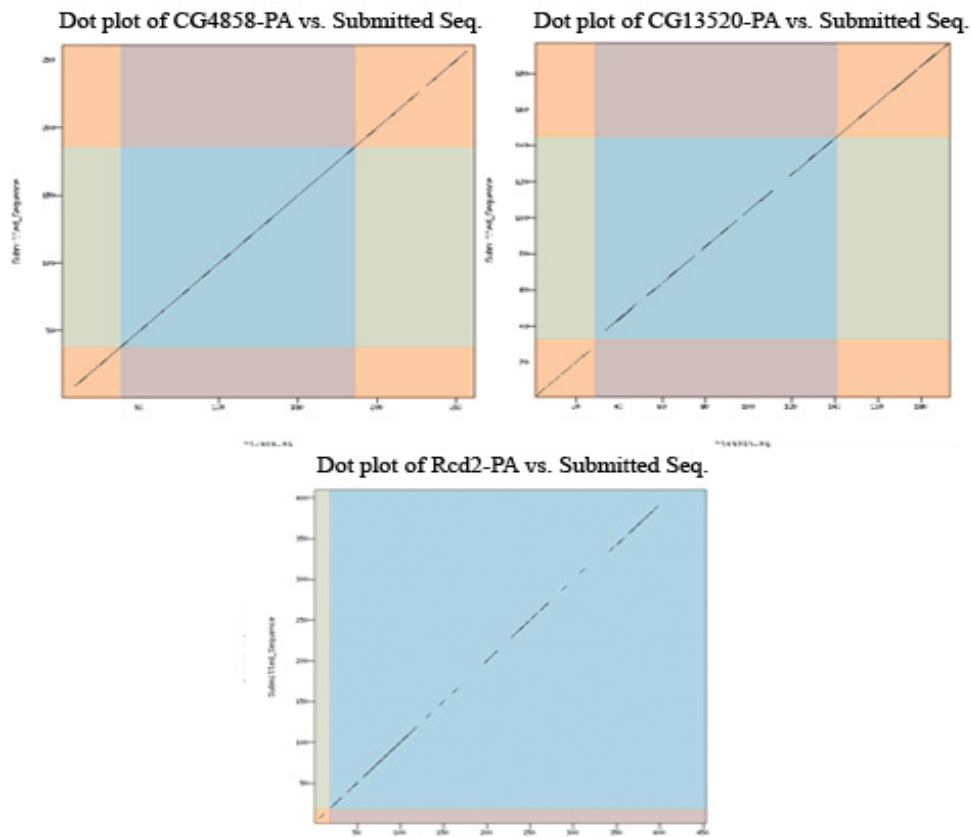


Figure 5. Fosmid 39 gene syntenies. Three dot plots of genes (CG4858, CG13520, and Rcd2), showing a comparison of sequence homology in Fosmid 39 versus their respective orthologs in *D. melanogaster*.

The Effects of Heat Stress on the Production of Reactive Oxygen Species and Cell Viability in *Eisenia hortensis*

Richard Tumminello and Sheryl L. Fuller-Espie, Cabrini College

Faculty Advisor: Sheryl L. Fuller-Espie, Ph.D., DIC, Professor of Biology

Abstract

In recent months, researchers in our lab were interested in determining the optimum temperature for culturing earthworm coelomocytes while carrying out *in vitro* assays. We carried out a study that involved culturing coelomocytes at temperatures ranging from 20°C (control) to 35°C for 10 hours and then measuring levels of reactive oxygen species (ROS). A double staining procedure was employed in which coelomocytes were tagged with the fluorescent compounds dihydrorhodamine 123 for detection of ROS and 7-aminoactinomycin D as a viability stain to distinguish viable from nonviable cells for analysis. We demonstrated that ROS production increased significantly ($p < 0.05$) and reproducibly at temperatures of 30°C and 35°C, but not at the lower temperatures of 20°C or 25°C. These results illustrate the importance of minimizing heat-induced oxidative stress in earthworm coelomocytes by conducting *in vitro* assays at temperatures at or below 25°C. Another area of investigation that our lab would like to pursue is to investigate whether ROS generated at temperatures greater than 25°C causes oxidation of DNA. For future directions, DNA damage will be measured using antibodies specific for either 8-hydroxy-2'-deoxyguanosine (8-OHdG), a marker for base lesions associated with mutagenesis, or phosphorylated serine residues in H2A histones that are generated during DNA fragmentation.

Introduction

Eisenia hortensis (earthworm) possess a coelomic cavity that is populated with leukocyte-like cells that are referred to as coelomocytes. These coelomocytes initiate innate immune responses consisting of highly effective cellular and humoral components.⁴ Our lab has been interested in studying oxidative stress in earthworm coelomocytes induced by a variety of stressors (e.g., polycyclic aromatic hydrocarbons and heavy metals) by measuring reactive oxygen species (ROS) production in addition to their

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effects on innate immune response mechanisms including inhibition of natural killer-like activities and phagocytosis.^{5-6,8} ROS are produced by phagocytes such as neutrophils and macrophages and indicate oxidative stress.³ ROS are highly reactive molecules used during innate host defense to eradicate pathogens⁵ and initiate signal transduction pathways.² When released from cells, ROS can damage neighboring cells and tissues through the induction of inflammatory events.¹ Van der Poel showed ROS production increases in isolated mammalian skeletal muscle at temperatures above 37°C in mammalian cells.¹⁰

We were interested in studying the effects of temperature variation in relation to ROS production and cell viability in earthworms which are typically comfortable around 13–18°C. We used four different temperatures with 5°C variations (20°C, 25°C, 30°C and 35°C) in CO₂ incubators to determine temperature effects on ROS production using the fluorogenic indicator dihydrorhodamine 123, (DHR 123) and cell survival using the cell viability dye 7-aminoactinomycin D (7-AAD). Both methods used flow cytometry. The fluorogenic substrate dihydrorhodamine 123 (DHR 123) was used to measure intracellular ROS production in earthworm leukocytes and the viability dye 7-aminoactinomycin D (7-AAD) to measure a percentage of cell death in a sample. DHR 123 is a nonfluorescent reporter molecule that is converted to fluorescent rhodamine 123 when oxidized intracellularly by intracellular ROS. Rhodamine 123 was detected using a flow cytometer (available at Cabrini College) according to the procedure described by Fuller-Espie et al.⁵

In preliminary tests, we showed that in fact a significant increase had occurred in temperature-induced ROS as heat stress is increased, along with a decrease in viability

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among the coelomocytes. Using six different temperature (4⁰C, 12⁰C, 20⁰C, 28⁰C, 36⁰C, and 44⁰C) and three different earthworms tested individually, the cells were incubated for 3 hours. The preliminary findings indicated that an increase had occurred in the production of ROS coincident with increasing temperature, which was measured using flow cytometry. Preliminary results also showed an increase of temperature leading to increased cell death and decreased cell viability. From the results that we obtained from our preliminary data, the heat stress analysis was then continued by narrowing the temperature ranges to acquire a more accurate range of ROS production and coelomocyte viability with four temperatures: 20⁰C, 25⁰C, 30⁰C and 35⁰C. These experiments differed by using four different batches of earthworm coelomocytes with each batch containing five earthworms (1 x 10⁶ total coelomocytes per treatment in duplicates) instead of using individual earthworms as mentioned in the preliminary experiments. The cells were incubated overnight for 8 hours before measuring ROS in the four groups. Again we demonstrated that ROS production increased significantly ($p < 0.05$) and reproducibly at temperatures of 30⁰C and 35⁰C, but not at the lower temperatures of 20⁰C or 25⁰C. Cell viability was also measured using 7-AAD. As temperature exposure increased, the proportion of viable cells correspondingly decreased.

Instruments and Methods

Chemical Hygiene

In the experiment outlined below, the laboratory procedures and handling of hazardous chemical waste will be carried out in accordance with the Chemical and Biological Hygiene Plan of the Science Department of Cabrini College.

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Animal Handling

Eisenia hortensis is a species of earthworm that is very easy to maintain and is able to extrude a large quantity of coelomocytes upon agitation. Vermitechnology (Tel: 352-591-1111, www.vermitechnology.com) supplied these earthworms. The earthworms were maintained in plastic boxes containing autoclaved wood chips and moistened shredded paper in a dark room at room temperature, and were fed twice weekly with Gerber's baby food powder. The day prior to extrusion of the earthworms, they were placed in groups of six to eight in a Petri dish moistened with fungizone. This allowed for defecation and removal of fungi on the surface of the earthworm to help reduce contaminants during *in vitro* incubation of the extruded coelomocytes. After coelomocytes had been harvested, earthworms were euthanized by freezing at -20°C .

Harvesting Coelomocytes

Earthworms were removed from Petri dishes and placed in troughs containing 3 ml ice-cold extrusion buffer (FacsFlow-BD Bioscience). This treatment of the earthworms with extrusion buffer stimulated the rapid release of coelomocytes from the coelomic cavity through the dorsal pores. The cells that were extruded were incubated with 0.5 mL Accumax (an enzyme mixture containing trypsin, collagenase and DNase) for 5 minutes at room temperature. Then, 5 mL of phosphate buffered saline (PBS) was added, which was followed by centrifugation at 800 rpm for 5 minutes at 4°C .

The coelomocytes were then cultured in Dulbeccos Modified Eagle Medium (DMEM) composed of L-glutamine, nonessential amino acids, penicillin, streptomycin, amphotericin B, tetracycline and chloramphenicol, HEPES buffer, and 10% Serum Sepreme (Super DMEM, SDMEM) according to Fuller-Espie et al.⁴ Cell counts were

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established using a hemocytometer and phase-contrast microscopy.

Treatment and Flow Cytometry:

After exposure to heat, ROS production in live granular amoebocytes was measured using the fluorogenic substrate DHR 123, a probe widely used to measure intracellular H₂O₂. The viability dye 7-aminoactinomycin D (7-AAD) was employed to enable the elimination of dead cells from our analyses of untreated and treated samples. For controls, coelomocytes (1 x 10⁵ in 0.1 ml) were pretreated with H₂O₂, CdCl₂, or saponin (in 0.1 ml), for a final volume of 0.2 ml in 96-well V-bottom plates at the indicated concentrations for 10 hours at 25⁰C, 5% CO₂.

After harvesting the coelomocytes by centrifugation (150 x g, 5 min at 4⁰C), they were washed once with PBS, and each sample was resuspended in 100 µl of PBS and 100 µl SDMEM containing 1 µM DHR 123 (Invitrogen, D-632, 1 mM stock in SDMEM) and 2.5 µl (0.125 mg) of 7-AAD (BD Biosciences, #559925) (to permit exclusion of dead cells from final analysis and determination of effect of treatment of cell death). Duplicate or triplicate samples were used in each assay. After 15 min incubation at room temperature, 100 µl BD FACSFlow sheath fluid was added to each sample. Finally, samples were placed on ice, protected from light, and run on the flow cytometer immediately. Data analysis was carried out using CellQuest ProTM software (BD Bioscience), and statistical analyses was performed. Fluorescence was measured using the FL-1 (rhodamine 123) and FL-3 (7-AAD) detectors. ROS production was measured in viable coelomocytes by gating on small coelomocytes that were 7-AAD negative. Cell viability was measured by gating on the region indicating cell death, which was predetermined by the red control with saponin and 7-AAD. The higher the

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percentage of cells entering the gated region of the red control, the higher the amount of cell death and the lower the cell viability.

Results

Assay 1 (Figures 1 and 2) was a preliminary test in which six different temperatures (4°C, 12°C, 20°C, 28°C, 36°C, and 44°C) were used to determine the temperature range at which ROS production would take place in the coelomocytes along with cell viability. The assay was run using duplicates and three earthworms and incubated for three hours. With 20°C as our control, our results showed a significant increase in ROS production at 28°C and 36°C and a steady consistent basal rate of ROS production at the lower temperatures (4°C, 12°C, and 20°C). The temperature of 44°C showed a slight decrease in ROS production. We believe the decrease in ROS production at this temperature was because of cell death, resulting in fewer cells to analyze. We confirmed this when looking at the 7-AAD viability dye that showed a steady decrease in viability, especially at the higher temperatures. ANOVA analysis was used proving significant results ($p < 0.05$) for both ROS production (4.98×10^{-11}) and cell viability (1.7×10^{-17}).

Assay 2 (data not shown) used four batches of earthworms each containing five earthworms run in duplicates and incubated for approximately 10 hours. We began narrowing our temperature range of ROS production to 20°C, 30°C, and 40°C; 20°C was once again our control temperature. Assay 2 showed a slight increase in ROS production from the control temperature to 30°C and a slight decrease in ROS production of the coelomocytes in the batch treated in 40°C. Once again, we were able to confirm the decrease in ROS production was because of the increase of cell death, thus, lowering the viability at 40°C. It became apparent that we needed to break up the temperature ranges

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and lower our highest temperature to below 40°C.

Assay 3 (data not shown) used a 10 hour incubation and four batches of five earthworms once again. In this assay, the chosen incubator temperatures were 20°C, 25°C, 30°C, and 35°C. 20°C was used as our control once again; an increase in the production of ROS was initially seen at 30°C and a significant increase in ROS production was observed at 35°C for all four batches. Once again, an increase in cell death as temperature increased was seen. The data proved to be significant with *p* values 0.0015 for ROS production and 1.89×10^{-6} for cell viability using ANOVAs analysis.

Assay 4 (Figures 3 and 4) was run with the same setting as Assay 3 10 hours incubation and four batches of five earthworms once again. In this assay, the chosen incubator temperatures were 20°C, 25°C, 30°C, and 35°C but was run in triplicates. Results showed an increase in ROS production starting at 30°C and once again increasing at 35°C. ANOVA analysis resulted in a *p* value of 1.27×10^{-24} for ROS production and 2.06×10^{-27} for the viability analysis that was gated on the percentage of live cells that decreased as the temperatures increased.

Conclusions and Recommendations

Our findings show that heat stress does in fact produce ROS in earthworm coelomocytes beginning approximately at 30°C and the production of ROS increased as temperature increased. We also saw that decreases in cell viability correlated with ROS production. Our lab will be determining whether heat-induced, oxidative stress is associated with oxidative damage to DNA. DNA damage will be measured using antibodies specific for either 8-hydroxy-2'-deoxyguanosine (8-OHdG), a marker for base lesions associated with mutagenesis, or phosphorylated serine residues in H2A

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histones that are generated during DNA fragmentation. In addition to heat-induced stress, the inclusion of the polycyclic aromatic hydrocarbon 7, 12 dimethylbenz[a]anthracene (DMBA), a xenobiotic associated with contaminated soil, will also be investigated. Polycyclic aromatic hydrocarbons (PAH) of anthropogenic origin formed through incomplete combustion of fossil fuels are considered environmental stressors to earthworms because these compounds can accumulate in soil. Thus, they are of considerable interest in the production of ROS in earthworms. PAH such as 7, 12 dimethylbenz[a]anthracene (DMBA) have been found to produce ROS through metabolism and redox cycling. DMBA is an immunosuppressant,⁸ and a carcinogen and may result in DNA damage through oxidation by cytochromes P450 and hydrolyzation by microsomal epoxide hydrolase, found to be essential for ROS production and immune suppression.^{7,9} Production of ROS in earthworm coelomocytes as an effect of heat and soil contaminants suggests the potential for the earthworm as a bioindicator of man-made changes to diagnose soil contamination and heat stress because of global warming effects on fossorial organisms through our flow cytometric methodology.

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Appendix

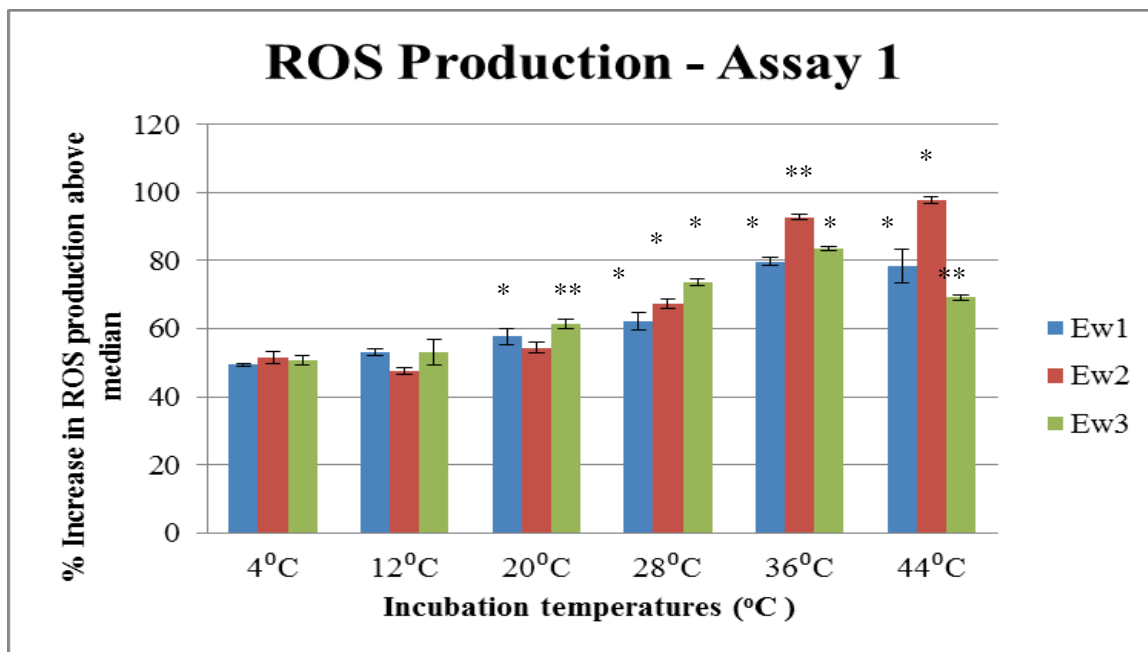
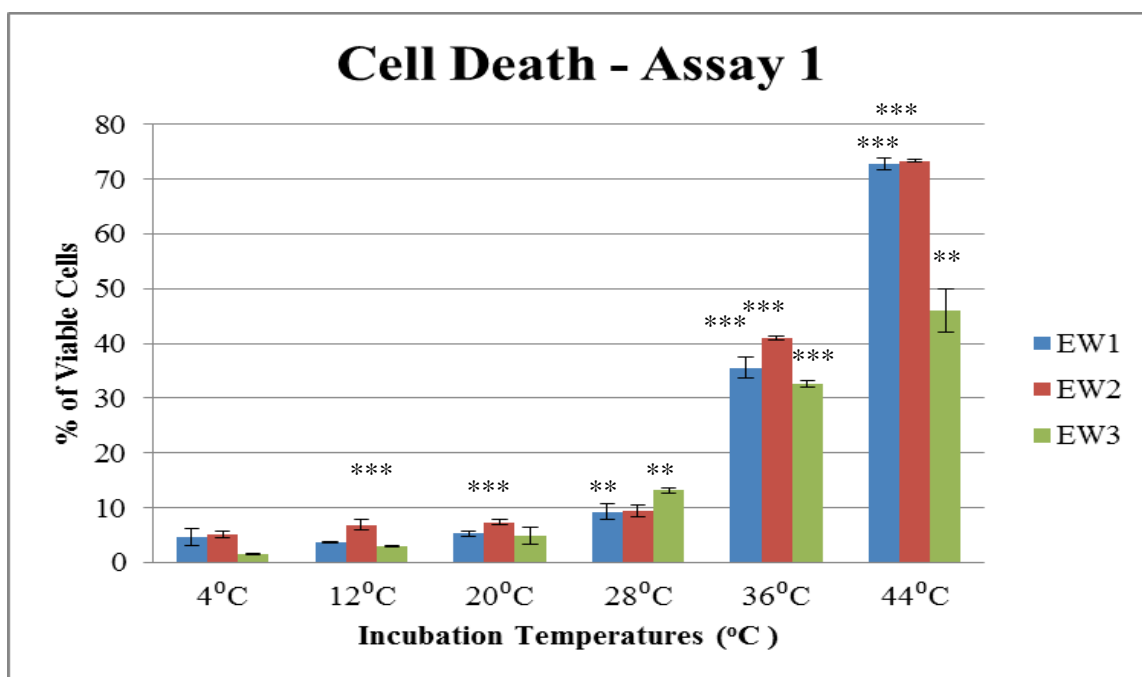


Figure 1. ROS production in three earthworms in preliminary Assay 1. Analysis was restricted by gating on granular amoebocytes. More ROS was produced as the temperature increased. Coelomocytes incubated at the higher temperature (44°C) were killed, hence the decrease in ROS production. *=*p* value<0.05; **=*p* value<0.005; ***=*p* value<0.0005; ****=*p* value<0.00005.



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Figure 2. Viability measured in three earthworms in preliminary Assay 1. Analysis was gated on granular amoebocytes. As the temperatures increased, so did the percentage of amoebocytes taking up the viability dye 7-AAD indicating cell death. $*=p$ value <0.05 ; $**=p$ value <0.005 ; $***=p$ value <0.0005 ; $****=p$ value <0.00005 .

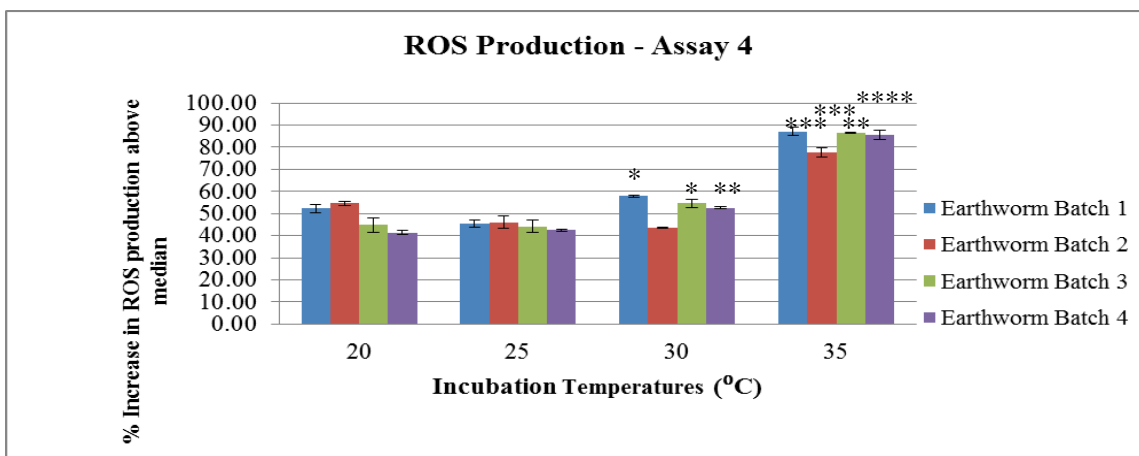


Figure 3. ROS production in Assay 4. Analysis was restricted by gating on granular amoebocytes. ROS production, as detected by the fluorochrome rhodamine 123, is relatively stable in earthworm coelomocytes during exposure to temperatures 20°C and 25°C. A gradual increase of the percentage of ROS takes place at 30°C exposure and a dramatic increase at 35°C. $*=p$ value <0.05 ; $**=p$ value <0.005 ; $***=p$ value <0.0005 ; $****=p$ value <0.00005 .

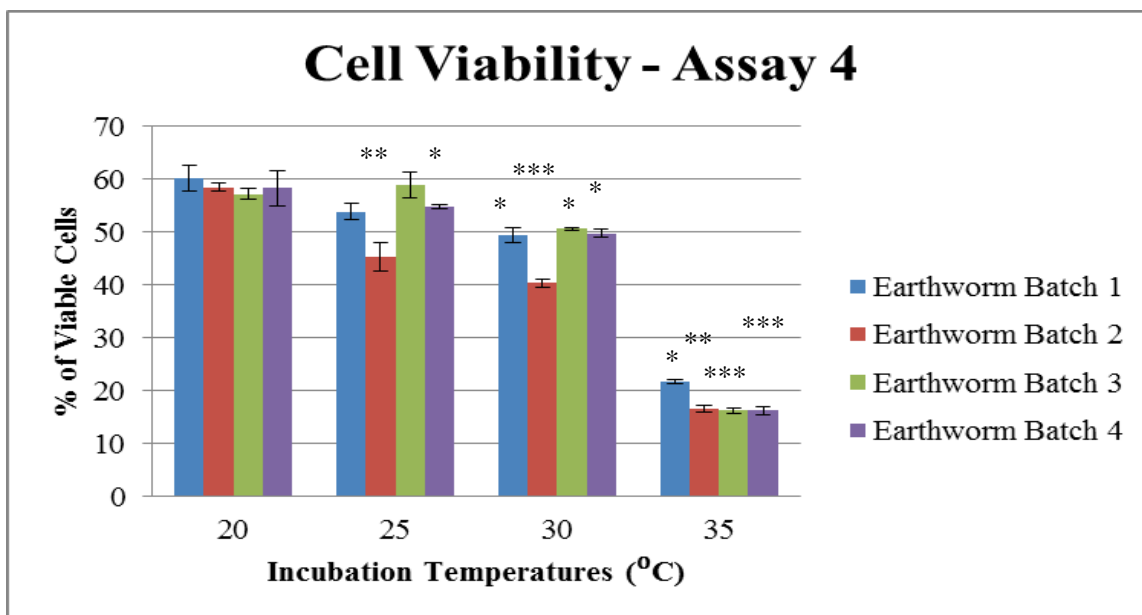


Figure 4. Cell viability in Assay 4. Analysis was restricted by gating on granular amoebocytes. Cellular viability, measured by 7-AAD, depicts that as temperature increases, the viability of cells decrease. The viability gradually decreases from 20°C to 30°C; the viability of the cells drastically decreases once exposed to temperatures 35°C and above. $*=p$ value <0.05 ; $**=p$ value <0.005 ; $***=p$ value <0.0005 ; $****=p$ value <0.00005 .

Social Sciences



Effects of a Parental Divorce on Their Adolescents' Future Relationships

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Abstract

The effects of a parental divorce were examined to determine whether they had an influence on adolescent's views of future relationships. A convenience sample of 85 undergraduate students from a small liberal arts college participated in this study. A total of 53 females and 32 males served as respondents. The study included 42 females and 26 males without divorced parents, and 11 females and 6 males with divorced parents. The participants completed a survey that had a five-point Likert scale. The survey was distributed at the beginning of several classes. A MANOVA was conducted to evaluate whether thoughts on marriage differed according to gender. Significant gender differences were found on thoughts of marriage. The marriage views solely depended on the participant's gender. The females had more positive thoughts about marriage than the males had. However, parental divorce and the adolescent's relationship status had no significant effect on their thoughts on marriage.

Introduction

If one word strikes fear into some people's hearts, it is the word "commitment." Youths, adolescents, and even young adults are fearful that they will go through a divorce just like their parents, and this is what makes them have a fear of commitment. They might love their partners very much, they might have no interest in being apart or being with anyone else; however, the mere thought of committing to the relationship makes them think twice. Some will do or say anything just to avoid being in a long-term relationship with someone, or even to avoid marriage. What this all boils down to in the end is the fear of commitment. Thus, the research questions are two:

- Why do young people have fear of commitment?

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- Why is it that someone doesn't want to be in a serious relationship with another person?

Review of the Literature

Numerous theories have been proposed and much research has been conducted on this topic. Some reasons why people have a fear of commitment include fear of rejection, loss of freedom, financial independence (meaning not wanting to share their hard-earned money), fear of history repeating itself with their past relationships, and having low self-esteem. One of the biggest reasons why people have a fear of commitment is because they witnessed their parents go through a divorce. They do not want the same thing to happen to them. These are just a few reasons why people have this fear of commitment. Numerous studies have been conducted on this topic (see Stanley & Markman, 1992; Levinger, 1999).

Ackerman, Griskevicius, and Li (2011) studied commitment in men and women. They looked at which gender, men or women, is more likely to confess love first in the relationship and how the other partner reacts and feels when she or he hears "I love you." Ackerman et al. conducted six different studies for this research. In the first study, participants were passersby on the street: 25 women and 20 men. The participants received a short questionnaire about romantic relationships. It asked a question about a given scenario (e.g., if you walk by on the street and hear a man say, "I love you," is he the first person who said it?). Most of the time, the women indicated that they were the ones to say, "I love you" first.

Ackerman et al.'s (2011) second study included 45 female and 66 male undergraduates who had been in a romantic relationship before. They were randomly

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chosen while walking on a college campus and asked if they wanted to participate. They received a short questionnaire asking about past experiences. They were asked the questions, “Who was the first person in your relationship to say I love you?” and “How long into the relationship did they say it?” Ackerman et al. found that the men had more often confessed first. In Ackerman et al.’s third study, 47 heterosexual couples were recruited by receiving letters in the mail asking them if they wanted to participate. The participants were given an online survey asking relationship questions including who confessed love first in the relationship. A total of 70% of the couples had agreed that the men had confessed love first in the relationship.

Ackerman et al.’s (2011) fourth study included 84 females and 35 males. They were random pedestrians on the street who were asked whether they wanted to take part in a survey. The researchers gave a survey asking the question: If they were starting a romantic relationship with someone whom they found attractive and interesting, when would “I love you” become appropriate? The results showed that the average couple waits about 3 months into the relationship before telling the significant other they love her or him. In addition, the survey asked how happy they felt after their romantic partner told them they loved them. The results showed a moderate level of happiness, as expected, meaning that people were fairly happy when they were told by their significant other that she or he loved them.

Ackerman et al.’s (2011) fifth study included 44 women and 29 men currently in relationships. They were recruited from a community, using ads in multiple cities. They were given a questionnaire that asked questions about emotional reactions to a love confession, perceptions of confessor honesty, and intercourse in the relationship. They

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had to answer using a scale of 1–8. The results showed that people had positive emotions and honesty at different points in their relationships. In relationships, women perceive more honesty in their partners after sex than before sex and the men perceive less honesty in their partners after sex than before sex. In addition, before having intercourse in the relationship, the men felt more positive about being told, “I love you,” than women felt. However, it was found that, after the intercourse happened, the women felt more positive about being told, “I love you,” than the men felt. It was determined that this was so because the women indicated feeling more positive emotions after sex.

Ackerman et al.'s (2011) sixth study included 107 female and 94 male undergraduates. They too were recruited from a community using ads in multiple cities. The respondents were asked to measure the scale of happiness when they hear “I love you.” The results showed that many people felt happy.

Across these six studies, Ackerman et al. (2011) found that, although people think that women are the first to confess love and feel happier, it is actually the men who confess love first and feel happier. Men and women's reactions to love confessions differ in important ways depending on whether the couple engages in sexual activity. For example, the men are more likely to confess, “I love you,” to their partner before they have sexual intercourse and the women are more likely to confess, “I love you,” to their partner after the sexual intercourse. “I love you” has different meanings depending on who is doing the confessing and when it is being made. Although these were good studies, these answers might not be reliable because the number of participants was small and not equal. These results leave the researcher wondering: For those people who say they are not happy, why do they stay in the relationship?

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Rhoades, Stanley, and Markman (2010) looked at some of the reasons why people stay in relationships. They examined four different aspects of commitment in romantic relationships relating them specifically to relationship adjustment and stability. These factors can serve to keep someone in a relationship when they might otherwise leave. The four aspects of relationship commitment included (a) dedication, (b) perceived, (c) felt, and (d) material constraints. Dedication is said to be a kind of interpersonal commitment and many people seem to battle the fear of commitment. Perceived constraint is said to be external or internal forces that encourage partners to remain together and it represents the way constraint commitment has typically been measured in this field. Felt constraint is said to be the sense that one is constrained in the relationship because of external pressures. Material constraint reflects the investments that couples might or might not directly perceive as potential constraints, but that they might create forces that push the relationship to continue (Rusbult, Martz, & Agnew, 1998). The participants in Rhodes et al.'s (2010) study were individuals who took part in the first of three waves of a longitudinal project on romantic relationship development. The participants were given a simple survey that was sent out through e-mails asking questions about the four aspects. The participants were 425 men and 759 women between the ages of 18 and 34. All of the participants were unmarried, but they were in a romantic relationship with someone of the opposite sex at the beginning of the assessment. The results showed that felt constraint was negatively related to relationship adjustment while the other three factors were positively related. This result means that the higher levels of felt constraint were associated with lower relationship adjustment, lower perceived likelihood of marriage, higher perceived likelihood of break-up, and less actual relationship stability, while the

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more dedication, perceived constraints, and material constraints were associated with higher relationship adjustment, higher perceived likelihood of marriage, lower perceived likelihood of break-up, and less stability. Therefore, the finding was that, if people desire a future partner, they will commit to each other and follow up with marriage.

Curtis and Susman (1994) studied the factors in fear of marriage. In this study, they identified 10 elements that seem to influence fear of marriage or certain avoidant patterns associated with the marital commitment. Further research has become necessary because the U.S. Census Bureau data has suggested that the increasing numbers of individuals have either delayed marital status or avoided it entirely. Although, Curtis and Susman's (1994) study had suggested that men traditionally have had more problems making marital commitments, more and more women are also avoiding marriage. Their study included 401 men and 541 women between the ages of 18 and 40 who were randomly selected. E-mails were randomly sent out to people and, those who were willing to participate, were given surveys to complete by answering questions about the fear of getting married and potential causes for the fear. Although, this study had suggested that men traditionally have had more problems making marital commitments, more and more women are also avoiding marriage. The results showed that some fears include the loss of identity, control, or finances, and the fear of accepting responsibility. These factors in the fear of marriage can also lead to parents not wanting to remarry or to marry the father of their child.

Waller and Peters (2008) also studied the risk of divorce as a barrier to marriage among parents of young children. In this study, they gathered a group of 30 unmarried men and 40 unmarried women to participate. The researchers gave them surveys, asking

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questions about their singleness with a child and whether they would want to marry their baby's father or whether the fathers wanted to marry their baby's mother. They examined how unmarried parents' risk of divorce influenced their decision to marry. The results showed that unmarried parents had a highly predicted probability of marital dissolution for a sample of initially married mothers with similar characteristics, and had significantly lower odds of marriage to the father of their child even after controlling for the individual and relationship characteristics expected to influence marriage. The dissolution propensity that was examined compared the measure of the local divorce rate. This comparison means to determine whether a number of divorced people are present in one population. The results provide support for the argument that high rates of divorce in the population relate to a fear of divorce among unmarried parents, which would decrease their probability of marriage. This research provides significant information on the effects of fear of divorce on unmarried parents, but it does not speak to the effects that divorce leaves on the children.

However, Christine (2005) did investigate the long-term effects on adolescents with two parents. The author highlighted the current trend of disrupted marriages and the effects that divorce has on families and children across the 20th century. One of the biggest concerns is the continuation of the pattern of divorce evident across generations. Christine surveyed a sample size of adolescents, 175 women and 125 men, who had parents who were divorced. Christine gave them a survey asking them questions about their parent's divorce and how they felt about marriage. Christine asked questions to determine whether adult children from divorced families view relationships differently than their peers who were raised in a household where the parents were not divorced.

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This study has shown that divorce can strongly affect adult children's intimate relationships. The children of divorced parents might suffer from fear of intimacy, and might remain skeptical of marriage. Adult children experienced fears that they would be abandoned and betrayed by their lover. This study has shown that divorce can strongly affect adult children's intimate relationships. However, the responses of some adult children in this study showed that no significant difference existed between having divorced parents versus having married parents. These children might even have strengthened intimacy and relationship skills developed by living through the divorce experiences and not wanting to become like their parents.

The words "I love you" represent the essence of romantic devotion to that significant other. Feelings of love are typically accompanied by many different ways of actual commitment and symbolic commitment. However, saying "I love you" may also be said because of pressures from the society around us today. These pressures may often lead to men making the first move in a profession of love and leading women to react to this with doubtful questions in their minds. Pressures from society can quite possibly be another reason why adult children are afraid to commit. They might want to marry merely because it is the norm when they really do not love the person. They were pressured into it. Their parent's divorce could have a huge impact on their fear of commitment. Past relationships are another factor that can cause fear if the relationship was bad. Although these studies were very well done, a clear answer to why people have a fear of commitment was not presented.

Purpose of the Study

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The purpose of this researcher's study was to determine whether there could be a clearer answer regarding whether the students at one small liberal arts college have a fear of commitment. The purpose of the study was to determine whether the divorce of a parent would influence their adolescent's future relationships and their views of marriage. If an adolescent was in a relationship, this survey assessed her or his level of commitment to her or his partner and whether the divorce had any effect on that level. The researcher hypothesized that the divorce of a parent would have a negative effect on her or his child's future relationships. The researcher also hypothesized that men would have a harder time committing to a relationship than women would.

Method

Participants

A convenience sample of 85 undergraduate students from a small liberal arts college participated in this study. A total of 53 females and 32 males served as respondents. The participants included 42 females and 26 males without divorced parents, and 11 females and 6 males with divorced parents. The student's grade levels ranged from freshman to seniors. Ages ranged from 18 to 22 years.

Instruments

The participants completed a survey that was a five-point Likert scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). The questions in the survey were taken from the Development of Investment and Commitment Scale (Lund, 1985), the Commitment and Satisfaction in Romantic Associations Test (Rusbult, 1980), and the Personal Authority in the Family System Questionnaire (Bray, Williamson, & Malone, 1984). The survey was split into three sections with a total of 43 questions. Section 1 measured the

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participant's commitment levels. Section 2 asked whether the participant was in a relationship and then measured their relationship commitments. Section 3 measured the participant's views on marriage. The participants were then asked whether their parents were divorced or married. Two consent forms were attached to the survey. The participants signed one copy and returned it, while they kept the other copy, which provided them with information about available counseling services in the event that answering these questions had been hurtful. The survey was given to different psychology classes and sciences classes using convenience sampling.

Procedure

The protocol was submitted to the Institutional Review Board (IRB), and APA guidelines for conducting psychological research were followed. The survey was distributed at the beginning of several classes on a small college campus, including two developmental psychology classes, a class on engagements with the common good, a sociology of religion class, and an introduction to psychology class. Participants were instructed to complete the survey carefully and honestly. Participation was voluntary, and the survey was constructed in a way that would ensure anonymity. If the participants wished to participate, they filled out a consent form. Once the survey was distributed, the surveyor stood by the door, in case anyone had any questions. Once the participants completed the survey, they brought it up to the front of the room and put their signed consent form in one pile and their completed survey in another pile. Once everyone was finished, the surveys and consent forms were put into separate envelopes. The survey took less than 10 minutes to complete.

Results

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A one-way multivariate analysis of variance (MANOVA) was conducted to evaluate whether thoughts on marriage differed according to gender. Significant gender differences were found among the thoughts on marriage on the dependent variables (men and women), Pillai's trace=.30, $F(14, 70)=2.20$, $p=.02$. The multivariate N^2 using Pillai's trace was quite strong (.31). Means and standard deviations on the dependent variables for the thoughts on marriage are reported in Table 1 (see Appendix A).

A second one-way multivariate analysis of variance (MANOVA) was also conducted to evaluate whether thoughts on marriage and fear of commitment differed according to relationship status. Marginally significant differences between those in a relationship and those not in a relationship were found among the thoughts on marriage on the dependent variables (in a relationship or not in a relationship), Pillai's trace=.60, $F(38, 130)=1.47$, $p=.058$. The multivariate N^2 using Pillai's trace was moderately strong (.30).

A third one-way multivariate analysis of variance (MANOVA) was conducted to evaluate whether thoughts on marriage and fear of commitment differed according to gender. Marginally significant gender differences were found among the thoughts on marriage on the dependent variables (male or female), Pillai's trace=.33, $F(19, 65)=1.70$, $p=.059$. The multivariate N^2 from Pillai's trace was moderately strong (.33).

Conclusion

As outlined previously, this survey analyzed gender differences, participants in a relationship versus not in a relationship, and participants with divorced versus married parents by using a one-way multivariate analyses of variance, MANOVAs. Each was analyzed separately. Significant differences were found among men and women on the

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thoughts on marriage on the dependent variables (men and women). The females had more positive thoughts on marriage than the males did. The females had a more positive outlook in believing that they would get married when they got older. However, parental divorce and the adolescent's relationship status had no significant effect on their thoughts on marriage. The marriage views solely depended on the participant's gender.

Two other MANOVAs were conducted. Both were marginally significant. The first MANOVA was conducted to evaluate whether thoughts on marriage and fear of commitment differed according to whether the participant was in a relationship or not. The p value was .058, but was rounded up to .06, which was not significant. The second MANOVA was conducted to evaluate whether thoughts on marriage and fear of commitment differed according to the participants' gender. The p value was .059, but was rounded up to .06, which again was not significant.

Thus, it has been supported through this study that females view marriage more positively than men view it. This finding actually contradicts previous research. In the study conducted by Curtis and Susman (1994), the authors found that more and more women were starting to avoid marriage more than men were avoiding it. Curtis and Susman found that the women had started to have fears of loss of identity, control, or finances and fears about accepting responsibility when thinking about marriage. However, this researcher's study has shown that the women have more positive views on marriage than men have, which means that, over the years, the gender's views might have switched. This researcher's results that concerned parental divorce were not significant; therefore, this researcher could make no comparison with previous research.

Limitations and Recommendations

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The main purpose of this research was to determine whether parental divorce had an effect on the adolescents' future relationships. However, no significant results were found to support this possible effect. The researcher had previously hypothesized that the divorce of a parent would have a negative effect on her or his child's future relationships. The researcher also hypothesized that the men would have a harder time committing to a relationship than women would. However, the researcher was able neither to prove nor to disprove this hypothesis because the results on the tests were not significant. This insignificance might have happened because the sample size was relatively small. A larger sample size for future research would be able to yield better results. In addition, future researchers should recruit more adolescents with divorced parents. Out of the 85 participants that completed the survey, only 17 of them had divorced parents. This low number made it very hard to find any significant results. The sample used in this study might not be representative of the population because a majority of the respondents had married parents. Further research should be done to account for the lack of divorced parents and to determine whether more significant results might be found with a larger sample size. Some other factors besides having a divorced parent might exist, but were not examined in this study. All of the factors that this researcher compared should continue to be considered in future research.

These results could be a positive because the fact that the results were not significant could mean that a parent's divorce has no effect on adolescent relationships. Divorce is not an easy experience for any child or adolescent to go through. It can be very traumatizing and can have psychological effects on the adolescent. Therefore, it is very important to determine whether divorce does in fact have a negative effect on adolescent

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relationships because, when they are young adults, they might be afraid that their marriage will end in divorce as their parents' marriage ended.

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**EFFECTS OF A PARENTAL DIVORCE ON THEIR ADOLESCENTS' FUTURE
RELATIONSHIPS**

Appendix A

Table 1

The Means and Standard Deviations of Females and Males on the Thoughts on Marriage Questions

Questions	Mean		Standard Deviation		N	
	Female	Male	Female	Male	Female	Male
Q 27	3.89	3.91	.91	1.06	53	32
Q 28	3.94	3.94	1.12	.95	53	32
Q 29	4.11	4.03	.95	.86	53	32
Q 30	3.13	2.97	1.18	1.15	53	32
Q 31	3.91	3.41	1.01	.95	53	32
Q 32	3.23	2.56	.95	.98	53	32
Q 33	2.06	2.19	.99	1.12	53	32
Q 34	2.05	2.72	.99	.99	53	32
Q 35	4.25	4.22	1.05	.91	53	32
Q 36	1.83	2.13	.94	1.07	53	32
Q 37	3.89	3.84	.99	.95	53	32
Q 38	2.83	2.97	1.10	.93	53	32
Q 39	3.06	2.78	1.34	1.10	53	32
Q 40	2.17	1.81	1.20	1.00	53	32

EFFECTS OF A PARENTAL DIVORCE ON THEIR ADOLESCENTS' FUTURE RELATIONSHIPS

Appendix B

Questionnaire on Commitments and Relationships

Part A: Please indicate by circling how strongly you agree with or disagree with each of the following statements.

1.) I don't make commitments unless I believe I will be able to keep them.

5 4 3 2 1
 Always Sometimes Never

2.) I do not feel compelled to keep all of the commitments that I make.

5 4 3 2 1
 Always Sometimes Never

3.) I have trouble making commitments because I don't want to close off alternatives.

5 4 3 2 1
 Always Sometimes Never

4.) I try hard to follow through on all my commitments.

5 4 3 2 1
 Always Sometimes Never

5.) Fairly often I make commitments to people of things that I do not follow through on.

5 4 3 2 1
 Always Sometimes Never

Part B: Please circle the answer that best describes you.

6.) Are you currently in a relationship? (If no, please skip down to Part C.)

A.) Yes B.) No

7.) How long have you been in a relationship?

A.) 6 months or less B.) 7–12 months C.) 13–18 months
 D.) 19 months or more

8.) I am committed to maintaining my relationship.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

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RELATIONSHIPS**

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9.) I find myself thinking about my partner frequently throughout the day.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

10.) I put effort into “making the relationship work” when there are problems.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

11.) I feel comfortable in telling my partner my true feelings about our relationship.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

12.) Our relationship makes me happy.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

13.) I feel that I can really trust my partner.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

14.) I am able to count on my partner in times of need.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

15.) There are times my partner cannot be trusted.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

16.) I am perfectly honest and truthful with my partner.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

17.) I would not feel very upset if our relationship were to end in the near future.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

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18.) I get satisfaction out of doing things for my partner, even if it means I miss out on something I want for myself.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

19.) Giving something up for my partner is frequently not worth the trouble.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

20.) I want to keep the plans for my life somewhat separate from my partner's plans for life.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

21.) I am willing to have or develop a strong sense of an identity as a couple with my partner.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

22.) I like to think of my partner and me more in terms of "us" and "we" than "me" and "him/her."

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

23.) I am more comfortable thinking in terms of "my" things than "our" things.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

24.) I am attracted to the single life style more than being in a relationship.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

25.) If I weren't dating my partner, I would do fine and would be able to find another person to date.

5 4 3 2 1
 Strongly agree Neither agree nor disagree Strongly disagree

EFFECTS OF A PARENTAL DIVORCE ON THEIR ADOLESCENTS' FUTURE RELATIONSHIPS

26.) It is likely that I will date someone other than my partner in the next year.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

Part C: Please circle one answer that best describes your thoughts on marriage.

27.) People should get married

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

28.) People should stay married to their spouses for the rest of their lives.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

29.) I will be satisfied when I get married.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

30.) I have doubts about marriage.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

31.) People should feel very cautious about entering into a marriage.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

32.) Most marriages aren't equal partnerships.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

33.) Because half of all marriages end in divorce, marriage seems useless.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

34.) When people don't get along, I believe they should divorce.

5 Strongly agree 4 3 Neither agree nor disagree 2 1 Strongly disagree

Effects of Birth Order on Personality

By Teresa Anthony, Cabrini College

Faculty Advisor: Melissa Terlecki, Ph.D., Department of Psychology

Abstract

Research on birth order is fascinating and can show significant effects on specific personality characteristics. A good self-esteem is merely one of the traits that have been shown to be more prevalent in certain birth ranks. The current study was developed to test the effects of birth rank on self-esteem. A short self-esteem survey was created and was distributed to the sample, which included 87 Cabrini College students between the ages of 18 and 23 years. Each participant indicated his or her birth rank, including first born ($N=30$), middle born ($N=26$), and last born (31). The group of only children had to be dropped because the number of participants was insufficient. The researcher hypothesized that the group of first-borns would have a higher overall self-esteem score. An ANOVA was conducted to find differences between overall self-esteem scores and birth rank. Results did not show any significant difference in self-esteem and birth rank groups.

Introduction

Over the last decade, a large range of research has been conducted on birth order and its effects on personality. Birth order, or birth rank, can be defined as the chronological order in which siblings in a family are born. Research on birth order is fascinating and important because of the role that it plays in personality development. Past studies have focused on birth order as a factor that stands alone, or a part of the bigger picture of a child's development. Countless factors contribute to a child's development—and birth order is one of them. Many researchers have studied a large variety of personality traits that have been attributed to birth order and its relationship to intelligence and cognitive development.

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Herrera, Zajonc, Wieczerkowska, and Chichomski (2003) were interested in the beliefs that society had about birth rank. They surveyed Stanford University undergraduates: 106 were firstborns, 17 were only children, 41 were middle-borns, 68 were last-borns, and the birth rank of two of the participants was unknown. Participants were to fill out four, 11-item questionnaires in which they were asked to rate each birth rank and their personality traits on a five-point scale for each of these personality elements: agreeable–disagreeable, bold–timid, creative–uncreative, emotional–unemotional, not envious–envious, extraverted–introverted, intelligent–unintelligent, obedient–disobedient, responsible–irresponsible, stable–unstable, and talkative–silent. The results showed that the participants believed that firstborns were the most intelligent, responsible, obedient, stable, and the least emotional and least creative. Only-children were believed to be the most disagreeable; middle-borns were the most envious and the least bold and talkative. Last-borns were perceived to be the most creative, emotional, extraverted, disobedient, irresponsible, and talkative. It was also noteworthy that the participants ranked themselves as exceeding in agreeableness, intelligence, obedience, responsibility, and stability. However, Herrera et al. concluded that the correlation is weak and that the link found might just be because of people’s own beliefs. The beliefs might result from parents’ expectations to be different for each child and therefore shape those characteristics into self-fulfilling beliefs..

In contrast to the previous study, in 2010 researchers decided to do a study that would show a significant correlation between birth order and personality traits. Eckstein et al. (2012) theorized two different foci of birth order. One is the actual order of birth of the sibling, also referred to as ordinal position. The second is a definition that was accentuated by Adler (1938), which is the psychological position, referring to the role

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that the child adopts in his or her interactions with others. Adler (1938) stated, “It is not, of course, the child’s number in the order of successive births which influences his character, but the situation into which he is born and the way in which he interprets it” (p. 377). Many factors influence a child’s personality (e.g., age, gender, and certain life events).

Eckstein et al. (2010) took a holistic approach and created a representative study of ordinal and psychological birth-order research. This meta-analysis focused on the four most prevalent birth-order positions: first, middle, youngest, and only. They examined 200 different studies and included those studies that found a statistically significant effect for each birth-order position. Each study’s results were summarized, and then recorded in order from the most prevalent to the least, ultimately illustrating an overview of literature from 1960 to 2010. The results showed interesting and, in some cases, predictable statistics. The oldest child born first of siblings was found to be the most intelligent, responsible, and conscientious; the most likely to be a leader; highly motivated and affiliative; and having high needs for affiliation under stress. The oldest child was also listed as most influenced by authority, conformist to parental values, most likely to have Type A behavior, to be vulnerable to stress, and fearful in new situations. Only children, those first-born without any siblings, have some similarities to first-born children. For instance, they also have high intelligence and need affiliation under stress. They are the most likable, cooperative, and trusting, but can be selfish. They are most likely to go to college and have the strongest gender identity. However, Eckstein et al. found that middle children are significantly different from first-born and only children. Middle children are defined as all those born between the first and the youngest. As expected, they show feelings of not belonging. They are known to compete in different areas than the oldest

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and are more faithful in monogamous relationships. They tend to relate well to older and younger people and have high success in team sports. The youngest of siblings, or the last-born, differed from each of the three other categories. They reportedly have the highest social interest, self-esteem, popularity, and empathy. They are most rebellious, most likely to be an alcoholic, and are most disturbed by losing a parent. These results show that birth order does in fact have a significant effect on certain personality characteristics. Eckstein et al. found no studies on second-born children; therefore, they suggested that it would be an interesting investigation and an important step for future research.

More specifically, Hartshorne, Salem-Hartshorne, and Hartshorne (2009) conducted a study on whether birth order has any effect on the formation of long-term friendships and romantic relationships. To do so, they created two surveys. The first was given to 900 undergraduate students at Central Michigan University. They were asked their own birth order, their best friend's birth order, and the birth orders of their parents to analyze two different relationships: friendship and romantic. Results were then recorded for each birth position, which was categorized by oldest, middle, youngest, and only. Results of the birth order analysis of the mother and father showed that people are more likely to form romantic relationships with someone of a similar birth order. Similarly, people are more likely to form friendships with those of the same birth position.

The second survey was given to a group of 2,624 volunteers who were recruited online from The Cognition and Language Laboratory. The survey contained the same questions as the first survey, plus two more: the researchers asked the country of origin and whether the participant's parents were still married. The results did not show a significant difference between foreign and domestic respondents, and not enough foreign

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volunteers responded; therefore, they were unable to do a country-by-country analysis. Again, research found a strong effect of birth order in both friendship and romantic relationships. The analysis of married and unmarried individuals did not show a significant correlation, but an inclination for a stronger relationship existed between married parents and birth rank. In essence, the effect of birth order on long-term success of relationships seems to be very small, but Hartshorne et al. (2009) yet concluded that birth order is a reliable factor in determining long-term relationships. However, as previously reported, another determining factor could be personality of each individual, which could also be influenced by birth order. Further research should take this into consideration.

Instead of focusing on birth order and relationships, Wichman, Rodgers, and MacCallum (2006) questioned the relationship between intelligence and birth order. They believed that the use of cross-sectional designs threatens the internal validity because of all of the different factors that could affect one's personality. They hypothesized that a multilevel analysis with a control variable results in two conclusions: birth order has no significant influence on children's intelligence and earlier reported birth order effects on intelligence were attributed to factors that vary between, not within, families. Researchers focused on two groups of children from the National Longitudinal Survey of Youth: 1,902 7-8-year-olds and 1,769 13–14-year-olds; first-born through the fourth-born children were analyzed in both groups. Each group was tested every 2 years from 1986–1998 using the Peabody Individual Achievement Test (PIAT; Dunn & Dunn, 1981; Dunn & Markwardt, 1970). Specifically, the children were assessed on age-appropriate mathematics, reading recognition, and reading comprehension. Higher scores indicated greater cognitive ability. In addition to the intelligence test, a control variable was also

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used to help define between-family and within-family influences. Wichman et al. chose mother's age because it can affect both the number of children they have and the way their children develop, which differs between families.

The results showed that because the maternal age was used as a controlled variable, previous research on the effects of birth order on intelligence became nonsignificant. This conclusion was attributed to the fact that the mother's age reflected only between-family difference. Wichman et al. (2006) proposed that similar studies should be conducted to determine whether the same results would be found. They also believed that future researchers could look at different between-family control variables that might influence children's intelligence.

Similar to the interest in intelligence, the relationship between adaptive style and birth order has also been a topic of study among researchers. In 2010, Skinner and Fox-Francoeur (2010) tested Kirton's (2003) theory of cognitive style. Kirton's adaption–innovation theory proposed that individuals vary in cognitive style, meaning their way of adapting to change and problem solution. Kirton also stated that cognitive style is formed during childhood. Skinner and Fox-Francoeur (2010) considered birth rank within the family as a factor in the formation of cognitive style. To test their theory, they looked at 168 volunteer undergraduate students who were enrolled at a large liberal arts college. The students participated in a group testing session, where they identified their birth rank within their family and completed the Kirton Adaption–Innovation Inventory (KAI; Kirton, 1976). The KAI measures an individual's preferred approach to problem solving by asking each participant to rate the degree of difficulty they have performing certain tasks. The results showed that first-borns and only children were predominantly adapters. Meaning, those who were reportedly a first-born or only child were found to be more

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efficient in problem solving skills that were assessed. The test did not find any significance for later-borns.

Ultimately, most research that has been conducted has found a significant correlation between birth order and certain personality characteristics. The results have shown that birth rank has effects on intelligence, cognitive style, and relationship style. Numerous traits also exist that are more prevalent at each different birth position. Although each person is not limited to the characteristics of their birth position, research has shown that they perhaps are predisposed to possess them. The current study looks specifically at the role that birth order has in determining the self-esteem of an individual. It has been hypothesized that the first-born will report having a higher self-esteem.

Method

Participants

The target sample for research was undergraduate students currently attending Cabrini College. All of the participants were young adults who ranged in ages between 18 and 22 years and included all majors, races, and levels in school. Participants were haphazardly attained by the distribution of surveys around campus, specifically in dormitory halls and off-campus housing. In addition, past and present professors were contacted via e-mail and asked for permission to distribute the self-esteem survey to the students in their classes. The study needed participants for each of the four groups of research: first-born, middle-born, last-born, and only child. However, in the end, the only child group ($N=9$) had to be dropped because not enough participants were obtained. Using quota sampling, the study aimed to acquire at least 30 or more participants for each group. In all, 87 participants were acquired: first-born ($N=30$), middle-born ($N=26$), and last-born ($N=31$).

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Instruments and Procedures

The research study had an ex-post-facto design that looked at the naturally occurring groups pertaining to birth order (first-born, middle-born, and last-born). It included a cross-sectional survey that determined and measured the relationship between birth rank and personality characteristics, specifically self-esteem. The survey was adapted from the Brief Self-Esteem Inventory (Williams, 2000), which contained 17 questions and took about 5 minutes to complete. Participants were obtained from campus dormitory halls by knocking on room doors. Additionally, after obtaining professors' permission, the surveys were distributed in classrooms. The students' daily routine was briefly interrupted to participate in this study. As participants were attained, the study was first explained without using any form of deception. Then each student was given a consent form to sign, agreeing to take the survey. They indicated their birth rank and then completed the brief self-esteem inventory. The survey was in Likert-scale form, which rated the participants' agreeableness for certain statements pertaining to self-esteem. Although the participants completed the survey in the classrooms, the researcher stood at the front of the classroom and stated that she was open to any questions or concerns. If the surveys were completed in a dormitory room, the researcher remained in the doorway while the participants filled it out. The participants were told to rip their survey from their consent form and return them to the researcher separately. The surveys were then scored by adding up the answers for each question. The final number represented the individual's overall self-esteem. The scores were broken up into five different ranges and levels of self-esteem:

64–68 This range stands for an excellent self-esteem. It is also possible that the individual might regard himself or herself more highly than he or she

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should.

- 54–63 Scoring in this range means that this individual has a very healthy view of himself or herself and should have few problems with self-esteem.
- 44–53 This area is neutral, meaning that the individual appears to be neither high nor low in self-esteem, but specific areas might need attention.
- 34–43 Self-esteem has considerable room for growth, or the individual might be somewhat depressed.
- 0–34 This range means that the individual has an urgent need for improvement and might indicate severe depression.

The scoring was also adapted from the Brief Self-Esteem Inventory (Williams, 2000).

The survey measured each participant on self-esteem, and then measured differences were looked at between the three birth rank groups (differential research).

Results

A one-way ANOVA was conducted to evaluate the relationship between birth rank and overall score on the self-esteem inventory. The independent variable included three different levels: first born ($N=30$), middle born ($N=26$), and last born ($N=31$). The number of participants that reported being an only child was not sufficient; therefore, the group was not included in the evaluation. The results were not significant, $F(2,84)=.49$, $p=.62$, showing that no differences existed between birth ranks and overall self-esteem score. Overall scores of the self-esteem inventory were in the same range for each group with middle-born scoring the highest ($M=54.85$, $SD=6.06$) and last born scoring the lowest ($M=53.00$, $SD=8.94$). The group of first-borns ($M=53.40$, $SD=6.33$) did not differ significantly (see Table 1).

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Discussion

The current research did not confirm the hypothesis that first-borns would reportedly have higher self-esteem. The ANOVA showed that the overall self-esteem score did not differ significantly between groups, including first-born, middle-born, and last-born. In addition, the overall group scores suggested that most participants have a healthy or neutral self-esteem. This suggests that the participants should have few problems with self-esteem or could improve in some minor areas. This was a positive finding and shows that most undergraduate students at Cabrini College have a good self-esteem regardless of their birth rank. Furthermore, past research showed that last-borns were found to have a higher self-esteem compared to other birth ranks (Eckstein et al., 2010). The current research did not fall in line with previous research in that the group of last-borns did not have a significantly higher overall self-esteem score than first and middle-borns. Thus, findings show that birth order does not play a direct, significant role in the development of self-esteem.

The research would have been more efficient and might have yielded different results with a larger sample. In addition, a larger or different population might have allowed for a participating group of only children. The comparison between only children and other birth ranks could have potentially been significantly different. Although the raw scores did not show significant differences, small individual differences might have existed between participants. One (anonymous) participant made note at the end their survey, "Being the oldest, I feel pressure to set the standard and be perfect." This statement suggested that the first born of a family lives under pressure and has higher standards to live up to. If the sample was larger and more diverse, first-borns as a group might have produced a different overall score. Furthermore, the statement also implied

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that parents play a key role in the self-esteem of their children. Parents set rules and standards for their children and decide whether they have met them. Parental roles and the influence on birth order and self-esteem should be considered for future research. In addition, future research should also incorporate the many other factors that influence the self-esteem of an individual. Many circumstances can change the dynamics of birth order within each family. For example, perhaps the gender of the participants' siblings also influences how self-esteem develops. The number of siblings could also play a role in influencing self-esteem. Being the first-born of many children and the first-born of just two children could be significantly different.

In essence, birth order did not have a significant effect on the self-esteem of undergraduate students at Cabrini College. If the sample population were larger, it would have allowed for diversity and might have yielded different results. Overall, the participants were found to have a healthy self-esteem, which was regarded positively. The research question has many possibilities for future research.

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Appendix

Table 1

Birth Rank and Overall Self-Esteem Score

Birth Rank	N	M	SD
First Born	30	53.40	6.33
Middle Born	26	54.85	6.06
Last Born	31	53.00	8.94

Note. Table 1 shows the sample population of undergraduate Cabrini College students. The participants formed three different groups and three levels of independent variable, first-born ($N=30$), middle-born, ($N=26$), and last-born ($N=31$). Overall scores of the self-esteem did not differ significantly for first-borns ($M=53.40$, $SD=6.33$), middle-borns ($M=54.85$, $SD=6.06$), or last-borns ($M=53.40$, $SD=6.33$). The results of the ANOVA were not significant, $F(2,84)=.49$, $p=.62$, showing that no differences existed between birth ranks and the overall self-esteem score.

EFFECTS OF BIRTH ORDER ON PERSONALITY

CONSENT FORM**Effects of Birth Order on Personality****Primary Investigator: Teresa Anthony, taa45@cabrini.edu****Faculty Advisor: Melissa Terlecki, Ph.D., Cabrini College,****(610) 902-8358, mst723@cabrini.edu**

Being a part of the Cabrini College community makes you an eligible candidate for partaking in this study. Participation will help gain insight into the study of birth order and its possible effects on personality traits. Agreeing to participate requires the completion of a short survey that will take about 7 minutes to complete.

Potential risks include becoming more conscious of your self-esteem. If this happens, Cabrini College Counseling and Psychological services are available Monday through Friday 9 am to 4 pm and can be reached at 610-902-8766. Potential benefits include gaining insight on how you view yourself.

Questions about this research are welcomed at any time. Your participation in this study is on a voluntary basis, and you may refuse to participate at any time without consequence or prejudice. The data you will provide will be recorded anonymously and your participation will be held in the strictest confidence.

Questions about participating in this survey may be directed to Dr. Tony Verde, Institutional Review Board Chair, Cabrini College, tverde@cabrini.edu, or the primary investigator listed above.

Signing your name below indicates that you have read and understand the contents of this Consent Form and that you agree to take part in this study.

 Participant's Signature

 Date

 Investigator's Signature

 Date

Moving of the Barnes Collection: A Case Study

By Tom Bowman & Jeffrey Young, Cabrini College

Faculty Advisor: Shelby Hockenberry, Ph.D., Department of History and
Political Science

Abstract

The art collection of Dr. Albert C. Barnes is one of the greatest cultural and artistic treasures in the world. The Barnes Collection contains an outstanding number of Impressionist and Modernist works including 181 by Renoir, 69 by Cézanne, 59 by Matisse, 46 by Picasso, 21 by Chaim Soutine, 18 by Henri Rousseau, 16 by Amedeo Modigliani, 11 by Edgar Degas, 7 by Van Gogh, and 6 by Georges Seurat. However, in the last decade or so, a massive legal and political battle has ensued over whether the Barnes Collection can be moved from its original home in Merion, Pennsylvania, to the city of Philadelphia, Pennsylvania. Using a case study methodology, the research explores a myriad of issues, specifically examining (a) the history of the Barnes, (b) the actors involved in the process, (c) the pertinent legalities, and (d) pro and con arguments regarding moving of the Barnes.

Introduction

The Barnes Collection is one of the greatest cultural and artistic treasures in the world. It contains an outstanding number of Impressionist and Modernist works including 181 by Renoir, 69 by Cézanne, 59 by Matisse, 46 by Picasso, 21 by Chaim Soutine, 18 by Henri Rousseau, 16 by Amedeo Modigliani, 11 by Edgar Degas, 7 by Van Gogh, and 6 by Georges Seurat (Avril, 2011). Dr. Albert Barnes' tremendous collection has been fought over by numerous actors for decades and it appears destined for relocation from Merion to Philadelphia.

The Barnes Collection History

Dr. Albert C. Barnes originally made his fortune through the creation and sale of the drug Argylol, which was a preventive treatment for gonorrhea applied to the eyes of

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newborn babies. This Argyrol-based fortune made possible Dr. Barnes' art collection (Anderson, 2003). Dr. Barnes kept the art collection at his estate in Merion, Pennsylvania, choosing not to show it museum style, but rather as a private educational facility. Barnes structured the museum so that it would cater to students and to the underprivileged as an homage to his humble beginnings (Anderson, 2003). Not wanting to have his collection stolen posthumously like his good friend John G. Johnson, Dr. Barnes worked with several high profile lawyers over the years, continually tinkering with the foundation's indenture (Anderson, 2003). Dr. Barnes decided to spurn his alma mater the University of Pennsylvania and the other major local colleges and universities because of their actions and attitudes toward him.

On October 20, 1950, Dr. Barnes changed his indenture for the last time, granting ultimate control over his foundation to Lincoln University, a small historically black university in rural Chester County, Pennsylvania (Anderson, 2003). From his death a year later in 1951 until the early 1990s, the Barnes Foundation operated in conjunction with Dr. Barnes' indenture. Lincoln University assumed control over the Barnes Collection after the 38-year reign of Barnes' protégé Violette de Mazia ended with her death in 1989 (Anderson, 2003). Several years later, the ambitious character of Richard Glanton emerged as the president of the Barnes Foundation. In 1992, Glanton decided to take the collection on an international tour, in breach of Barnes' indenture, to raise money for the ailing Barnes Foundation (Anderson, 2003). After an up-and-down tenure as Barnes Foundation president, Richard Glanton and Lincoln University president Niara Sudarkasa were ousted from controlling the Barnes in 1998 (Anderson, 2003). The new board of trustees now claimed that the foundation was in dire financial straits and that the only option for saving the Barnes Collection was moving it from Merion to Philadelphia. A

MOVING OF THE BARNES COLLECTION: A CASE STUDY

massive legal and political battle over the possible moving of the Barnes Collection raged over the next decade.

Actors Involved

Now deceased, Dr. Albert Barnes is definitely the most important actor in the whole Barnes Foundation situation and battle. Without Dr. Barnes' considerable fortune and great eye for fine art, there would be no Barnes art collection to fight over at all. However, Dr. Barnes' ideas were influenced by others as well, most notably his close confidant John Dewey (Anderson, 2003).

Dr. Albert C. Barnes had a close friendship with the philosopher John Dewey. Dewey was a progressive education reformer who shaped Dr. Barnes' ideas about art and education (Ecker, 1997). His desire to preserve his foundation as an educational institution was shaped by Dewey's philosophical teaching as evidenced by the part of the indenture that reads, "Said art gallery is founded as an educational experiment under the principles of modern psychology as applied to education" (Barnes, 1922). Most of Barnes' "idiosyncrasies" in the presentation of his art can be traced back to Dewey's teachings, specifically the philosophy espoused by Dewey's *Art as Experience*.

Art as Experience contains many teachings that students of the Barnes would find familiar. Dewey (1934) posited,

The denial of meaning to art usually rests upon the assumption that the kind of value (and meaning) that a work of art possesses is so unique that it is without community or connection with the contents of other modes of experience than the esthetic. (p.)

Dr. Barnes obviously took this idea to heart because he assembled the art in ensembles that combined different styles, cultures, and time periods to better understand the art

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(Anderson, 2003). Dewey also believed that educational facilities should be about imparting wisdom and skills, rather than forcing a teacher's viewpoints on the students (Ecker, 1997). Dr. Barnes' staunch adherence to Dewey's ideas, tempered with his impoverished upbringing, created a unique educational museum where the art was for the common man to view as a part of the world, not separated from it. These were the ideals that Barnes wanted desperately to protect with his indenture.

Another actor and the most controversial is Richard Glanton, the Lincoln trustee who served as president of the Barnes Foundation in the 1990s. Although not the first president to serve after Violette de Mazia, Richard Glanton was the first Barnes president to stray from the old guard way set forth by de Mazia and push the limits of Dr. Barnes' will. Richard Glanton directly violated Dr. Barnes' will by taking the artwork on an international tour (Anderson, 2003). Glanton's actions led to frivolous lawsuits which greatly squandered the Barnes Foundation's funds. The foundation's nearly going broke gave cause for the eventual moving of the Barnes Collection to a new permanent home away from Merion. Glanton also provided reasoning to the eventual movers of the Barnes by exacerbating the poor financial situation of the Barnes Foundation to an even worse state. He also allowed a local reporter to examine the dilapidated nature of some of the museum and to report his skewed view of the building in the media (Anderson, 2003).

Seeing the Barnes Foundation in a state of disarray after Glanton's tenure as president, three charitable foundations, the Pew Charitable Trusts, the Lenfest Foundation, and the Annenberg Foundation, pounced at the opportunity to get their hands on Dr. Barnes' art collection. The Annenberg Foundation is the most interesting foundation of the three. The Annenberg Family, the wealthy former owners of the Philadelphia Inquirer, was one of Dr. Barnes' greatest enemies during his lifetime. These

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organizations were able to wrest control of the Barnes Foundation from Lincoln University by convincing the university to agree to add an additional 10 members on the Barnes Foundation's board of directors (Joyce & Argott, 2009).

Former Pennsylvania Governor and Philadelphia Mayor Edward G. Rendell is another actor in the battle over the Barnes Foundation. Rendell, through his large ties to Philadelphia, thought of the Barnes Collection as an opportunity for tourism and profit for the city. Moving the greatest private art collection to the city would provide for more economic and cultural growth of Philadelphia. With this idea in mind, Rendell began backing foundations such as the Pew Charitable Trust in their legal endeavors to take control of the Barnes Collection. Governor Rendell gave \$25 million in state grant funds to the Barnes Collection relocation project just several years after the Pennsylvania state budget allocated a massive sum of \$107 million for the relocation of the Barnes Collection to Center City (Joyce & Argott, 2009). Rendell also took care of the hurdle that Lincoln University might present to the relocation of the Barnes Collection by brokering a deal between Lincoln University and the state. This deal provided the university with \$80 million for the construction of a new campus building in exchange for agreeing to support a potential Barnes Collection relocation (Joyce & Argott, 2009).

Legalities

The main argument against moving the Barnes Collection has been the section of Barnes' indenture that prohibits such a move. However, his indenture also allows for his collection to be moved in certain situations. Additionally, whether the Barnes Foundation was allowed to adhere to Dr. Barnes' original will is a matter of debate in itself.

In Article IX, section 2, parts 29 and 30, Barnes' indenture sets the conditions upon which the Barnes Foundation shall operate; during his lifetime, it will be open 2

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days a week (Barnes, 1922) and after his death, it will be open 5 days a week, but only for educational purposes (Barnes, 1946). Gresham Riley, former president of the Pennsylvania Academy of The Fine Arts, debated the legality of the move in a Drexel University debate sponsored by the Friends of the Barnes. He posted that the Barnes Foundation, “became a 501(c)3 organization whose tax-exempt status depended upon its pursuing and fulfilling important *PUBLIC* (sic) interests” (Riley, 2007). Riley (2007) went on to say that the move more accurately serves Dr. Barnes’s philosophy, intended audience, and educational purposes. As a 501(c)3 organization is classified by the Internal Revenue Service (2010) as a public charitable organization, the exclusive nature of Barnes’ original indenture is of questionable legality. The moving of the Barnes Collection is in breach with part of the original indenture, but it coincides with other parts. The Barnes Foundation’s status as a charitable organization means that it might not even be legally allowed to operate in the original manner Dr. Barnes intended.

Pro and Con Arguments

Moving the Barnes art collection is the culturally and philosophically right thing to do. The financial situation of the Barnes Foundation has led to the deterioration of priceless works of art, like Matisse’s masterpiece *Joy of Life* (Avril, 2011). The lack of funds endangered the art and transformed the issue from the preservation of one man’s will to the preservation of an incalculably precious art collection. By 2004, the Barnes Foundation had gone almost completely bankrupt. The board of trustees asked that the Montgomery County Orphans Court allow them to move the foundation. Judge Ott ruled that the foundation could be moved to “a more accessible site” (Matheson, 2011). Dr. Barnes wanted his foundation to be more accessible to “the plain people, that is, men and women who gain their livelihood by daily toil in shops, factories, schools, stores and

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similar places” (Barnes, 1946). These were the people whom Dr. Barnes wanted to “have free access to the art gallery”). The new location would also undoubtedly bring in more money for the foundation and the city of Philadelphia and it would more accurately reflect Dr. Barnes’s original educational goals.

The center of the debate against moving the Barnes Foundation is that his indenture explicitly states that the art shall not move (Barnes, 1922). However, Dr. Barnes was not a foolish man and he did not exclude the possibility that a situation would arise that jeopardized his house, school, and art collection. Barnes (1922) added a measure to the indenture in December 6, 1922, for just such an occasion:

Should the said collection ever be destroyed, or should it for any other reason become impossible to administer the trust hereby created concerning said collection of pictures, then the property and funds contributed by Donor to Donee shall be applied to an object as nearly within the scope herein indicated and laid down as shall be possible, such application to be in connection with an existing and organized institution then in being and functioning in Philadelphia, Pennsylvania, or its suburbs.

The paintings could be moved if their existing location made the Barnes Foundation unable to carry out its intended mission. Furthermore, the new location of the foundation would have to continue to carry out the educational and philosophical goals that Barnes originally intended for the foundation. Moving the Barnes Collection from Merion to a new museum in Philadelphia would accomplish the twin goals of saving the art collection and upholding the initial mission of the Barnes Foundation.

The ethics of the Barnes Collection moving to Philadelphia are continually debated. With the Barnes Collection in Philadelphia set to open in May 2012, there are

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still pending court cases arguing whether it is even lawful to move the collection. The main argument against the Barnes Collection making its way to the “Champs Elysees” of Philadelphia is that the Friends of the Barnes believe that Dr. Barnes never wanted or intended to have his collection moved. In addition, the Friends of the Barnes argue that moving the Barnes to such close proximity to the Philadelphia Art Museum is an extra slap in the face to Dr. Barnes who fought with the PMA for much of his adult life.

Two leading architects designed the new state of the art building for the Foundation in Philadelphia. The same two, who recently designed the American Folk Art Museum in New York City, have truly made a masterpiece to house Barnes’ art. They wanted to keep the design low key allowing for a similar charm to the Merion location that housed the collection for so many years. The new location also allows for a larger demographic of people to see the work by placing it in a more accessible location. The new building provides more security for the collection which is an important factor to the move as well as the better conditions for the art to live without fear of deterioration and loss of value.

The positive outcomes of moving the collection to Philadelphia are endless. Both financially and culturally, the city will most certainly prosper by having the Barnes as their newest tourist attraction. From research, it is know that Dr. Barnes had a love for giving back to his community both economically and culturally. The move to Philadelphia will provide for him to do that for a larger amount of time. Although the move was strongly swayed through the court systems, the charitable trusts, most notably the Pew Charitable Trust, will provide the Barnes Collection to teach a larger amount of people about art than the Merion site could ever hold.

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Conclusion

Whether or not the Barnes Collection should move is a matter of perspective. On one side of the debate is the fact that the state has overwritten a private person's will for economic gain. The Barnes Collection's new building will increase tourism revenue in the city of Philadelphia. On the other side of the debate, moving the art collection is for the betterment of the public and for art culture. More people will be able to experience a simulacrum of Barnes' views on art and education. A priceless collection of art is also preserved. The legal issues involved with Barnes' will are nonissues because, although the will states that the art shall not be moved, it also contains situations when the art can be moved. Ultimately, a person will agree with whatever side he or she believes is morally right because the relocation of the Barnes Collection is an ethical quandary with no clear answer.

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Has Reality Television Affected How We View Ourselves, Our Society, and What We Believe Represents Reality?

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Abstract

The researcher asked the research question, “Would viewing habits and personal beliefs about reality television (TV) shows have measurable effects on social beliefs and practices?” The participants were surveyed on their reality TV habits, social beliefs, and attitudes. The survey sample included 26 male and 36 female students from Cabrini College. The results showed significant gender differences in issues of enjoying reality TV, female gossiping practices, binge drinking, and sex. Those who watched more reality TV were also more likely to enjoy reality TV programs, to find the “reality aspect” more appealing, and to believe “drama” is a large part of everyone’s life. In addition, greater enjoyment of reality TV shows correlated with the greater personal appeal of the “reality aspect,” the belief that most of their friends also watch reality shows, and the social practice of gossiping or talking behind someone’s back. Finally, the belief that these shows accurately represent real life had a significant relationship with how often participants watched such shows, how appealing they found this “reality aspect,” and how often they engaged in gossip talk. This study shows that higher frequency of watching and looking favorably upon reality TV shows does correlate with certain socialization behaviors and beliefs. In addition, marked gender differences were exhibited in these attitudes.

Introduction

The increase in reality television (TV) shows in the past decade has been tremendous. With such a high supply, the demand must be reflective of this. From 2001–2007, reality television programs topped TV ratings in the United States and in 2003, 85% of the most valuable advertising programs were reality TV programs (Coyne,

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Robinson, & Nelson, 2010). The potential impact of these shows is an emerging area of interest to researchers. To understand better this new generation of TV viewers, these shows and their potential effects must be evaluated. Likewise, the viewers to which these shows appeal can be categorized and examined for trends and recurring patterns of behavior, interests, and characteristics.

Review of the Literature

Researchers Lundy, Ruth, and Park (2008) studied reality TV viewing patterns, viewers' reasons for watching reality TV, viewer perceptions of reality TV shows and the situations portrayed, and the role of social affiliation in the students' viewing. Focus groups were established in college students; each consisted of six to 12 participants (34 in all), over the course of 4 months. Just over 75% of participants indicated that they watch a reality show on a regular basis. Lundy et al. noted that people tended to underestimate their reality TV viewing and their knowledge of reality-based TV shows. One of the most popular reasons for watching was escapism. Television provides an escape from real life and allows the participants to live vicariously through the characters. Other popular reasons were humor, boredom, and voyeurism. Participants also tended to group reality shows into "good" and "bad" categories, the latter not representing reality properly, being driven by shock value, and featuring manipulated scenarios. However, it is also noted that individuals differed in opinion and classification of "good" and "bad" reality shows. Another commonly reported theme was a lack of morals in the people on the shows and within the shows themselves. The majority of participants stated that reality TV no longer reflects real life. Lundy et al.'s findings brought about new information on the nature of viewing reality TV and viewer's opinions of such programs.

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One of the most popular themes of reality TV programming is dating. Bandura's social cognitive theory suggested that TV provides viewers with models for behavior. Therefore, a younger generation of viewers could be learning about dating, sexual interaction, and norms through reality TV. Researchers Ferris, Smith, Greenberg, and Smith (2007) conducted a content analysis of 64 hours of reality TV dating shows to determine dating attitudes across multiple variables. Additionally, 197 undergraduate students were surveyed on their attitudes toward dating preferences, dating behavior, levels of dating experience, and realism of TV. Some of the most commonly analyzed attitudes from the content analysis included "women are sex objects," "dating is a game," and "men are sexually driven." Men were more likely to advocate the first and third attitude. "Women are sexual objects" was also cited as having significantly more rewards than punishments. Those with higher perceived realism and viewing levels were more likely to endorse the attitudes perpetuated in these shows. No support was offered for a relationship between viewing level and judged importance of dating characteristics. High viewing rates did correlate with an increase in the endorsement of two behaviors commonly seen in reality dating shows on a first date: drinking alcohol and getting in a hot tub or spa. This research shows some of the attitudes shared by those who enjoy reality shows and the potential affects reality TV programs can have on these individuals.

Roberti (2007) also conducted a research study on reality TV dating shows, collecting data from 601 participants about themselves and reality TV shows. Roberti's data was collected and analyzed across a multitude of factors. The results showed that women and single people preferred watching reality dating shows. These shows also appealed to those who had an education higher than the high school level. Those who

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watched more reality dating shows reported that the shows had positively influenced their desire to marry and that these shows correctly represent real-life relationships. The strongest reported motives for watching reality dating TV shows were excitability and escape; women had higher means of these scores than men had. Roberti's research added to the already existing research on why people watch reality TV. With additional research, investigators can better assess how this medium has affected the personal lives and thought processes of young adults.

In addition to dating, another popular subcategory of reality TV is the "make over" show or body culture media. Marwick (2010) examined one show in particular, *The Swan*, in which individuals alter their bodies to correct personal problems. Unlike regular diet and exercise reality shows, *The Swan* shows cosmetic surgery as a normal and sometimes vital part of the empowerment process. Marwick reports statistics that cosmetic surgery has risen 966% from 1992 through 2007, with 91% of these patients being female. Reality shows like *The Swan* perpetuate this desire to find the authentic self through body augmentation. Reality TV shows are presenting plastic surgery as liberating, which position goes against commonly held feminist theories. Even the American Society of Plastic Surgeons condemned the show for its reckless approach to cosmetic surgery. Interestingly, it was determined that, as far as morals are concerned, viewers generally do not see a difference between the reality shows that support cosmetic surgery and reality shows that do not support it; both types of shows support the changes in moral character. Marwick's findings can be used as a basis for further study on the impact of reality TV on self-image and peer body image.

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Other researchers have proposed that reality TV can lead to alternative behaviors by their viewers. Researchers Cato and Carpentier (2010) proposed the theory that young adults incorporate televised images into their lives in multiple ways. Likewise, audiences are apt to model the behavior viewed if the outcomes are positive. Cato and Carpenier specifically studied *The Girls Next Door*, a reality TV show about Hugh Hefner's three Playboy model girlfriends. The study was conducted to determine whether any behavioral or mental changes were evident in women who viewed this show regarding sexual empowerment and sexualization. The study was comprised of 68 undergraduate women. Almost all were self-described "avid TV viewers" and were given surveys to collect information on their media gender preferences, opinions about gender roles, and view of empowerment. Upon completion of this survey, the participants were shown three 5-minute clips from *The Girls Next Door*; the clips showed all three girls during the entire show engaging in some form of career work (i.e., illustrating their sexual empowerment). After the video clips, the women were surveyed regarding their opinion of the clips, the show, and the characters. The results showed that participants who preferred watching this reality show tended to endorse sexual empowerment and traditional female roles. The women who endorsed traditional autonomous empowerment tended to reject sexual permissiveness and their opinions about the show were less positive. However, a favorable opinion of sexual empowerment coincided with positive opinions about sexual permissiveness and the TV show. Most participants stated they enjoyed the clips to some degree, regardless of their opinions of empowerment. The researchers noted that these findings could be used to examine altered behavior because these perceived beliefs and views of such shows support sexual empowerment.

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One of the most popular reality TV shows is *Big Brother* (see Orwell, 1934).

Researchers Thornborrow and Morris (2004) set out to study the method of “gossip talk” in strategy on this show. Participants must appeal to both the other players and the home audience (for the vote for winner and loser at various times during the show); therefore, an established dichotomy exists between speech in private and public. Gossip involves a social-bonding experience that can be dangerous in this game because potentially the audience can view anything that is said in private. They illustrate the importance of gossip talk as a key human social activity in addition to using a detailed and structured analytic approach to reviewing the dialogue from *Big Brother*. Gossip talk is a vital component of many reality TV shows. Thornborrow and Morris argued that gossip talk is an important part of real life; therefore, reality TV viewers enjoy seeing it reflected in reality TV, adding to perceived realism. If further research were to show that these programs influence behavior, then gossip talk might rising or evolving to model that is shown on reality TV.

In addition to understanding what behaviors viewers could be learning and modeling, it is important to know why viewers choose to watch reality TV. Researchers Papacharissi and Mendelson (2007) surveyed 157 students on their rationale for watching reality TV shows. They used a series of questions asking why the participants enjoyed watching reality TV shows, using previously established popular criteria for watching TV. Those participants who stated that they watched reality TV to pass the time acknowledged that this passing of time became an event or ritual. Many participants reported that they found these shows entertaining, citing that the “reality” aspect of the shows made it more entertaining or appealing. One finding that surprised Papacharissi

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and Mendelson was the low appeal of voyeurism. This finding went against the popular belief that people watch reality TV to live vicariously through others. Papacharissi and Mendelson's findings also implied that, to enjoy reality TV as entertaining or relaxing, the viewers had to accept the realism of its content. Papacharissi and Mendelson's study provided insight into why people watch reality TV and what about it appeals to them. Papacharissi and Mendelson also found that perception of reality adds to enjoyment of viewing.

In another similar study, Barton (2009) surveyed 689 students about reality shows. Questionnaires consisted of 23 specific questions about why they watched reality shows. Three reality shows were also singled out—*The Apprentice*, *The Bachelor* and *The Bachelorette*, and *Survivor*—and participants were specifically asked about them. One interesting finding was that, now that more reality shows exist, they no longer appeal to a general audience, but rather to small subgroups that are increasing in the generation of individual gratification. One factor that was introduced in this study was the personal utility factor. This new factor was one of the highest in overall satisfaction compared to the other factors. Personal utility refers to appeal on a personal level to the person. Questions measuring this factor were “They make me feel less lonely,” “They make me forget about my problems,” and “They help me relax.” At the end of the study, the Barton recommended that additional research be conducted on a wider category of reality shows and that the results should be compared between genders.

One of the most pressing questions around reality TV is “Why do people chose to watch it?” Researchers Reiss and Wiltz (2004) surveyed 239 adults on their motives and habits concerning reality TV show watching. They provided several interesting findings

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from this study. They found that the more a person liked reality shows, the more likely he or she was to be status-oriented. The participants who enjoyed reality shows also placed a higher value on vengeance, a trait seen frequently in reality shows. This emphasis shows that people adopt motives and themes because they watch reality TV, believing that it reflects real life. People who like two or more reality TV shows also tended to be more motivated by social life, less motivated by honor, more concerned with order, and more motivated by romance, as compared to those who did not watch reality shows. Similar to previous studies, the reasoning behind this study was to determine what it is about reality shows that appeals to people and how they affect them. Reiss and Wiltz's research can be paired with the previous studies and findings to propel a further study into the relationship between reality TV and those who view it.

In summary, several researchers have investigated the type of people who enjoy watching reality TV shows and why the shows appeal to these people. This researcher believes that reality TV has had measurable effects on the current generation; therefore, this research is an invaluable resource. With the rise in televised reality shows, the cultural impact should be evaluated. These findings can be a vital part of further study into the impact of reality TV on those who watch these shows. Most of the researchers reviewed have agreed that reality TV has affected how people view themselves and "real life." Most people stated that they enjoy watching reality TV because of enjoyment, personal utility, and a sense of escapism. The research reviewed will lay the groundwork for this researcher's hypothesis that enjoying and viewing reality TV has measurable effects on how people view themselves and the world around them when compared to those who do not enjoy and do not watch much reality TV. These effects include factors

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such as self-esteem, gender stereotypes, attitudes about beauty and body modification, and sexuality. The researcher will conduct further research to investigate these areas.

Methods

Participants

The participants for this study included male and female students that attend Cabrini College. This target sample ranged between ages of 18–21 years. The sample included 26 male and 36 female participants. The factors of ethnicity, major, and age and year in school were diversified, but were not considered for this study because they were not deemed influential factors on this analysis. The participants were recruited from Cabrini College's campus through a variety of methods.

Instruments

The researcher created the survey for participants to complete upon request. Through this survey, the researcher obtained vital demographic information for later categorical comparison (e.g., gender) through opinion questions on (a) level of enjoyment of reality TV programs; (b) beliefs on how accurately reality TV represents real life; and (c) preference for theme of reality TV shows (e.g., dating, life-following, competition, talent, and none). The survey also included a variety of questions about the participants self-image, attitudes towards social interaction, gender beliefs, alcohol usage, sexuality, body image, and socialization practices. Questions relating to sex and alcohol were included because many reality TV shows that are aimed at college students tend to endorse these behaviors.

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Procedure

The sampling technique that the researcher used was haphazard sampling for convenience where surveys were handed out to participants. The experimental design of this study was a survey that was primarily distributed to students in classrooms in Founders Hall at Cabrini College and that took less than 10 minutes to complete. The survey was given to students with a consent form attached to the front. The students filled out the consent form and survey before separating the two items and placing them in separate piles in the front of the classroom. Both the completed surveys and the consent forms were collected and stored until they were analyzed. Some surveys were also completed outside the classroom environment in one-on-one scenarios. Participants were separated in groups by gender and preferences in relation to habits regarding reality TV programs.

Results

Although this researcher's main goal in this study was to analyze differences in social attitudes in relation to reality TV habits, significant differences were found in participants' answers in relation to gender via an independent samples *t* test. A significant difference was found between men ($M=2.68$, $SD=1.11$) and women ($M=3.36$, $SD=1.31$) on how much they enjoy watching reality TV shows, $t(60)=2.12$, $p=.04$, with women more likely to state they enjoy watching reality shows. Men ($M=4.31$, $SD=1.01$) were significantly more likely than women ($M=3.56$, $SD=1.11$) to hold the conviction that women engage in gossip more than men do, $t(60)=2.74$, $p=.01$. A significant difference in results showed men ($M=3.35$, $SD=1.52$) were more likely than women ($M=2.42$, $SD=1.05$) to believe that drinking alcohol excessively was a great way to have fun with

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friends, $t(60)=2.85, p=.01$. Likewise, a significant difference was found between men ($M=3.04, SD=1.56$) and women ($M=2.28, SD=1.23$) in attitudes of binge drinking, $t(60)=2.14, p=.04$, with men rating themselves higher on beliefs that binge drinking rarely has negative effects on their lives and relationships. In addition to the significant gender differences on both questions relating to alcohol, significant differences also existed between men and women on both questions pertaining to sex. Men ($M=3.85, SD=1.26$) were significantly more likely than women ($M=2.23, SD=1.10$) to hold the belief that casually “hooking up” or having casual sex is acceptable for someone of their age, $t(60)=5.32, p=.00$. Similarly, a significant difference was found between men ($M=2.73, SD=1.44$) and women ($M=1.64, SD=.80$) on beliefs that having sex early in a relation would strengthen that relationship, $t(60)=3.51, p=.00$, with men rating it higher than women.

When it came to favorite type or theme of reality show, “life-following” was the most popular and most preferred type of show with 43% (see Figure 1 and Figure 2 for full list of percentages). Life-following was also the most popular choice for both genders. For men, the second and third most popular type were “challenge” and “none” respectively; for women, the second and third were “talent” and “none” respectively. Those who listed “challenge” as their favorite type also had a score of $M=4.90$ on a five-point Likert scale on their answers for how much they enjoyed watching reality TV programs. Women and men also did not significantly differ in how often they watched reality TV, with women just barely scoring higher, although women significantly enjoyed watching reality shows more than men did.

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A multivariate ANOVA was conducted to evaluate the relationship between how often participants watched reality TV programs and their answers reported on the remainder of the survey to determine whether any significant relationships existed. The independent variable included six levels: “never,” “less than once a month,” “a few times a month,” “once a week,” “a few times a week,” and “once or more a day.” When compared to how much participants enjoyed watching reality shows, the results were significant, $F(5, 56)=16.45, p=.00$, showing that the more a person likes reality TV shows, the more likely he or she is to watch such shows. In addition, participants were significantly more likely to cite the “reality aspect” of reality TV as making it seem more appealing the more they watched reality TV shows, $F(5, 56)=7.60, p=.00$. The last significant relationship was regarding how often a participant watches reality TV shows related to their beliefs on feuding and “drama”; those who watch more reality TV shows were more likely to believe that feuding and “drama” are a large part of everyone’s life, $F(5, 56)=2.50, p=.04$.

An additional multivariate ANOVA was conducted to evaluate the relationship between (a) how much a participant enjoyed watching reality TV shows and (b) their answers on the remainder of the questions; this ANOVA was used to determine any and all potential significant relationships. The independent variable included five levels using a five-point Likert scale: from 5 (*agree strongly*) to 1 (*disagree strongly*). When compared to how much the participant believed the “reality aspect” made reality TV more appealing, the results were significant, $F(4, 57)=14.77, p=.00$, illustrating a strong relationship between higher levels enjoying reality TV and higher levels of finding the “reality aspect” appealing. The results also yielded a significant relationship between

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enjoying reality TV programs and stating that most of their friends watch reality TV as well, $F(4, 57)=3.92, p=.01$. The last significant relationship found was between enjoying reality TV programs and engaging in gossiping or talking behind someone's back; the more a participant stated he or she enjoyed reality shows, the more likely he or she was to engage in gossip or gossip talk, $F(4, 57)=3.56, p=.01$. Interestingly, no relationship found between this variable and beliefs that gossiping is socially acceptable.

One final multivariate ANOVA was conducted to evaluate the relationship between (a) how much participants believed that reality shows accurately represented real life and (b) their answers reported on the remainder of the survey to determine whether any significant relationships existed. The independent variable included five levels based on a five-point Likert scale: from 5 (*agree strongly*) to 1 (*disagree strongly*). When compared to how often participants watched reality TV programs, the results were significant, $F(4, 57)=2.56, p=.049$, displaying that those who watch more reality TV were more likely also to believe that it represents real life accurately. A significant relationship was also found between higher rates of believing reality TV accurately represents real life and feeling that this "reality aspect" is more appealing, $F(4, 57)=10.59, p=.00$. Finally, a significant relationship was found between higher rates of engaging in gossip or taking behind someone's back and believing that reality TV accurately mirrors real life, $F(4, 57)=2.66, p=.04$.

Conclusion

Although the data does not conclusively prove that reality TV affects social practices and beliefs, it does suggest that differences exist between those who view reality TV more favorably than those who do not view it favorably regarding certain

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beliefs and practices. Women are more likely than men to enjoy watching reality TV shows. Conversely, men are more likely than women to believe that women (a) engage in gossip more than men do, (b) believe that drinking alcohol is a great way to have fun with friends and that binge drinking will rarely have negative effects on their life and relationships, (c) believe that having sex early in a relationship will strengthen that relationship, and (d) believe that casually “hooking up” or having casual sex is acceptable for someone their age (18–21 years old). Life-following reality shows were the most popular in both genders. Men and women also admitted watching reality shows nearly equally.

A higher frequency of watching reality TV shows was significantly linked with (a) higher enjoyment levels of reality TV programs, (b) finding the “reality aspect” appealing, and (c) believing that feuding and “drama” are a large part of everyone life. This finding aligns with previous research that the belief in the “reality” of reality TV is linked with frequency of viewing it and its favorability. It was also interesting to observe that more viewing was significantly linked with the views on feuding and drama, which are common elements in reality TV programs, perhaps most noticeably in the life-following category (the most popular type in both genders). Those who listed higher scores in enjoying reality TV shows also showed higher views in accepting the “reality aspect” as an attractive part of reality TV. This finding confirms the original hypothesis and is supported by past research. In addition, higher scores in finding reality programs enjoyable was significantly linked with higher beliefs that most of the participants’ friends watched reality TV and that they engage in gossiping or talking behind someone’s back. Prior research has shown that many view reality TV shows as a social experience

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and as common among groups of friends. Although participants admitted to engaging in gossip talk, it should be noted that views on the social acceptability of such talk were much lower; this finding exhibits a cognitive dissonance in viewpoints and actual behaviors when it comes to gossiping and talking behind a person's back. No significant relationships were found among variables such as self-esteem, personal value of social interaction, male gender roles, and attitudes on body modification. The research of Roberti (2007) suggested that dating reality shows were more popular with women, which finding was consistent with this researcher's study; however, only one participant chose dating as her favorite show.

The belief that reality TV programs accurately represent real life is considered to be a strong predictor for the popularity of such programs. This survey concluded that a greater belief that these shows do correctly represent real life also predicts higher scores in the viewing of reality TV programs. Consistent with the original hypothesis, people who are more likely to watch reality shows are more likely to view them as accurate and vice versa. One can only speculate regarding the behavior or the belief has the greater influence on the other. This variable also shows a relationship with finding this "reality aspect" appealing, which is also a factor in increasing viewing habits and developing favorable opinions. Finally, in addition to higher viewing patterns of reality TV, a greater belief in the reality aspect is linked with higher practices of gossip talk.

Limitations and Recommendations

With all of these findings, it can be concluded that reality TV habits do significantly correlate with certain social beliefs and practices. With this knowledge in mind, further studies can be conducted on a larger scale and with different populations of

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demographics to look for similar or conflicting results to bring greater light to this area of study. A greater population, especially of more men, would have been preferred for this experiment. Additional studies could look at different social attitudes and behaviors with different populations. With the ever-increasing prevalence of reality TV programming, studies must be conducted to evaluate any measurable effects that these shows might be having on their viewing population.

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Appendix

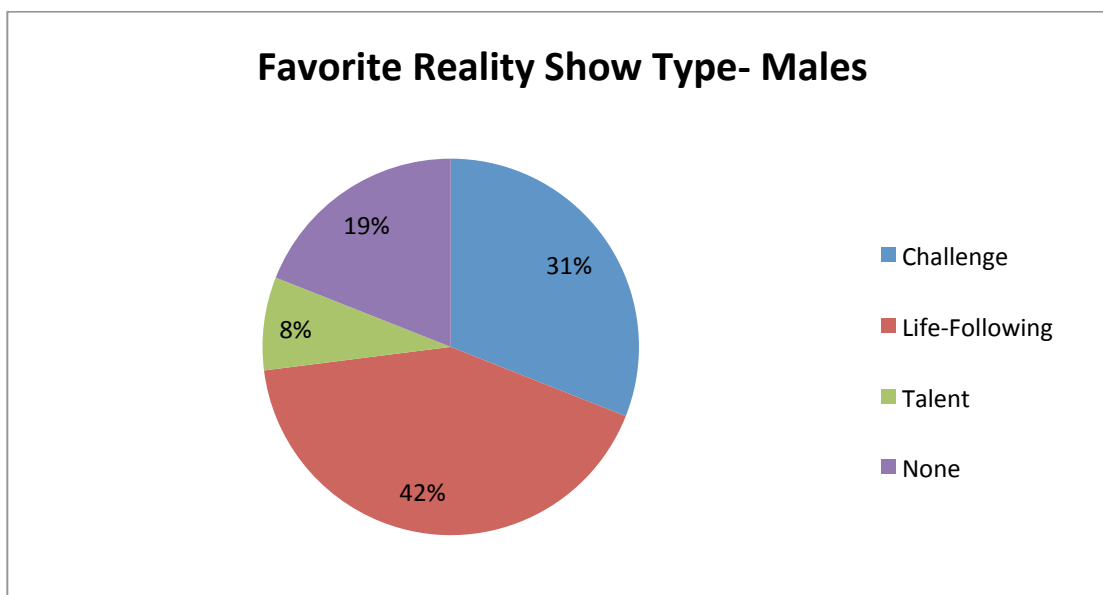


Figure 1. Life-following was the most frequently reported (42%) favorite reality show type for male participants. No male participants favored dating type reality shows.

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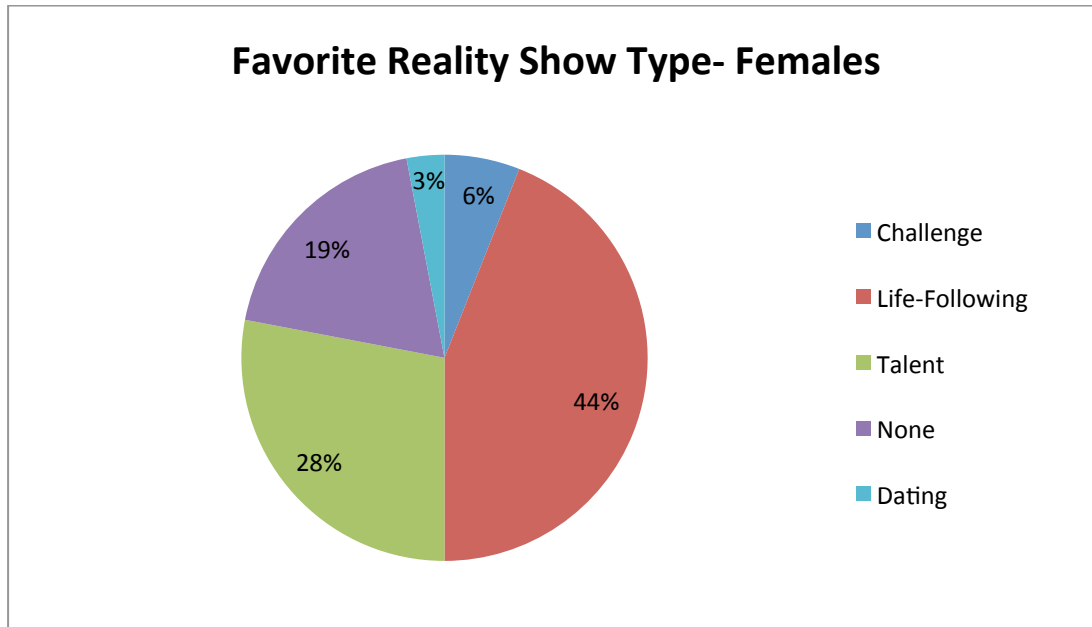


Figure 2. Life-following was the most frequently reported (44%) favorite reality show type for female participants. Dating was the least popular type. The challenge type was much less popular when compared to men, but the talent type was more popular with women.

Knowing the Logos Around Us

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Introduction

The logo is the visual element used to define a firm or brand. Common objectives in the design of logos are (1) a highly memorable style, (2) identification of the company's product, and (3) boldness, simplicity, and ease of reading... Ideally, logos are durable and have a timeless quality. (Design Team, 2006, p. 1)

According to Raposos (2009), four ways help people recognize logos. Raposos (2009) stated that one of them is to “use your logo, colors and graphics consistently throughout your web content, marketing materials and communications. Create a theme and an image you want to portray and stick to it so prospects and customers can begin to recognize you” (p. 2).

All companies want to make as much profit as they can. Today most companies' profits come from advertisements, but what makes a consumer remember what company they saw an advertisement for? For many companies it is the logo. As stated on Design Team's (2006) Web site promoting the company's ability to create logos, “Being forgettable does not produce profit” (p. 1). Businesses must stand out and make a name for themselves. Logos are important because they can change a company's status in a field from “just another company” to that recognizable company.

In today's society of advertisements, a group of logos are well known. The well-known logos are such a part of the consumers' lives that they are recognized on their own without any name attached to them. The most powerful logos evoke feelings and perceptions in the consumers' minds about the company and product. Examples of these

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logos include Nike, Apple, and McDonalds. These are the perfect examples because they are known worldwide and recognized across all walks of life.

One influence on recognition is gender. Gender stereotyping causes a belief in what should be known by certain men and women. According to Fitts (2008), “The appearance of gender stereotypes is a result of the sociohistorical construction of a gender relations model in which gender differences were situated above other individual differences of personality between men and women” (p. 541). Goffman (1991) conducted a review of gender stereotyping in media, arguing that advertisers draw upon the stereotyped acts of males and females. Males and females might not necessarily perform these stereotyped actions; however, in the 1970s and 1980s a report (Goffman, 1991) showed that in advertisements, women were most often shown as housewives. The roles were domestic. However, Goffman (2006) showed that new product placements created a new road for advertisers. As a result of the gender stereotyping in media, it is expected that women will be affected by advertisements in the shows that they watch, the magazines that they read, and the radio programs to which they listen. However, these advertisements might not pertain to them; rather it is housewife-type advertisements they view or hear. If these are the advertisements that they are seeing, they might also recognize these companies more frequently.

Research Question and Review of the Literature

However, how important is gender in purchasing the advertisements? Pullins, Reid, and Plank (2004) answered this question. They surveyed both male and female consumers on purchases and correspondences with salespersons. The result of the study did not show what males and females buy more of, but it did show that the gender of the salesperson mattered. This is an important finding because it reminds this researcher that

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more goes into buying than merely advertisements. However, Pullins et al. shows that sometimes those factors do not matter and that more emphasis should be placed on other factors such as advertisements and the logos themselves.

As for the influence of age on company and logo recognition, psychologists have looked at the influence on children. Much of the research has taken place after the fast food industries have come under fire for advertising directly to children. By engraving the logos in the children's brains at a young age the food market is creating brand loyalty and securing future purchases. Arredondo, Castaneda, Elder, Slymen, and Dozier (2009) sought to determine whether young children would recognize fast food logos more often than other food brands. Children aged 4–8 years were recruited from elementary schools and asked to match 10 logo cards to products depicted on a game board. The results showed a relationship between a child's age, weight, and recognition of fast food restaurant logos, such that the more a child weighed or the older he or she was the more he or she recognized the brand. Arredondo et al. also showed that demographics do play a role in recognition. A family's psychosocial and sociodemographic characteristics had a correlation to the type of logo that the child recognized, such that children from lower income families recognized fast food logos more often than children from higher income families.

Fischer, Schwartz, Richards, Goldstein, and Rojas (1991) looked at the influence of nonfood logo recognition on children. Cognitively, children absorb and learn more information than adults do. In the study, the children demonstrated high recognition rates of all logos. What was shocking about the survey was that children recognized cigarette logos more than they recognized all other adult logos. The recognition rates of The Disney Channel logo and Old Joe were highest in their product categories. The study did

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find that, as children got older, their recognition rates increased. Approximately 30% of 3-year-old children correctly matched Old Joe with a picture of a cigarette compared with 91.3% of 6-year-old children. Thus, children see understand and remember advertising at a young age. This can be dangerous especially in regards to health conditions related to smoking.

The influence that logos have on children is clearly great. Logos are influencing them to eat certain foods and in the end might influence them to buy certain products (e.g., cigarettes). Regarding older individuals, Mangleburg, Grewal, and Bristol (1997) reported that young adults use what is called consumer socialization to acquire knowledge that they must have to function as a consumer. Results from Mangleburg et al. showed that adolescents learn about the industry from parents and friends. Females will rely more on product labels and being informed than males will. Thus, in the case of company logos, females might recognize the logos faster and more frequently because they pay more attention to the product and its utilities, while males are considered more passive.

These studies are important because logos are pictures that we see every day through all forms of media. Together these studies argue that many factors affect what logos an individual will recognize. The factors include age, gender, advertisements, product, and lifestyle.

Method

It is not often that people realize exactly how they are being influenced. For some, very blatant advertisements might be almost subliminal because they see it often enough to pay attention, yet they go out the next day and buy the products from the advertisement that they saw. This researcher will investigate how logos are affected by age and gender

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in the Cabrini College community. In this study, the researcher will also bring awareness to logos and the impact that they can have on consumers. As one of the participants in the study said, “It is crazy how these things run our lives” (see study data).

Participants

This study had a research sample of 99 participants (59 aged 17–30 years and 40 aged 30+ years). The sample included 65 females and 34 males. All 99 participants were students, faculty, and staff at Cabrini College. The students were drawn from all grade levels. The faculty and staff were drawn from a variety of backgrounds. The researcher went to dorm rooms, offices, and classes to conduct the survey. The survey was always taken in a semiquiet place with no interruptions from other people. Participants were not told the true purpose of the study was logo recognition. The participants also did not know that the logos were geared toward particular ages and genders until after the experiment was completed.

Instruments

The materials involved in this research study included 50 index cards with logos imprinted on them and pen and paper to record the answers as participant give them. The 50 logo cards came from The Logo Board Game, produced by Spin Master, and from the Internet. Ten logos were geared toward males, 10 were geared toward females, 10 were geared toward the younger age group, 10 were geared toward the older age group, and 10 were gender- and age-neutral (see Table 1).

Procedure

Participants were asked to participate in the survey through door-to-door soliciting, flyers in mailboxes, e-mails, and classes. After consenting to the survey the participants sat down and were shown cards with logos on them. The participants were

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asked to “Say the name of the company of brand that you associate each logo with.” Each card was shown individually for no more than 10 seconds. They were told that they could say that they did not know if they were having trouble recognizing a logo. The answers that the participants gave were marked as correct or incorrect by the investigator after every card. If the participants choose, they were given the answers after they were finished with the survey. The participant’s gender, age, and answers were then imported into SPSS. The information was analyzed through a Chi Square grouped by gender, followed by a Chi Squared grouped by age.

Results

Within the 10 male-dominant logos, eight were recognized significantly more by males, and four were recognized significantly more by 17–30-year-old participants. The percentage of female recognition ranged from 0%–86.2%; the percentage of male recognition ranged from 2.9%– 91.2% (see Table 2).

Within the 10 female-dominant logos, five were recognized significantly more by 17–30-year-old participants and one was recognized significantly more by 30+-year-old participants. The percentage of female recognition ranged from 7.7%–92.3%; the percentage of male recognition ranged from 5.9%–91.2% (see Table 2).

Within the 10 age 17–30-year-olds’ (youth) dominant logos, nine were recognized significantly more by 17–30-year-old participants and five were recognized significantly more by males. The percentage of 17–30 year old recognition ranged from 49.2%– 89.8%; the percentage of 30+-year-old recognition ranged from 12.5%– 70% (see Table 2).

Within the 10 aged 30 +-year-olds’ (old) dominant logos, six were recognized significantly more by 30+-year-old participants, one was recognized significantly more

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by 17–30-year-old participants, and three were recognized significantly more by males. The percentage of 17–30-year-old recognition ranged from 8.5–76.3%; the percentage of 30+-year-old recognition ranged from 35%–90% (see Table 2).

Within the gender and age neutral logos, three were recognized significantly more by 17–30-year-old participants, one was recognized significantly more by 30+-year-old participants, and four were recognized significantly more by males (see Table 2).

Conclusion

The results from the experiment indicate that age and gender do play a significant role in the logos that people recognize. Males recognized more male logos, while female logos were not reliably recognized by more females. Youth-branded logos were recognized more by younger participants, while logos meant for an older population were similarly recognized by older participants.

The males seemed to recognize many more of the logos overall. Males tended to be the more visual of the two genders. This might lend weight to how much the males were able to recognize logos correctly. Another reason that males might recognize logos correctly more often might be attributed to the diverse backgrounds of their lives. For example, some of the males might have been able to recognize the female logos because of their sister or girlfriend.

The first time this experiment was performed, only gender- and age-neutral logos were used. From the first test, no significant results were found. The second time this experiment was performed, gender- and age-neutral logo recognition varied. After conducting this experiment twice with different groups of people, the researcher could determine that when the number of people and the age of the people were expanded, the

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results became more meaningful. If this survey were to be expanded beyond the second test, the data might be more significant.

Recommendations

The impact that this knowledge could have on a society is great. Such studies might change the way that people view media and the way that advertisers market to their target age groups, genders, and demographic groups. First, parents could take this information and change the programs to which they subject their children. This step might also change the way that parents watch commercials on television, view advertisements on billboards, and shop their favorite stores. They might try to subject their children to fewer mediums while they are younger.

Limitations

Second, the researcher believes that many of the people that participated in this survey realized exactly how great an effect that logos have on our society. They also commented that they enjoyed taking the survey. The researcher did not encounter many problems in this survey. The researcher also wishes that this study had a more significant outcome. The small outcome might have been because of the small sample size and the fact that all of the participants in the study were about the same age. Results could have been biased because of the limited sample or the particular logos selected for use in this experiment. Factors beyond merely age and gender can influence what people recognize in their lives.

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Appendix

Table 1

Logo Recognition by Gender and Age

Male dominant	Female dominant	17–30 dominant	30 +dominant	Neutral
Air Jordan	Always	Ambercrombie and Fitch	All State	Betty Crocker
Armor All	Barbie	AIM	AOL	BIC
Go Daddy	Channel	American Eagle	CBS	Hamburger Helper
Good Year	Degree for Women	Game Cube	General Electric	Microsoft
Honda	Dove	Hollister	Merrill Lynch	Mustang

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Male dominant	Female dominant	17-30 dominant	30 +dominant	Neutral
Jockey	FTD	Napster	MGM	Nestle Nesquick
MLS	Girl Scouts	North Face	NBC	Peeps
NBA	Hallmark	Puma	PBS	Pizza Hut
Old Spice	Juicy Couture	Twitter	Travelers	Thunderbird
Yamaha	Zumba	Under Armor	United Way	Yellow Pages

Table 2

Logo Recognition by Gender and Age with Significance

Logo	Recognized significantly by	Significance
Yamaha	Males	$\chi^2(1, N=99)=16.64, p=.00$
Armor All	Males	$\chi^2(1, N=99)=23.12, p=.00$
Good Year	Males	$\chi^2(1, N=99)=26.85, p=.00$
Go Daddy	Males	$\chi^2(1, N=99)=16.04, p=.00$
Old Spice	17-30	$\chi^2(1, N=99)=5.95, p=.02$
Old Spice	Males	$\chi^2(1, N=99)=26.85, p=.00$
MLS	17-30	$\chi^2(1, N=99)=5.05, p=.03$
MLS	Males	$\chi^2(1, N=99)=16.28, p=.00$
Air Jordan	17-30	$\chi^2(1, N=99)=5.39, p=.02$
Air Jordan	Males	$\chi^2(1, N=99)=7.84, p=.01$
Honda	17-30	$\chi^2(1, N=99)=4.72, p=.04$
Honda	Males	$\chi^2(1, N=99)=15.28, p=.00$
Barbie	17-30	$\chi^2(1, N=99)=21.16, p=.00$
Dove	17-30	$\chi^2(1, N=99)=8.02, p=.01$
Channel	17-30	$\chi^2(1, N=99)=5.39, p=.02$
Zumba	17-30	$\chi^2(1, N=99)=7.55, p=.01$
FTD Florists	17-30	$\chi^2(1, N=99)=53.70, p=.00$

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Logo	Recognized significantly by	Significance
Juicy Couture	30+	$\chi^2(1, N=99)=16.45, p=.00$
American Eagle	17–30	$\chi^2(1, N=99)=32.76, p=.00$
Ambercrombie and Fitch	17–30	$\chi^2(1, N=99)=13.24, p=.00$
Puma	17–30	$\chi^2(1, N=99)=6.30, p=.01$
Hollister	17–30	$\chi^2(1, N=99)=23.57, p=.00$
North Face	17–30	$\chi^2(1, N=99)=14.20, p=.00$
Napster	Males	$\chi^2(1, N=99)=23.66, p=.00$
AIM	17–30	$\chi^2(1, N=99)=10.20, p=.00$
AIM	Males	$\chi^2(1, N=99)=4.79, p=.03$
Under Armor	17–30	$\chi^2(1, N=99)=7.66, p=.01$
Under Armor	Males	$\chi^2(1, N=99)=8.74, p=.00$
Game Cube	17–30	$\chi^2(1, N=99)=13.31, p=.00$
Game Cube	Males	$\chi^2(1, N=99)=12.12, p=.00$
Twitter	17–30	$\chi^2(1, N=99)=19.40, p=.00$
Twitter	Males	$\chi^2(1, N=99)=8.43, p=.00$
MGM	30+	$\chi^2(1, N=99)=21.16, p=.00$
United Way	30+	$\chi^2(1, N=99)=37.97, p=.00$
NBC	30+	$\chi^2(1, N=99)=19.30, p=.00$
CBS	30+	$\chi^2(1, N=99)=5.80, p=.02$
Travelers	17–30	$\chi^2(1, N=99)=11.10, p=.00$
AOL	Males	$\chi^2(1, N=99)=10.98, p=.00$
General Electric	30+	$\chi^2(1, N=99)=22.00, p=.00$
General Electric	Males	$\chi^2(1, N=99)=6.97, p=.01$
Merrill Lynch	30+	$\chi^2(1, N=99)=13.85, p=.00$
Merrill Lynch	Males	$\chi^2(1, N=99)=5.05, p=.03$
Yellow Pages	17–30	$\chi^2(1, N=99)=17.54, p=.00$

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Logo	Recognized significantly by	Significance
Hamburger Helper	17–30	$\chi^2(1, N=99)=10.58, p=.00$
Peeps	30+	$\chi^2(1, N=99)=7.55, p=.01$
Mustang	Males	$\chi^2(1, N=99)=4.74, p=.01$
BIC	Males	$\chi^2(1, N=99)=7.55, p=.01$
Thunder Bird	Males	$\chi^2(1, N=99)=4.71, p=.03$
Pizza Hut	Males	$\chi^2(1, N=99)=9.49, p=.00$
Pizza Hut	17–30	$\chi^2(1, N=99)=4.04, p=.05$

The Effect of Facebook Usage on the Self-Esteem of College Students

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Abstract

With the growing popularity of social networking Web sites, it is important to determine whether it has a positive or negative effect on college students. In an attempt to test this effect, an experiment was conducted that compared pretest and posttest self-esteem scores from a test on which the participants related time spent on Facebook. A sample size of 40 Cabrini College students was divided into two experimental groups. Each of the groups spent time on Facebook, but differed in what they viewed: one group spent time only on their own profile page and one group spent time only on other people's pages. The data collected from this pretest and posttest design was analyzed using a repeated-measures ANOVA. Contrary to previously conducted studies, the participants who viewed other people's Facebook pages, as well as those who viewed their own profile pages, showed decreased self-esteem. Those who viewed other people's Facebook pages were slightly more negatively affected, suggesting that viewing others' pages has more of a negative effect on self-esteem than viewing one's own page.

Introduction

Technology is constantly improving and providing us with multiple devices with which we can access the Internet and enhance the ability to communicate. Social networking has worked its way into the lives of almost every college student today. In the past 5 years, social networking sites have rocketed from a functional activity into a phenomenon that engages tens of millions of Internet users. According to a national survey (Lenhart & Madden, 2007), more than half of all online American youths use online social networking sites. One source for social networking is Facebook, which began in 2004 as a social network for Harvard University students. It quickly encompassed over 2,000 other university and college campuses in the United States.

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Two-thirds of users use it at least daily, spending an average of 20 minutes on the site. It was the third most popular site on the Web in 2007 with over 22 million users and 15 billion pages viewed (Lenhart & Madden, 2007). It gives its users an opportunity to create personalized profiles that include general information with options to add specific applications to personalize the pages further. Students can add links and song clips of their favorite things, post messages to friends, and post and “tag” videos and pictures.

Through the site, members connect with friends, colleagues, fellow students, family members, and sometimes strangers (Zywica & Danowski, 2008). Checking Facebook is a daily, hourly, and sometimes by the minute occurrence. Whether it is between or during class, every morning and night, or at random times throughout the day, students are checking their Facebook accounts for notifications that show someone has written to them, “liked” something that they posted, or “tagged” them in a picture. Facebook is a social network site turned popularity contest that shows them how many friends they have obtained and whether they actually know them personally. With increasing forms of media retrieval, Facebook has become even easier to access. Smart phones, tablets, and other hand-held devices give them the power to search and update Facebook at their fingertips, even when they are on the go.

To many people who use it, Facebook is addicting. Every user loves to see that little red box that indicates that someone has taken notice of something that he or she posted. This can elicit positive feelings, boosting the user’s self-esteem. Wilson, Fornasier, and White (2010) wrote that self-esteem is “the subjective evaluation a person makes and maintains about himself or herself and the extent of belief in their capability, worth, and significance, which is conveyed through their attitudes and verbal behavior” (p. 173). This is the question that this researcher asks: Does this constant need to have

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Facebook contact with their “friends” lead to negative emotions when they check their Facebook pages and see that they have no notifications? This means that someone did not respond to their post, people did not like the picture that they posted, or no one liked their status. This lack of attention could cause low self-esteem, leaving the Facebook user clinging to the hope of seeing a little red box, proving that someone has liked their post well enough to give them attention.

Gonzalez and Hancock (2011) created a study that measured the levels of self-esteem that each participant recorded while they participated in Facebook interactions. Facebook allows for selective self-presentation; therefore, users are able to post only what makes them feel good about themselves, carefully selecting the aspects that they wish to emphasize. The feelings of self-esteem that originate while looking at their Facebook profile was compared to that which was felt while looking in a mirror. The participants were 63 male and 63 female students who participated in the study. Self-esteem was measured using the Rosenberg (1965) Self-Esteem Scale. The findings showed that Facebook had a positive impact on self-esteem because, after time spent looking at their favorite photos, quotes, and friendships, the feel-good attitudes that these items provoke came through, thus, boosting self-esteem. However, it also showed that those who left their own Facebook page to explore others reported lower self-esteem than those who stayed on their own profile page. The conclusion showed that having social-networking sites provides multiple opportunities for selective self-presentation. This allows students to create the ideal image of themselves and to promote their image to others. It is yet unknown what the effect of the number of Facebook friends has on self-esteem. Researchers cannot know from a single study the long-term effects on self-esteem from using Facebook.

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Another study conducted by Kalpidou, Costin, and Morris (2011) looked at the relationship between Facebook and the well-being of 70 undergraduate college students. The amount of time spent on the Internet was compared to their expressed loneliness and depression. Through self-report measures, they assessed demographic information (e.g., age, gender, socioeconomic status (SES), ethnicity, and year in college), Facebook usage and attitudes, and psychological well-being (i.e., self-esteem and adjustment to college). The results showed that spending a large amount of time on Facebook was negatively related to self-esteem. This result is potentially because of the fact that time spent on Facebook detracts from the amount of time spent with peers, friends, and family. Those young people who have an emotional connection to Facebook also reported low self-esteem. Having many Facebook friends was positively related to social adjustment and attachment, suggesting that Facebook strengthens social adjustment by improving social networks. This study also shows that spending a large amount of time on Facebook results in low self-esteem, but the number of friends one has (positive or negative relationships) might be a better predictor of well-being than time spent. This result should be studied further in additional research, examining the concept of Facebook friends, including, but not limited the research to the basis of the relationship and how well the friend is known to the user.

Similarly, Stefanone, Lackaff, and Rosen (2011) conducted a study on the relationship between self-worth and social-networking-site behavior, specifically the relationship between the number of friends, the number of photographs posted, and the feelings of self-worth of the participants on Facebook. Out of a sample of 311 people, correlations showed that younger participants reported being more focused on appearance and competition, whereas those with larger social support networks identified more

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closely with family and virtue-related items. There were also gender differences; females spent more time managing their profiles and sharing photos online. Future research should attempt to tease out the nuances of self-presentation regarding photo sharing in social media. Stefanone et al. also argued that individual traits are a precursor to much of the social behavior enacted online. Incidents in which people assess their self-worth represent a new approach to understanding how personal identities are developed and maintained. Identity construction, social interaction, and media use are all part of a rapidly changing communication environment.

Similar to the first two articles, Acar (2008) studied the effect of viewing Facebook on the users' self-esteem. Studies have shown that the communication with strangers results in increased confidence and self-esteem. Likewise, body image and anxiety show a correlation predicted by self-esteem. The perceived body image of Facebook users suggests that attractiveness influences social network size and attractive users are more likely to be contacted by other social network members. To test self-esteem, Acar also used the Rosenberg (1965) Self-Esteem Scale. The findings showed that the higher the self-esteem, the lower the percentage of strangers whom the individual added as "friends" and the lower was their anxiety. People with high self-esteem were reluctant to add members to their network unless they really knew them well. Those with low self-esteem seem to have a greater desire and need to communicate with strangers, perhaps to boost their self-images.

Likewise, Mehdizadeh (2010) looked at self-esteem and narcissism on Facebook. Humans have a vital need to maintain or raise their self-esteem. One might expect that individuals might strive for positive self-presentation in online settings. It is also likely that people with low self-esteem might be even more eager to participate in online

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activities that might raise their self-esteem. Using the same Rosenberg (1965) Self-Esteem Scale (1965) that was used by Acar (2008) and Gonzalez and Hancock (2011), the participants were evaluated after they had spent time on Facebook. Mehdizadeh (2010) used the test to measure the participants' feelings of self-worth. The results showed that the participants selected attractive photos and wrote self-promoting self-descriptions in an attempt to enhance their sense of self. This was a valuable insight to understand how narcissism and self-esteem are constructed in a virtual environment. Marketing and advertisements online can be used to sell products that enhance physical attractiveness, a feature that narcissists and those with low self-esteem value. It is necessary to conduct further research on whether individuals with low self-esteem are more apt to use these sites.

These articles provided good insight into the best ways in which to measure self-esteem as it relates to the use of social-networking sites, such as Facebook. The Rosenberg (1965) Self-Esteem Scale is a popular tool used to measure the participant's self-esteem. Overall, these articles show that Facebook usage and self-esteem correlate. Those people with low self-esteem typically have more friends on their networks because they strive to find "friendship" with even people who might even be complete strangers. Those people with high self-esteem have been shown to be hesitant to add people who are strangers, declining friend requests except for those people whom they know personally. Looking at one's own page has been shown to promote one's self-esteem because of self-presentation. Individuals are likely to use only their best pictures, ideas, and comments to adorn their pages; therefore, they have a boost in confidence when looking at their own pages. However, Gonzalez and Hancock (2011) showed that those people who looked at the Facebook pages of other people reported lower self-esteem.

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In addition, self-esteem might have an impact on the benefit that people gain from using Facebook. Those people who have higher self-esteem were shown to use Facebook more frequently to increase closeness in relationships. To the point, Christofides, Muise, and Desmarais (2009) explored deeper into students' use of Facebook, including what information they disclose, how they control access to that information, and the personality factors associated with online information control and disclosure. These factors include need for popularity, self-esteem, trust, and a general tendency to disclose. The results showed that the participants spent an average of 39 minutes on Facebook each day and had between 25 and 1,000 "friends." Facebook users were also very likely to share personal information and to make this information available to friends as well as complete strangers. This amount of disclosure was used as a variable that included and compared the general likelihood of disclosing information, trust, self-esteem, and need for popularity.

To test the relevance of these studies, this researcher combined their methodology as a way to form a rounded study that would evaluate the effect of Facebook usage on the self-esteem of college students. The researcher hypothesized that participants who looked at other people's Facebook pages would have a decreased self-esteem and that participants who looked at their own Facebook pages would have an increased self-esteem. This hypothesis is congruent with the previous findings and being in agreement with this researcher's ideas about time spent on Facebook.

Methods

Participants

Cabrini College students aged 18 to 25 years were selected using haphazard sampling. There were 40 participants in total. No specification regarding the gender or

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major of the participants was used because this was not a necessary part of the experiment. The participants were placed into experimental groups using quota sampling. The first group that was collected (Group 1) contained 24 participants. Group 1 was only able to look at other peoples Facebook pages, but not their own pages. The second group of data (Group 2) that was collected contained 16 participants. This group was only able to look at their own Facebook page.

Instruments

The participants were first asked to sign a consent form. This form provided the participant with the risks and benefits of participating, and what to expect. It also provided them with an assurance of anonymity and the option to drop out at any point without consequence. Part 1 of this social networking study was a 10-question survey adapted from the Rosenberg (1965) Self-Esteem Scale. An example of the type of question found on this survey is “I wish I could have more respect for myself.” There was a Likert scale of 1–5, ranging from 1 (*disagree*) to 5 (*agree*). Part 2 of the study, taken after 5 minutes were spent on Facebook, was adapted from the Heatherton and Polivy (1991) State Self-Esteem Scale. This scale was a 13-question survey, with similar questions, such as “I am worried about whether I am regarded as a success or a failure.” This survey was also scored on a numbered Likert scale of 1–5 ranging from 1 (*disagree*) to 5 (*agree*). These surveys were scored by taking a percentage of the participants answer out of the highest possible answer on the scale. This procedure was done by dividing the score of the participant by the highest possible score. A score of 1.00 meant the highest level of self-esteem one could score on the pretest and posttest.

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Procedure

The experiment was held in a Cabrini College classroom that contained computers. After completing a consent form, the study was explained to the participants. First, all participants were asked to complete the pretest (Rosenberg, 1965). This step asked them to record their answers on 10 questions that related to self-esteem, according to how they felt over the past 3 months. After this step was completed, each person signed onto his or her Facebook account and was told whether they could look at their own page or other people's pages. After they completed their allotted 5 minutes on Facebook, participants were asked to take a 13-question posttest (Heatherton & Polivy 1991). This test asked them to record their answers according to how they felt at that moment in an attempt to record any feelings that were evoked from the time spent on Facebook.

Participants remained anonymous and were given a numerical code that enabled their pretest and posttest to be matched, while also coding them into their specific group. All of the data was collected in a single sitting and was then analyzed.

Results

A repeated measures ANOVA was conducted to analyze the data. This was done to evaluate the difference of the score on the pretest and posttest scores between Group 1 (viewed only other people's Facebook) and Group 2 (viewed only their own Facebook page). The independent variable included two levels: those who could only look at other people's Facebook pages, and those who could only look at their own page. The dependent variable was the pretest and posttest scores. The results were significant, $F(1, 38) = .15, p = .00$. This shows that a significant difference existed in the scores of the pretest and posttests for both of the experimental groups.

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From a possible score of 1.00, Group 1 scored higher on the pretest ($M=.87$, $SD=.15$) than on the posttest ($M=.76$, $SD=.18$). On the same tests, Group 2 also scored higher on the pretest ($M=.88$, $SD=.08$) than on the posttest ($M=.78$, $SD=.13$). No posthoc tests were conducted because of the number of groups. On average, Group 1 had a deficit of .11 points on their overall posttest scores and Group 2 had a deficit of .10 points. Although both groups' self-esteem scores went down, this result suggests that those students who looked at other people's Facebook pages had a slightly higher negative effect on their self-esteem.

Conclusion

This researcher hypothesized that looking at other people's Facebook pages would negatively affect one's self-esteem, and that looking at one's own profile would boost one's self-esteem. However, the results showed that both groups' time spent on Facebook negatively affected their self-esteem. This was evident in the pretest and posttest scores. Both groups' self-esteem scores showed a significant difference between the pretest and posttest. This result suggests that time spent on Facebook, regardless of how that time might be spent, will have a negative effect on self-esteem. However, the group that could only look at other people's Facebook pages had a slightly higher negative influence on their posttest self-esteem scores. This result suggests that time spent on other people's Facebook pages has a greater impact on self-esteem than spending time on one's own page; nevertheless, both situations have the potential to negatively affect self-esteem.

Limitations

This study has shown to the researcher the influence that Facebook can have on self-esteem. From previous research, the researcher was aware that performing certain

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actions on Facebook might negatively affect self-esteem; however, after conducting this research, the negative impact that it can have seems more prominent. More than 95% of the participants recorded a lower self-esteem score on the posttest. Although spending time on one's own Facebook profile lowers self-esteem, which contradicts previous research, it is possible that by spending time on Facebook immediately before taking a test of self-esteem brought about the *recency effect*. The recency effect suggests that information presented last will have the most influence. While spending time on their own Facebook pages, participants were forced to look at photos of themselves, wall posts they had received, and relationships with certain "friends." Although Facebook users are advised to use selective self-presentation to make their profiles look desirable, it is possible that looking at these profiles can also cause users to be hypercritical about their appearance, their ideas, and about the way others view them.

Recommendations

Social networking and technology have had a large impact on all who use it. Whether people use Facebook for 5 minutes or for many hours per day, researchers can see that it can have a significant effect on self-esteem. Further research is highly recommended. Given the opportunity to replicate this study, the researcher would prefer to obtain a larger sample size. With more participants in the sample, and more diversity, the results might have been a more accurate portrayal of the population. The researcher would also like to have a larger time-span for the participants to spend on Facebook, so that the pretest and posttests could be further apart. Facebook is less than 10 years old; therefore, little research has been conducted on its impact. This study, combined with future research will be helpful in determining the effect of social media networking on our technology-driven society.

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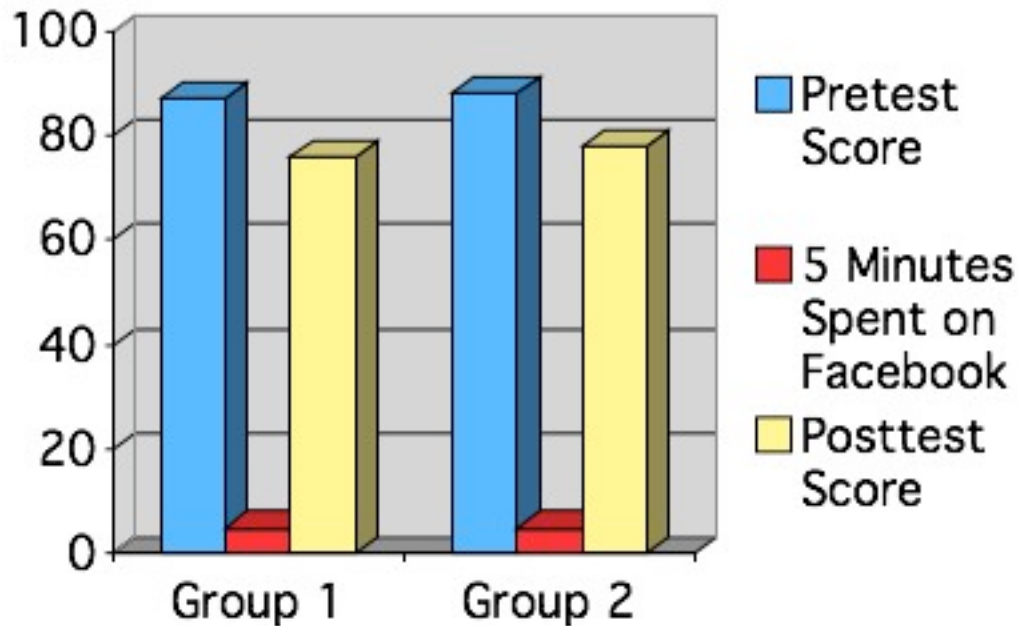


Figure 1. Figure 1 shows the pretest and posttest scores of Group 1 and Group 2. Group 1 spent 5 minutes on Facebook viewing only other peoples' Facebook pages. Group 2 spent 5 minutes on Facebook viewing only their own Facebook profile page. The same pretests and posttests were given to both groups. Group 1 scored higher on the pretest ($M=.87, SD=.15$) than on the posttest ($M=.76, SD=.18$). Group 2 also scored higher on the pretest ($M=.88, SD=.08$) than on the posttest ($M=.78, SD=.13$).

Social Networking Study

Part 1

Please circle the answer that applies to how you have been feeling the past few months:

1	2	3	4	5
Disagree		Somewhat Agree		Agree

1. I feel that I am a person of worth, at least on an equal plane with others.

1	2	3	4	5
----------	----------	----------	----------	----------

2. I feel that I have a number of good qualities.

1	2	3	4	5
----------	----------	----------	----------	----------

3. All in all, I am inclined to feel that I am a failure.

1	2	3	4	5
----------	----------	----------	----------	----------

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4. I am able to do things as well as most other people.

1 2 3 4 5

5. I feel I do not have much to be proud of.

1 2 3 4 5

6. I take a positive attitude toward myself.

1 2 3 4 5

7. On the whole, I am satisfied with myself.

1 2 3 4 5

8. I wish I could have more respect for myself.

1 2 3 4 5

9. I certainly feel useless at times.

1 2 3 4 5

10. At times I think I am no good at all.

1 2 3 4 5

Social Networking Study

Part 2

Please circle the answer that applies to how you are currently feeling:

1 2 3 4 5
Disagree **Somewhat Agree** **Agree**

1. I feel confident about my abilities.

1 2 3 4 5

2. I am worried about whether I am regarded as a success or failure.

1 2 3 4 5

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- | | | |
|-----|---|--|
| 3. | I feel satisfied with the way my body looks right now. | |
| | 1 2 3 4 5 | |
| 4. | I feel that others respect and admire me. | |
| | 1 2 3 4 5 | |
| 5. | I am dissatisfied with my weight. | |
| | 1 2 3 4 5 | |
| 6. | I feel self-conscious. | |
| | 1 2 3 4 5 | |
| 7. | I feel displeased with myself. | |
| | 1 2 3 4 5 | |
| 8. | I feel good about myself. | |
| | 1 2 3 4 5 | |
| 9. | I am pleased with my appearance right now. | |
| | 1 2 3 4 5 | |
| 10. | I am worried about what other people think of me. | |
| | 1 2 3 4 5 | |
| 11. | I feel inferior to others at this moment. | |
| | 1 2 3 4 5 | |
| 12. | I feel unattractive. | |
| | 1 2 3 4 5 | |
| 13. | I feel concerned about the impression I am making. | |
| | 1 2 3 4 5 | |

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CONSENT FORM

Social Networking Study

Researcher: Amanda Rosica, acr49@cabrini.edu

Faculty Advisor: Melissa Terlecki, Ph.D. Cabrini College,

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I am conducting research to establish the role that social networking, specifically Facebook, plays in the lives of college students. To help me gain insight, I am asking you to participate in my study.

Your participation should take about 20 minutes to complete. Ten of these minutes will be spent on your Facebook account, so you must have one to participate.

There are no potential risks to participating. Potential benefits include gaining insight into your use of social networking. The data will be recorded anonymously and held in strict confidence. Your participation is on a voluntary basis, and you might refuse to participate at any time without consequence or prejudice.

I welcome any questions you might have at any point during the study. Questions about you as a research participant might be directed to Dr. Tony Verde, Institutional Review Board Chair, Cabrini College, tverde@cabrini.edu, or to the researcher above.

Signing your name below indicates that you have read and understand the contents of this Consent Form and that you agree to take part in this study.

Participant's Signature

Date

Investigator's/Researcher's Signature

Date

The Effect of Visual Subliminal Messages on Choice Behavior

By Breaghann Smith, Cabrini College

Faculty Advisor: Melissa Terlecki, Ph.D., Department of Psychology

Abstract

Since James Vicary's famous cinema-advertising experiment during the 1950s, the impact of subliminal messages has been an area of interest for many researchers in the field of psychology. Various experiments have been performed to determine whether subliminal messages have the ability to tap into a person's unconscious and alter that person's behavior or thinking, but results have been inconsistent. The current experiment is an attempt to determine whether subliminally implanted visual stimuli can affect the choice behavior of an individual. One hundred and six Cabrini College undergraduates participated; roughly half of them were exposed to a geometric shape subliminally implanted during processing of a visual stimulus. Unexpectedly, the control group preferred the subliminal shape (65%). However, no significant between group differences were found. Thus, the researcher concluded that subliminal messaging did not have an effect on choice behavior.

Introduction

The word, subliminal, means below the threshold of sensation or consciousness (Harris, 2009, p. 129). A subliminal message is a message that is embedded into another medium. It is designed to pass below the normal limits of the human mind's perception. These messages cannot be recognized consciously, but they can be picked up by the unconscious mind (Taylor, 2011). It is believed that subliminal messages can alter a person's thoughts and behaviors. Whether or not this belief is true remains unclear because several studies support this claim and several other studies deny it.

Review of the Literature

For several reasons, subliminal messages are of an interest today to psychologists and scientists. One of the reasons is because they want to determine whether conscious

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and unconscious processes are fundamentally different from one another. In other words, a particular stimulus, when presented consciously, might have a completely different effect than when it is presented unconsciously (Epley, 2005).

The Stroop Effect

Merickle and Joordens (1997) conducted the Stroop Task experiment. In the experiment, participants watched a video that first contained the word “green” or “red” in gray letters. In one group, the word was displayed long enough for conscious awareness (167 ms); in the other group, the word was displayed at a subliminal level (33 ms). After the presentation of the word “green” or “red,” a mask displayed in gray, was shown for 267 ms, and then a target symbol, displayed as the color red or green was presented until a response was made. Participants were required to choose the color of the target symbol by using a computer mouse. The word and target symbol were incongruent 75% of the time. The researchers found that, in the groups in which the word “red” or “green” was presented at a subliminal level, the stroop effect was shown. However, when the word “red” or “green” was displayed long enough for conscious awareness, the stroop effect was reversed. Merickle and Joordens found that participants predicted that the word and target symbol would be incongruent when the presentation of the word was conscious. They were able to make faster and more correct responses. These expectancies did not occur in the participants when the word was unconsciously perceived. According to the Merickle and Joordens, the results indicated that perception with awareness and perception without awareness could lead to different results.

Researchers also wanted to study subliminal messages is to investigate the nature and function of consciousness. Some psychologists such as Rogers, Bandura, and Mischel have argued that conscious awareness is important and that it is necessary for a

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stimulus to cause a particular behavior. However, one must ask the question: Can the unconscious be manipulated to elicit certain behaviors? Subliminal messages can be used to determine whether an effect or behavior can be produced without conscious awareness (Epley, 2005). Subliminal messages can be sent through the consciousness two ways: aurally or visually.

Audio Subliminal Messages

One type of subliminal message is an audio subliminal message. Audio subliminal messages have been used over the years to help people quit smoking, to induce weight loss, to promote relaxation, and to decrease shoplifting. According to Vokey (1992), subliminal self-help tapes have a \$50 million per year market. Researchers have questioned whether these tapes are truly effective. An article in TIME magazine in 1979 reported that nearly 50 department stores in the United States and Canada were using subliminal messages in the music systems to reduce shoplifting and employee theft. Messages such as “I am honest” and “I will not steal” were played many times in the background music of the stores at a low, “subliminal level.” One chain store reported that the amount of store theft was reduced by 37% (De Giorgio, 2010). However, according to Vokey (1992), no evidence was given to validate the claims made this research.

Becker has conducted many experiments dealing with audio subliminal messages. One experiment involved using subliminal stress reduction messages to reduce fainting, smoking, and temper flare-ups. The stress reduction messages were incorporated into the sound system at the McDonagh Medical Center in Kansas City, Missouri. Over a period of 7 months, Becker claimed that the amount of fainting caused by needle pain was reduced to almost zero. Becker claimed that a 79% decrease was observed in the amount

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of smoking in the staff lounge, and the amount of patient temper flare-ups decreased by 60% (De Giorgio, 2010).

One of Becker's most interesting experiments involved participants who listened to a hissing sound known as pink noise with a three-digit number subliminally embedded. In three separate experiments, an average of 77% of those exposed to the subliminal numbers guessed correctly, compared to only 10% of those in the control group (De Giorgio, 2010). Nevertheless, Becker has often been criticized for lack of credibility in his studies. For example, McConnell (1989) has repeatedly challenged Becker to produce a controlled and reliable study, showing that subliminal tapes can work. McConnell claimed that Becker has been unable to provide a satisfactory response.

Several studies that involved audio-subliminal messages have also yielded negative results. For example, Egermann, Kopiez, and Reuter (2006) tried to manipulate choice behavior by presenting adults with subliminally implanted words masked by music. In the first experiment, the word "sun" was repeated 60 times in 100 seconds in a song. After listening to the song, participants were asked to choose a word from a list (one of the words in the list was "sun"). In a second experiment, the name of a drink was spoken for 108 repetitions in 176 seconds while being masked by a song. Four bottles of water, each labeled with different name (one of which was labeled with the name that was subliminally implanted in the song) were presented to the participants. The participants were asked to place a plastic chip in one of the bottles. After the experiments, the researchers concluded that there were no differences between the experimental and control group for either of the experiments. The audio-subliminal messages had no effect on the participants' choices.

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A criticism of subliminal audio messages is that no standardized method exists for how to implant a message subliminally into music or another background noise. The method for making a subliminal audio recording depends on the producer's intuition (Egermann et al., 2006). No standardized method exists to make an audio recording subliminal; therefore, it is often difficult to test reliably the effectiveness of an audio-subliminal message.

Visual Subliminal Messages

Visual subliminal messages, however, do have standardized methods for implanting a subliminal message into a visual medium. Two common methods are used for visual subliminal presentations: foveal priming and parafoveal priming. Priming is defined as an increased sensitivity to certain stimuli because of prior experience. In foveal priming, the stimulus is shown in the center of a person's visual field. This would involve placing the stimulus in the center of the computer or television screen. Parafoveal priming involves presenting the stimulus just outside the foveal visual field, for example, in the corners of the computer or television screen. To mask the stimulus, visual marks are shown immediately after presenting the stimulus. These visual marks can be random letters or pictures. The purpose of the visual mark is to erase the after-image that the individual would receive after being presented with a subliminal stimulus (Epley, 2005).

One of the most popular visual subliminal message experiments was the one performed by Vicary (1957). Vicary argued that he could increase sales of Coca-Cola and popcorn in a movie theater through subliminal visual advertising. Vicary's experiment consisted of altering movies so that messages such as "Eat popcorn!" and "Drink Coke!" flashed for about 1/2000th of a second at regular intervals throughout the movie. According to Vicary, sales of popcorn increased by 58% and sales of Coca-Cola

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increased by 18%. However, attempts to replicate this study were unsuccessful. Vicary later admitted in 1962 that he falsified his results (Dane, Johnson, Pauli, Phillips, & Strausz, n.d.). Although Vicary's study was fraudulent, other visual subliminal method experiments have been successful.

Current research in the area of subliminal visual perception has supported the existence of visual subliminal priming effects. In a study performed by Naccache, Blandin, and Dehaene (2002), subjects were required to decide whether a visually presented digit between the range of 1 and 9 was smaller or larger than the number 5. Before the digits appeared, another digit was shown subliminally. As a result, decision speed increased when the subliminally presented digit corresponded to the target stimuli by being greater or smaller than the digit 5. The authors concluded that subliminal priming could activate a particular connection in memory and make responses faster.

Another priming experiment, that was performed in 2005, found that men who were subliminally primed with words related to alcohol ("wine" or "beer") rated women more attractive than when they were primed with words unrelated to alcohol ("milk" or "coffee"). Priming words were presented for a few milliseconds on the screen and then the men evaluated the attractiveness of the women in following pictures. However, the priming effect was only observed in subjects who preferred alcohol to stimulate their libido (Friedman, McCarthy, Förster, & Denzler, 2005).

Visual subliminal messages have also been shown to invoke feeling of hunger and thirst in research participants. Byrne (1959) flashed the word "beef" for 1/200th of a second throughout a film. Subjects who watched the film with the word "beef" subliminally implanted were found to be hungrier than the control groups (Byrne, 1959). Likewise, an experiment conducted by Hawkins (1970) subliminally implanted the word

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“Coke” to participants in an experimental group. Those participants were said to have greater thirst ratings than participants in the control group (Hawkins, 1970).

Researchers from Duke University who were looking at the effects of brand exposure on individuals performed another interesting study involving subliminal messages (Fitzsimmons, Chartrand, & Fitzsimmons, 2008). The researchers subliminally embedded the Apple logo into a video. The researchers hypothesized that the Apple logo is linked with creativity and innovation; therefore, the participants who would be exposed to the logo would be more creative. The researchers found that participants who were subliminally exposed to the logo were more creative in inventing unconventional uses for a brick than the participants in the control group.

Nevertheless, researchers have questioned whether subliminal messages can truly have an influence on an individual’s choice behavior. Controlled studies have yielded inconsistent results. Champion and Turner (1959) showed a film that included a subliminally implanted picture of a bowl of rice labeled “Wonder Rice.” After the film, Champion and Turner concluded that the experimental groups did not correctly identify the brand of the bowl of rice more than the other groups. Calvin and Dollenmayer (1959) subliminally presented their subjects with instructions such as “choose left” or “choose right,” but these instructions were unable to influence the subject’s choice when they were asked to guess “right” or “left.”

However, in a more recent study, researchers Karremans, Stroebe, and Claus (2005) found that visual subliminal stimuli could affect an individual’s choices. In their study, participants were subliminally primed with the word “Lipton Ice” or a control word while watching a video. They then were instructed chose between Lipton Ice and another beverage. Participants were also asked on a self-report scale to indicate their level

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of intention to drink Lipton Ice and their level of thirst. The researchers found that subliminally exposing the participants to the brand name “Lipton Ice” increased choice for and intention to drink Lipton Ice. Nevertheless, this effect was only seen individuals who indicated that they were thirsty on the self-report scale. Subliminal priming did not affect the choice behavior of participants who did not report being thirsty. Thus, perhaps subliminal messages can affect the choice behavior of an individual, but only if the subliminally primed stimulus is relevant to the individual being exposed that particular stimulus.

After reviewing the literature, it appears that studies are inconsistent with one another regarding the effectiveness of subliminal messages. In the case of audio-subliminal messages, some studies (e.g., the one performed by Egermann et al, 2006) have found negative results. Other studies that claim to be successful (e.g., those performed by Becker) have been criticized for being unable to provide substantial evidence to show that the results are valid. It seems that audio-subliminal messages cannot be effectively tested until a standardized method is created to implant a message into an auditory medium.

In the case of visual subliminal messages, both positive and negative results have been found. Byrne (1959) and Hawkins (1970) were able to induce feelings of hunger and thirst in their participants by subliminally priming them with the words “beef” and “Coke” respectively. For choice behavior, Champion and Turner (1959) and Calvin and Dollenmayer (1959) tried to use subliminal messages to influence their participants, but they were unable to find any effect. However, Karremans et al. (2005) claimed that subliminal messages could have an effect on choice behavior, as long as the subliminally implanted message would be relevant to the motivations of the person processing the

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visual stimulus. It appears that visual subliminal messages can invoke physiological responses, but whether they can affect an individual's choice still remains unclear.

In the present study, the researcher studied the effect of subliminal messages on choice behavior. The purpose of this study was to determine whether people would be more likely to choose a shape, when given the option, if that shape were subliminally presented to them while viewing a video. The hypothesis of the study was that subjects who were subliminally exposed to a specific shape would choose that shape more often when given the option, when compared to subjects in the control group. The idea for the experimental design came from Cornell University (Epley, 2005). The results will be analyzed to determine whether subliminal messages had any effect on choice behavior.

Methods

Participants

Participants in the study consisted of 106 (28 male, 73 female, 5 N/A) Cabrini College students. They ranged in age from 18 to 36 years. Various professors were e-mailed for their permission to use their class time to perform the experiment on their students. After obtaining permission from the professor for each class, the experiment was tested on willing students, all at once, during their normal class time. Each class that was visited was randomly assigned to the experimental or control group. The experimental group included 54 participants, and the control group included 52 participants.

Instruments and Procedure

The two videos (control and experimental) used for this experiment were created on the computer software program "Final Cut Pro" (Apple Inc., 2012). The videos were each 1:45 seconds in length. Both videos contained two images of geometric patterns that

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were shown throughout, and they contained the same set of numbers that were shown one at a time during the video. The experimental video also contained a shape that was subliminally implanted using the parafoveal priming method (Epley, 2005). The sequence of the experimental video was as follows: (a) a geometric pattern shown for 1 second, (b) a different geometric patterns shown for another 1 second, (c) the subliminal shape shown for 60ms, (d) the two previous geometric patterns shown again for 1 second each, and (e) a number that ranged from 1–20 shown for 3 seconds. This sequence repeated for the entire length of the video. The shape was implanted into the video seven times, and it was masked by the two geometric patterns. The control video had the same sequence as the experimental video, but it did not contain a shape subliminally embedded within it.

Students in both the control and experimental groups were told that the purpose of the experiment was to test addition skills, which is why numbers were presented one at a time during the video. The participants were instructed to keep track of the sum of the numbers. They were not allowed to write anything down; they had to calculate the total in their heads. The addition task was included to distract the participants from the underlying purpose of study, and to ensure that they were actively watching the video. The video was shown on the projector screen in each classroom that was visited. After viewing the video, students in both groups were presented with a handout with two shapes on it (one of which was the subliminal shape shown in the experimental group). Participants were instructed to choose the shape that they preferred. After each student had made his or her choices and the handouts were collected, they were informed that the real purpose of the study was to test the effect that subliminal messages have on choice behavior.

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Results

A Chi-Square test was performed on the data to determine whether a significant difference existed within the experimental and control groups, and between the experimental and control groups. Within the experimental group, no difference was found in the choice of shape ($X^2(1, N=54)=2.67, p=.10$; see Figure 1). Within the control group, a difference was found in choice of shape ($X^2(1, N=52)=4.92, p=.03$) with participants choosing the subliminal shape more often (65%; see Figure 2.). No between group differences were found in choice of the subliminal ($X^2(1, N=67)=.06, p=.90$) or nonsubliminal ($X^2(1, N=39)=.23, p=.63$) shape. These results are contrary to the hypothesis.

Conclusion

The results from the experiment indicate that subliminal messages do not have an effect on choice behavior. Other experiments, such as those performed by Champion and Turner (1959), Calvin and Dollenmayer (1959), and Egermann et al. (2000), also found that subliminal messages did not affect choice behavior. However, the effectiveness of subliminal messages cannot be ruled out by this investigation. Different results could be possible under altered conditions.

Some factors might have affected the results of the experiment. It was unclear how long to make the video, the length of time the geometric patterns should be shown, and how long the intervals should be between presenting the subliminal shape. The only aspect of the video creation that could be supported by research was the length of time the subliminal shape should be presented: 60ms each time (Epley, 2005). However, because the video was created on software that was not intended for subliminal message production, and because it was then shown on a projector screen, the amount of time the

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shape was presented could not be entirely controlled. Future researchers could repeat this study, but they should try to make it more sophisticated. A better method is necessary to implant a message subliminally into a video, rather than merely relying on a generic computer program. Further investigation is also needed to determine the most effective way to make a subliminal video. The appropriate length of the video, the interval between each presentation of the subliminal stimulus, and how long the masking picture must be shown, should be determined to obtain a more valid and reliable study.

Although this study did not yield positive results, other studies (as discussed earlier) have been successful. Subliminal messages were able to produce in people feelings of hunger (Byrne, 1959) and feelings of thirst (Hawkins, 1970), but both researchers were unable to influence choice behavior of their participants.

Nevertheless, as previously stated, researchers Karremans et al. (2005) did find that visual subliminal stimuli could affect an individual's choices, as long as the subliminally primed message would be relevant to the individual's motives. Participants who reported being thirsty were more susceptible to subliminal persuasion and, significantly, chose the drink with which they were primed (Lipton Ice) more often than the participants who reported lower thirst levels.

Yet, it is unclear whether subliminal messages can affect choice behavior. A possible future research study would be to replicate the study performed by Karremans, Strobe, and Claus (2005). Instead of subliminally priming the subjects with a brand name drink, pseudo-names could be invented for the drinks. Egermann et al. (2006) used this technique to try to eliminate the possibility that an existing trademark could influence choices. It would be interesting to know whether the results found by Karremans, Strobe, and Claus (2005) could be replicated under slightly altered conditions.

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Until more research is done in the area of subliminal messaging, it appears that subliminal messages can invoke physiological responses in people, but that they cannot influence the choices that people make. For example, a person might feel thirsty after being subliminally primed to a particular drink, but that priming does not necessarily mean that the person will choose that drink to relieve the thirst. When it comes to choices, it appears that, for now, an individual cannot be manipulated by subliminal stimuli.

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Appendix

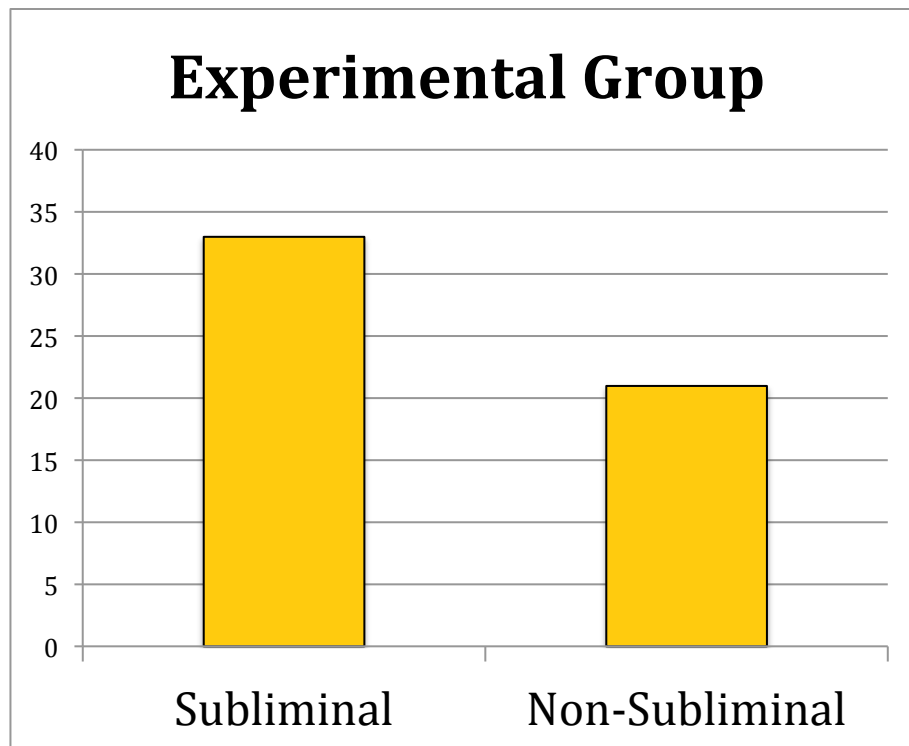


Figure 1. Choice of subliminal or nonsubliminal shape in experimental group.

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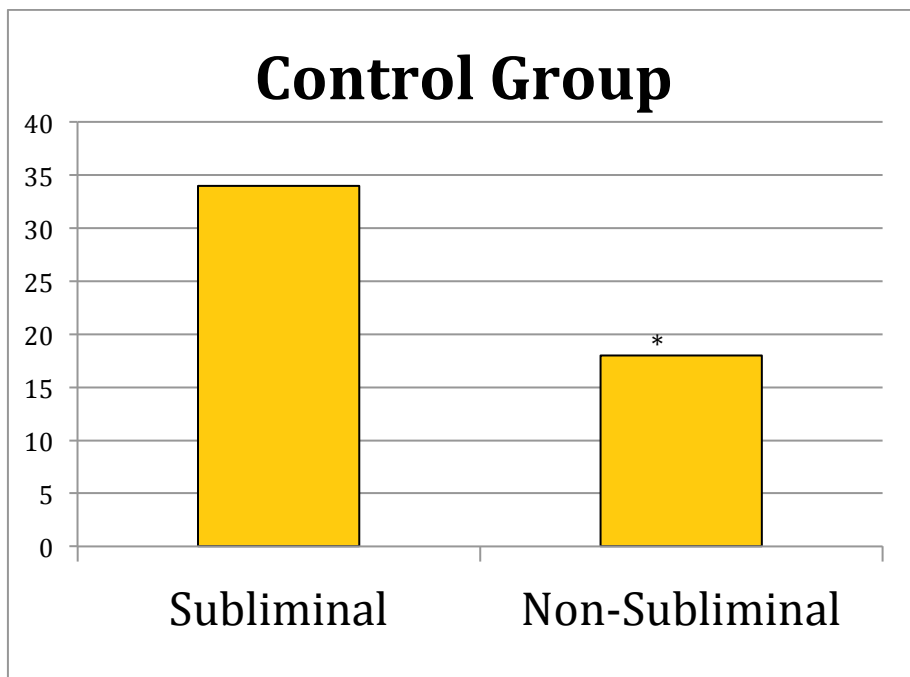


Figure 2. Choice of subliminal or nonsubliminal shape in control group.
* $p < .05$

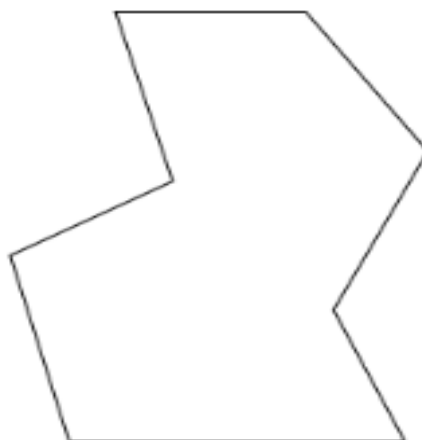


Figure 3. Subliminal shape.

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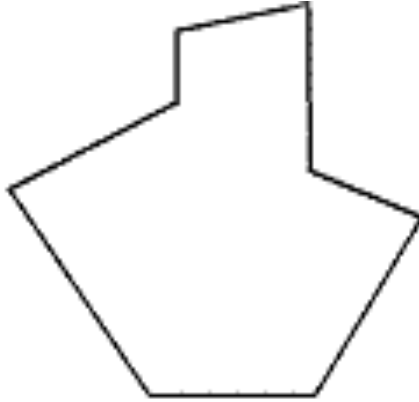


Figure 4. Nonsubliminal shape.

