

McNair Scholars Journal 2015

VOLUME 19



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Scholarly and Creative Excellence**

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GVSU McNair Scholars Journal

A Message from the McNair Scholars Program

With great pleasure, we present the 2015 Grand Valley State University McNair Scholars Journal. This journal is the culmination of the collaborative scholarship undertaken by our student scholars and their faculty mentors through our Ronald E. McNair Scholars Program. Their contributions to this journal represent the persistence and creativity of the students and the faculty mentors who exemplify GVSU's dedication to undergraduate scholarship and transformative learning.

The Ronald E. McNair Scholars Program, now in its 21st year at GVSU, is a federally-funded program providing research opportunities for low-income/first-generation, and underrepresented college undergraduates to prepare them for Ph.D. programs. At GVSU, our goals and values align with the McNair Scholars Program as we continually strive to provide equitable support for our students and prepare them for success in graduate school.

We congratulate each of the McNair Scholars whose research and scholarship is presented in this journal. This work represents your intellectual efforts, your persistence, and your limitless potential as future scholars. We are grateful for the faculty mentors who have worked so closely with our McNair Scholars to encourage their intellectual curiosity and foster their goals and dreams. This work also represents your dedication to your student's success.

We would also like to extend our appreciation to our colleagues who support and embrace the McNair Scholars Program; it is their dedication and hard work that makes this program possible.

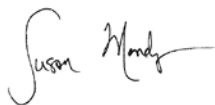
Sincerely,



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Vice Provost for Research Administration

Executive Director of the Center for Scholarly and Creative Excellence



Susan Mendoza, Ph.D.

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Director of McNair Scholars Program



**GRAND VALLEY
STATE UNIVERSITY**

***“Before you can make a dream come true,
you must first have one.”*** – Ronald E. McNair, Ph.D.

Ronald Erwin McNair was born October 21, 1950, in Lake City, South Carolina, to Carl and Pearl McNair. He attended North Carolina A&T State University where he graduated Magna Cum Laude with a B.S. degree in physics in 1971. McNair then enrolled in the prestigious Massachusetts Institute of Technology. In 1976, at the age of 26, he earned his Ph.D. in physics.

McNair soon became a recognized expert in laser physics while working as a staff physicist with Hughes Research Laboratory. He was selected by NASA for the space shuttle program in 1978 and was a mission specialist aboard the 1984 flight of the USS Challenger space shuttle.

After his death in the USS Challenger space shuttle accident in January 1986, members of Congress provided funding for the Ronald E. McNair Post-baccalaureate Achievement Program. The goal is to encourage low-income, first generation students, as well as students who are traditionally underrepresented in graduate schools, to expand their opportunities by pursuing graduate studies.



Ronald E. McNair, Ph.D.

Ronald E. McNair Post-baccalaureate Achievement Program

The Purpose

The McNair Scholars Program is designed to prepare highly talented undergraduates to pursue doctoral degrees and to increase the number of individuals (from the target groups) on college and university faculties.

Who are McNair Scholars?

The McNair Scholars are highly talented undergraduate students who are from families with no previous college graduate, low-income background or groups underrepresented at the graduate level for doctoral studies. The program accepts students from all disciplines.

Program Services

The McNair Scholars are matched with faculty research mentors. They receive academic counseling, mentoring, advising, and GRE preparation. In addition to the above services, the McNair Scholars have opportunities to attend research seminars, conduct research, and present their findings orally or written via poster presentations. In the first semester of their senior year, the scholars receive assistance with the graduate school application process.

Funding

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***Only abstracts are available for this publication.**

“They Do Not Treat Us Like Human Beings”: Latino-Police Relations in 1960’s Chicago



Crisol Beliz
McNair Scholar



David Stark
Faculty Mentor

Instances of police brutality against unarmed African-Americans dominate the news and media outlets. Stories of police brutality against unarmed citizens across the United States have garnered the attention of a worldwide audience. Names such as Eric Garner and Rodney King were embedded in people’s memories, but what about names like Manuel Ramos? Members of the Latino¹ community have also been victims of police brutality, even though this community is often left out of the conversation. The Puerto Rican community in Chicago during the 1960’s experienced first-hand the effects of police brutality, most notably in the cases of Celestino González and Silvano Burgos, Arcelis Cruz, and Manuel Ramos and Rafael Rivera. The Latino community attempted to bring attention to the state of Latino-police relations in the 1960’s through various means because there was a lack of awareness of their struggle with police brutality and excessive use of force. How did the Puerto Rican community respond to police brutality and the use of excessive force in 1960’s Chicago? Police brutality, in combination with other factors (i.e., poverty, discrimination, segregated housing, etc.), gradually led to the development of a Latino political consciousness beginning with a letter-writing campaign, a violent protest, and eventually a call for unity among marginalized—specifically Blacks and Latinos—groups who raised their collective voices for action. With their combined efforts, these communities were able to bring attention to police brutality against the Latino community,

even though the issue of police brutality continued to negatively affect the community. Their efforts were not in vain; instead, their actions were able to bring the Latino community of Chicago into the larger national conversation about the mistreatment of marginalized groups in the 1960’s.

Puerto Ricans in Chicago

Puerto Ricans have been migrating to Chicago since the early years of the twentieth century. After World War II there was a surge in migration from Puerto Rico. Between the years of 1946-1950 an average of 30,000 Puerto Ricans were migrating to the US annually.² Due to deplorable economic conditions on the island, Puerto Ricans left for the United States in search of jobs. These economic conditions were brought on by the United States’ takeover of Puerto Rico. The island’s multi-crop economy switched to a single cash crop.³ Sugar companies took over Puerto Rican land and paid workers some of the lowest agricultural wages in Latin America. In Puerto Rico sugar plantation workers were paid an average daily wage of 67 cents while in Cuba and Honduras the average daily wage was over \$1.20.⁴ Some Puerto Ricans believed jobs in the United States could provide steady employment and better wages. Although unemployment information is unavailable during this time, there is data on the economically inactive population. In 1935, 24.2 percent of men were economically inactive compared to 65.7 percent of women.⁵ Without the opportunity to migrate to the United States the unemployment rate would have been unmanageably high.⁶

1. Paul Taylor et al., “When Labels Don’t Fit: Hispanics and Their Views of Identity,” Pew Research Center: Hispanic Trends, April 4, 2012, <http://www.pewhispanic.org/2012/04/04/when-labels-dont-fit-hispanics-and-their-views-of-identity/>. Latinos are persons of Latin American ancestry living in the United States. Latino is often used interchangeably with Hispanic. The Pew Hispanic center uses the terms interchangeably in articles. There is frequent debate regarding the interchangeability of these terms. Hispanic is the preferred term used by most Hispanics/Latinos according to a survey conducted by Pew Hispanic center.
2. Felix M. Padilla, *Puerto Rican Chicago*, (Notre Dame: University of Notre Dame Press, 1987), 56.
3. Felix M. Padilla, *Latino Ethnic Consciousness*, (Notre Dame: University of Notre Dame Press, 1985), 39.
4. Dietz, James L., *Economic History of Puerto Rico: Institutional Change and Capitalist Development*, (Princeton: Princeton University Press, 1986), 111.
5. *Ibid.*, 131.

Mass migration to Chicago was the result of two things. First, there was a private job recruiting agency called Castle, Barton, and Associates set up in Puerto Rico in 1946 to recruit workers for the Chicago area.⁷ Recruits were hired for domestic work and to work in heavy industry, like the steel mills. Second, Puerto Ricans felt Chicago offered more economic opportunity than cities like New York. New York had previously been the destination of choice for Puerto Rican migrants to the U.S., but this changed in the 1940's when fewer jobs were available.⁸ This led Puerto Ricans to look for other options, and they began migrating to cities in the Midwest like Milwaukee, Cleveland, and Chicago.⁹

Once they arrived Puerto Ricans had a hard time finding their place in Chicago's racial hierarchy. In 1940, Chicago's Black population was 278,000 and its White population was 3,115,000, while Chicago's total population was 3,396,808. By 1950 Chicago's Black population had doubled to 492,000 and continued to increase each subsequent decade reaching 1,197,000 (or 40 percent of the total population of Chicago) by 1980, while the White population declined accounting for only 50 percent of Chicago's total population at nearly 1.5 million.¹⁰ The 1960 census first enumerated Puerto Ricans in Chicago; it revealed the Puerto Rican population of Chicago to be 32,371, which would double in the next decade.¹¹ As Puerto Ricans began arriving in large numbers, they struggled to fit within Chicago's racial hierarchy. This difficulty was a result of the Black-White binary in the United States, whereby race is seen largely as Black or White and everything in between is left in an ambiguous position.¹² The dichotomy of race made it difficult for Latinos and Puerto Ricans, in this case, to fit in with either community. Puerto Ricans were newcomers in a city that did not yet know how to categorize them.

Puerto Ricans had a different culture, spoke a different language, and did not quite have the physical characteristics of Whites or Blacks; they were somewhere in between these two categories. Unable to fit within either community made it hard for them to navigate their space in Chicago. Puerto Ricans couldn't live in white neighborhoods because they weren't White and there was still much prejudice against Hispanics. These migrants also came from a remarkably different culture with its own cuisine, traditions, and values.

Most Latino groups, including Puerto Ricans, tended to socialize among themselves which distanced them from other ethnic groups, contributing to their isolation. Many communities often divided themselves along ethnic lines, which is evident in many social organizations created by Latinos and other marginalized groups. Examples of this include the Brown Berets and the Young Lords Organization (YLO) and gangs like the Latin Kings or the Mexican Mob. In socializing among their own ethnic groups Latinos found support with other Puerto Ricans and Mexicans who were able to sympathize as there is strong kinship developed among the Pan-ethnic Latino groups. This is likely because ethnic groups share the same language and culture, enabling them to talk about their homelands with those who understand and share common traditions and beliefs. After migrating to a foreign country many ethnic groups follow this similar pattern because being reminded of home provides comfort. Another problem for Puerto Ricans is that they often returned to the island – since Puerto Rico is a part of the U.S. they can come and go as they please, and many did. In other words, they maintained strong ties to the island rather than create new ones in their host communities. A lack of understanding of this new ethnic group to the area would contribute to people's bias, as many were unwilling to accept Puerto

Ricans as valuable community members

Puerto Ricans faced various types of discrimination in Chicago. For example, they faced discrimination in housing. Upon their arrival they were relegated to some of the most run-down neighborhoods in the city. Most of them moved into areas like the Lincoln Park neighborhood (See figure 1, number 3). In an interview with José "Cha Cha" Jimenez, the founder of the YLO, said there were certain neighborhoods Puerto Ricans could not go in, and even certain streets they could not go past.¹³ Job discrimination was another concern for many Latinos and Puerto Ricans in Chicago. Certain hiring practices such as strict educational requirements kept many Puerto Ricans in working-class jobs as busboys, janitors, waiters, and other similar positions.¹⁴ The most pressing of their concerns was police brutality. Police officers viewed Latinos and other marginalized communities with hostility because of their different backgrounds. This hostility was often reflected in relations between the police and Latinos. The Puerto Ricans of 1960's Chicago often did not feel protected by police, and responded to instances of police brutality in different ways that eventually led to the development of their political consciousness.

Latino-Police Relations

Police brutality can be defined as any hostile action an officer makes against a citizen. For example, this might include using derogatory language when addressing minorities or using excessive force in the handling or arrest of citizens. At the Democratic National Convention of 1968 the Chicago Police Department earned a reputation for police brutality when officers attacked protesters on live television.¹⁵ During the convention, beginning on August 25th, nearly 12,000 police officers clashed for five days with anti-war demonstrators. A

6. Felix M. Padilla, *Latino Ethnic Consciousness*, 39.

7. Felix M. Padilla, *Puerto Rican Chicago*, 58.

8. Felix M. Padilla, *Latino Ethnic Consciousness*, 40.

9. Felix M. Padilla, *Puerto Rican Chicago*, 58.

10. Lilia Fernandez, *Brown in the Windy City: Mexicans and Puerto Ricans in Postwar Chicago*, (Chicago: University of Chicago Press, 2012), 3.

11. Felix M. Padilla, *Latino Ethnic Consciousness*, 40.

12. Lilia Fernandez, *Brown in the Windy City*, 5.

13. Jose "Cha Cha" Jimenez, "Latino-Police Relations," interview, 2015.

14. Felix M. Padilla, *Puerto Rican Chicago*, 110-111.

Figure 1

Source: <https://ylohistory.wordpress.com/chapter-ii-harvest-of-empire/>



total of 12,000 Chicago policemen, 7,500 National Guardsmen, and 1,000 secret servicemen had to be brought in before the convention's end. The riots at the convention reflected the political climate of the 1960's. The Civil Rights Movement received a great amount of attention from the mass media in the 1960's with activists marching across the United States. In fact, on August 6, 1966 Dr. Martin Luther King Jr. marched in Chicago with 600 civil rights demonstrators against segregated housing.¹⁵ African-American residents in the Chicago community

were aware of the way minorities were treated in comparison to Whites. In one article published in response to the riots during the 1968 Democratic National Convention, African-Americans commented that they doubted officers would shoot any rioters like they did with the Black community; they believed this was because the rioters were White.¹⁶ Among the Latino community of Chicago, police brutality was a significant concern, which was evident in their treatment of Latino residents.

One of the first incidents that raised

Puerto Rican consciousness was the beating of Celestino A. González and Silvano Burgos. On July 23, 1965 police came to clear children playing around an open fire hydrant at the intersection of Mozart and Division streets. González and Burgos went into their home when they saw the police officers. This raised the officers' suspicions, which then proceeded to break down the door to arrest the two men. The officers alleged that the two men resisted arrest, and González and Burgos were charged with aggravated battery, resisting arrest, and reckless and disorderly conduct.¹⁷ They were escorted into an officer's car and were taken to the hospital, where the officer who broke the door down was treated for his wounds. At the hospital González and Burgos were brutally beaten in a washroom, and finally they were then taken to the police district where they were again beaten by officers.¹⁸ González was beaten until the point where he lost consciousness, fell to the floor and woke up in Cook County Hospital with his hands and feet tied to the bed. This event sparked outrage within the Latino community, particularly among Puerto Ricans as these two men were Puerto Rican. One Puerto Rican organization called *Los Caballeros de San Juan* (The Knights of San Juan) wrote a letter to Mayor Richard J. Daley urging for an investigation.¹⁹ In this letter they explain Puerto Rican grievances with law enforcement as a whole:

We by no means intend to give the impression that this is an isolated case. The complaints of Spanish-speaking residents within this area revolve around not only the several accusations of irresponsible beatings, but also a complete lack of concern on the part of police in the protection of Latin-American residents.²⁰

15. Human Rights Watch, *Shielded from Justice*, (New York: Human Rights Watch, 1998), 152.

16. Gene Roberts, "Rock Hits Dr. King as Whites Attack March in Chicago," *New York Times*, August 6, 1966, <http://search.proquest.com.ezproxy.gvsu.edu/docview/117213815?accountid=39473>.

17. Earl Caldwell, "Chicago Negroes Stirred by Clashes between Whites and Police, Not Convention," *New York Times*, Aug 29, 1968, <http://search.proquest.com.ezproxy.gvsu.edu/docview/118396957?accountid=39473>.

18. Felix M. Padilla, *Puerto Rican Chicago*, 124.

19. *Ibid.*, 124.

20. *Ibid.*, 127. *Los Caballeros de San Juan* was a social organization established by the Catholic Church and Puerto Rican laypersons in Illinois as a fraternal and civic entity meant to provide support for Spanish speaking men.

The conflict went beyond the use of excessive force. It was about the lack of concern with which police treated Latino residents by not responding to their calls. The chaplain of *Los Caballeros de San Juan*, Donald J. Headley, also made an appointment to meet with Mayor Richard J. Daley to discuss the charges against the men. It is not known whether such a meeting occurred.

This was one of the first incidents of police brutality that garnered a community response. Prior to this the Latino community had called for investigations of these cases, but this time was different as the excerpts of the letter were published and Reverend Headley asked for a meeting with Mayor Daley. The community's voice was finally heard through some of its leaders, specifically *Los Caballeros de San Juan*. Letter writing was one of their earliest responses to police brutality. Puerto Ricans were able to express their concerns through an organization that cared about the Puerto Rican community and its wellbeing. The fact that there were Puerto Rican organizations indicates that there already was some sort of Latino consciousness. Membership in *Los Caballeros de San Juan* became a way to preserve Puerto Ricans' culture and provide support for them in a hostile environment where Puerto Ricans did not fit in. The Puerto Rican community must have already been aware of the discrimination they were facing because they were willing to take action in response to injustices against their community.

Puerto Ricans faced discrimination in a variety of ways once they arrived in Chicago. First, they were stuck in the laboring class working as waiters, janitors, or housekeepers. Second, they also faced discrimination in dealing with police officers. Puerto Ricans were often arrested, questioned, or searched without provocation.²² This was embarrassing enough for the Latino community as a

whole; in addition officers frequently used the derogatory term "spik" when dealing with Latinos.²³ They also faced discrimination from other citizens. The *Chicago Daily Defender* reported an instance where two dark-skinned Puerto Rican boys (each seventeen) were chased by a mob of Whites screaming "We don't want negroes in our park" on June 19th, 1966.²⁴ Incidents like this illustrate how Puerto Ricans didn't fit within the racial hierarchy of Chicago. To the White community they were considered to be Black, yet there also existed tension between Black and Latino communities. Who were these citizens to look to for protection if not law enforcement? They were forced to find support and protection within their community.

Letter-writing campaigns allowed the Puerto Rican community to voice its concerns and avoid physical confrontations with the police. In the letter *Los Caballeros de San Juan* wrote to the mayor they argued on behalf of all Latin American residents. As leaders in the Puerto Rican community they used their voice to fight for the Latino community as a whole identifying themselves as Latin-American residents rather than just Puerto Ricans. *Los Caballeros de San Juan* argued that police lacked concern in dealing with Latin American residents. If the community was collectively aware that Latino residents were treated differently, there must have already been some sort of Latino consciousness because without it they could not have expressed these concerns. In fact organizations like this could not have been set up without awareness of an issue. For example *Los Caballeros de San Juan* could not have created an organization to preserve Puerto Rican heritage without perceiving some sort of threat to it. The Puerto Rican formation of a community consciousness likely had its origins in social organizations such as this. Participation in organizations such as *Los Caballeros de San*

Juan empowered Puerto Ricans to begin thinking and acting on the concerns of all Latinos.

Mayor Richard J. Daley designated the first week of June in 1966 as Puerto Rican Week and community members were thrilled at the opportunity to show off their ethnic pride.²⁵ This event likely held so much significance in the community because it reflected an acceptance of Puerto Ricans as a part of the Chicago community. However, on June 12th, the last day of the celebration, police officer Thomas Munyon shot 21-year old Arcelis Cruz at the Damen-Division street intersection in the Westtown area, a predominantly Puerto Rican neighborhood.²⁶ Immediately after the shooting the crowd became unruly. Police released the canine unit on the crowd, and a Puerto Rican man named Juan Gonzales was injured, which further intensified the crowd's anger.²⁷ Over the course of the next three days the Puerto Rican community rioted. During the ensuing riot 50 buildings were destroyed, 49 people were arrested, 16 injured, and millions of dollars in damage resulted.²⁸ Assistant Police Superintendent John E. Harnett even called in Spanish-speaking police officers to calm the Puerto Rican community, but to no avail. Afterwards articles were published in several different newspapers such as the *Chicago Sun-Times*, *The New York Times*, and *Chicago Daily News*.²⁹ Many of these articles reported on eyewitness accounts of these events; some witnesses alleged they saw Officer Munyon shoot Cruz after he pulled out a revolver.³⁰ The amount of press coverage received signaled that the Latino community had succeeded in bringing attention to the issue of police brutality within their community.

This event finally gave the Puerto Rican community the opportunity to express their concerns. The riot was an expression of the pent-up frustration they experienced. Police brutality was the

21. Ibid., 124.

22. Ibid., 125.

23. Ibid., 125.

24. Lilia Fernandez, Brown in the Windy City, 163.

25. "Shooting Angers Crowd, Patrol Car Burned." *Chicago Daily Defender* (Daily Edition) (1960-1973), Jun 13, 1966. <http://search.proquest.com.ezproxy.gvsu.edu/docview/494238344?accountid=39473>.

26. Felix M. Padilla, Puerto Rican Chicago, 146.

27. Ibid., 147.

28. Felix M. Padilla, Puerto Rican Chicago, 111.

final push the Puerto Rican community needed to act on their frustration. This response became one of the most well-known expressions of Puerto Rican outrage in Chicago. It was the first time the community united as a whole and acted against the discrimination they were facing, and it was fueled by the state of Latino-police relations.

For Puerto Ricans there was no real opportunity for upward mobility because these opportunities were limited. They were stuck in the working class because of a combination of racial discrimination and education requirements that kept them in low income jobs. In 1960 the leading category of employment for Puerto Ricans in Chicago (45.7%) was “operative and kindred workers” meaning they were largely employed in semi-skilled jobs such as welders and plumbers.³¹ Aside from not being able to escape the working class, Puerto Ricans also could not escape poor housing conditions. Whites often did not want to live with Puerto Rican neighbors which left Puerto Ricans few housing options, including the Lincoln Park and Humboldt Park areas. Landlords were able to charge Puerto Ricans higher rents as they had few other choices.³² These issues created the frustration that led to the Division Street Riots.

The riot put a spotlight on the blight of the Puerto Rican community with housing and employment. The public was finally willing to hear about the frustration of Puerto Ricans with the discrimination they faced at an institutional level. In fact, after the Division Street Riots, Janet Nolan, from the University of Notre Dame, conducted research and interviewed Puerto Rican residents of the

area to understand coping mechanisms among Puerto Ricans in overcoming poverty.³³ Many residents felt that police officers never treated them fairly because they were Puerto Rican. In addition to this research being conducted in response to the Division Street Riots, a month later a public hearing was held in response and testimonies were taken from 54 witnesses. The Puerto Rican community identified police brutality as their top concern out of six problem areas in the summary report of the hearing.³⁴ Most Puerto Ricans believed officers were hostile and that officers failed to protect Puerto Ricans by not responding to calls in Puerto Rican neighborhoods. Often Latinos attributed the issue of police brutality to their inability to speak English and officers’ discrimination against Spanish-speakers. Many Latinos felt that the police degraded them and were racist.

Riots plagued the United States of the 1960’s at the height of the Civil Rights Movement. Throughout the 1960’s and persisting through the 1970’s youths across the United States became politically active. Youths began protesting the Vietnam War, poverty, imperialism, and racially motivated violence in the United States. Riots occurred sporadically throughout the United States and even high school students were walking out of schools in protest.³⁵ The Brown Berets organized student walkouts in East Los Angeles for Chicano students to demand a better education.³⁶ They believed issues such as overcrowding, poor facilities, and culturally insensitive teachers were a detriment to their education.³⁷ They also demanded courses about Mexican culture and the Mexican-American experience. Gentrification became an issue for

marginalized groups. For example, in 1966 Dr. Martin Luther King Jr. led a march against segregated housing in Chicago with 600 other demonstrators.³⁸ The Young Lords, a former street gang, also made the transition to a civil rights organization in 1968 to combat gentrification. This era brought recognition to many leftist organizations such as the Young Lords and the Black Panthers.

Chicago’s Black Panther Party played a significant role in the community, and influenced many other militant organizations. The Black Panther Party (BPP) was a Black Nationalist and militant organization. The organization was created in 1966, inspired by the philosophies of Malcom X.³⁹ Bobby Seale and Huey P. Newton founded the BPP in Los Angeles, and Fred Hampton was the founder of the Chicago Black Panther Party.⁴⁰ They served as the model for other militant nationalist organizations such as the Young Lords and the Brown Berets. Hampton helped create a coalition with other social activist groups of all racial backgrounds, in particular groups like Students for a Democratic Society—a predominantly White organization—and other groups like the Latino Young Lords. During this time period activists from various communities began collaborating to combat issues such as war, racism, and imperialism. Many of these activists were from marginalized groups that had been affected by colonialism such as Native-Americans, African-Americans, and Mexican-Americans. These marginalized groups were tired of living in segregated housing, dealing with inferior educational facilities, and being treated as inferiors. As a result some groups advocated

29. Ibid., 117.

30. Ibid., 148.

31. Ibid., 148.

32. Rodolfo F. Acuña, *Occupied America: A History of Chicanos*. (Boston: Longman, 2011), 302-303.

33. Arturo F. Rosales, “Brown Berets,” *The American Mosaic: The Latino American Experience*, ABC-CLIO, June 2, 2015, <http://latinoamerican2.abc-clio.com/>. The Brown Berets were a militant civil rights organization directed at Chicanos; before their decline their membership encompassed 5,000.

34. Matt S. Meier and Margo Gutiérrez, “Chicano Student Walkouts,” *The American Mosaic: The Latino American Experience*, ABC-CLIO, June 2, 2015, <http://latinoamerican2.abc-clio.com/>.

35. Gene Roberts, “Rock Hits Dr. King”, 1.

36. Zoe Trodd, “Black Nationalism,” *The American Mosaic: The African American Experience*, ABC-CLIO, June 20, 2015, <http://africanamerican2.abc-clio.com.ezproxy.gvsu.edu/>. Malcom X was a prominent spokesperson for the Nation of Islam, and later for Muslim Mosque, Inc. He was a prominent leader of the Black Power Movement and advocated for Black self-defense.

37. Jamie J. Wilson, “Black Panther Party,” *The American Mosaic: The Latino American Experience* ABC-CLIO, August 26, 2015, <http://latinoamerican2.abc-clio.com/>.

38. Jose “Cha Cha” Jimenez, “Latino-Police Relations,” interview, 2015.

39. Ibid.

Figure 2

Source: Young Lords in Lincoln Park Collection, Grand Valley State University



Figure 3

Source: <https://ylohistory.wordpress.com/chapter-i-introduction/>



separatism; Chicano activists advocated the creation of a separate nation called Aztlán, while Black activists called for a return to Africa. The Young Lords were sympathetic to these issues and published articles in their newspaper about the Chicano struggle, Native American concerns, and articles from the Black Panthers' newspaper.

Created in the early 1960's the Young Lords were a street gang, and the members were mostly the children of Puerto Rican immigrants. Immigrant communities often created social clubs to celebrate holidays, milestones in community members' lives, and finding a sense of community in a foreign setting. Often self-defense organizations were formed from these social clubs in response to the racially motivated violence these communities experienced. The Young Lords were founded by several individuals including José Jimenez. This was the result of the violence and discrimination they grew up seeing even against their own parents; according to José Jimenez his own parents were antagonized. Puerto Ricans weren't allowed to go beyond certain streets or into certain neighborhoods.⁴¹

The Young Lords were a self-defense organization originating in the 1960's to protect boys in the Lincoln Park neighborhood from local White youths. Most of the boys joined the Young Lords street gang at young ages, approximately 12 or 13 years old.⁴² Many Young Lords went on to become involved in petty crimes, or spent time in jail. In fact at one point José Jimenez had 18 court cases against him, but this was during his time as an activist.⁴³ One of his earlier jail sentences was actually responsible for his political awakening, which took place in jail when a guard gave him books about Malcom X and other Black activists.⁴⁴ During this time Black activism provided a template for the activities of many marginalized groups. Organizations like the Brown Berets and the Young Lords were influenced by the militant tactics and organizational platform of the Black Panthers. The

40. Ibid.

41. Michael Gonzalez. "The Revolution Has Come," Ruffians and Revolutionaries~ The Development of the Young Lords Organization in Chicago, <https://ylohistory.wordpress.com/>.

Young Lord's transformation occurred in 1968 when they became the YLO in response to Jimenez's political awakening. They became a radical organization that "sought to eliminate inequality, colonialism, poverty, and social injustice."⁴⁵ Several logos used by the Young Lords illustrated dedication to Puerto Rican determination, and are pictured below (See Figure 2).

The organization fought against the discrimination and gentrification taking place in Chicago. Puerto Ricans were being displaced and forced to relocate frequently as gentrification was underway. Older buildings in the city were being torn down and newer ones were built. The newer buildings were meant to provide housing for middle and upper income individuals leaving no place for low income residents. Organizations such as the Young Lords, Black Panthers, and Students for a Democratic Society were forged in an era of increasing political consciousness among youths. In the late 1960's the Young Lords, the Black Panthers, and Students for a Democratic Society formed the Rainbow Coalition. These groups united over issues beyond race; war and poverty were two of the largest concerns, which were fundamental issues that the Rainbow Coalition united against.

In 1969 with the shooting of Young Lords member Manuel Ramos the YLO and the Rainbow Coalition took a stand against police brutality. During a celebration on May 4, 1969 off-duty police officer James Lamb shot Manuel Ramos in the face for pointing a gun at him, and Rafael Rivera in the neck outside of Orlando Davila's home in the Lincoln Park neighborhood. The

celebration was for the baptism of Davila's daughter and a birthday. Officer Lamb was dressed in street clothes and covered in paint because he had been painting an apartment across the street.⁴⁶ In the midst of the chaos four members of the Young Lords street gang, formed in the early 1960's, allegedly attacked Lamb after Ramos and Rivera were shot, and were arrested.⁴⁷ Ramos and Rivera were rushed to the hospital after the shooting where Ramos died only minutes later.

After the shooting of Ramos, the Young Lords directed the community in a different form of protest than earlier methods such as the Division Street Riots; this time their methods were calculated. In the aftermath of the shooting, the YLO along with the Black Panther Party, Students for a Democratic Society, and the Latin American Defense Organization (LADO) held a rally at the corner of Armitage and Halsted Streets.⁴⁸ Inspired by the words of Ramos' family at the rally, the crowd of about 3,000 led a caravan of 35 cars to the Deering police station in the neighborhood where Ramos was shot.⁴⁹ On May 5th the Young Lords, the Black Panthers, and parents in the Lincoln Park community attended the funeral which brought out several hundred people.⁵⁰

The Latino Response

Manuel Ramos' death united an entire community in protest against police brutality. This wasn't just about the death of Manuel Ramos, but about the treatment of all Latinos and persons of color by police officers. In response to the death of Manuel Ramos, there was little to no violence involved in comparison to the riot because more thought was put into it. The Young Lords had organized a

rally to mobilize the community. Though the protest at the police station was not planned, it still required some thought. Members of the community had discussed going to the police station to protest the murder of Ramos before reacting violently. Another factor to consider is that the response was not immediately after the shooting. There was more time to consider a plan of action, whereas the riots were spontaneous reactions from an outraged community. Members of the community might have felt a need to participate in these protests because it could have easily been themselves or one of their family members. After all, Ramos was not just a Young Lord he was also a father, a husband and a son.⁵¹ Later, in their newspaper the Young Lords paid tribute to Manuel Ramos by printing a collage of the events that took place after Ramos' death (See Figure 3).

Community members tried to use non-violent protest instead of a riot as in the previous case and this could have been the product of several factors. First, the riot of 1966 was part of a string of riots that occurred between 1965 and 1967 called the Long Hot Summer. The Young Lords also strove to make this a non-violent protest. With their transformation into a political organization, they likely tried to follow tactics popular among other activists of the times. Activists across the country were marching, conducting sit-ins, and conducting rallies as non-violent forms of protest. The politicization of the Young Lords helped organize the community. They also gave power to a powerless community because marginalized communities often believed they lacked the power to make a change, but organizations like the Young Lords

42. Lilia Fernandez, *Brown in the Windy City*, 204.

43. *Ibid.*, 204. It is possible that Officer Lamb had been conducting surveillance on Young Lords members as the police were already conducting surveillance on Young Lords members such as José Jimenez.

44. Jose "Cha Cha" Jimenez, "Latino-Police Relations," interview, 2015. Part of this could have been because some members were suspected of being involved in illegal activities. Cases involving police brutality or excessive force are often controversial, as there is conflicting information which makes the truth hard to find and therefore requires the use of allegedly.

45. Lilia Fernandez, *Brown in the Windy City*, 188.

46. "Group Stages Protest Over Police Action," *Chicago Tribune*, May 14, 1969. <http://search.proquest.com.ezproxy.gvsu.edu/docview/168913412?accountid=39473>.

47. Lilia Fernandez, *Brown in the Windy City*, 188.

48. "Inquest Finds Policeman Lamb Justified in Killing of Ramos," *Chicago Tribune*, May 30, 1969. <http://search.proquest.com.ezproxy.gvsu.edu/docview/168886904?accountid=39473>.

49. Lorena Oropeza. *!Raza Si! !Guerra No!: Chicano Protest and Patriotism During the Viet Nam War Era*, (Berkeley and Los Angeles: University of California Press, 2005), 67.

50. *Ibid.*, 67.

gave them clout. They spoke on behalf of the community, and helped them collectively voice their frustrations.

Demonstrations following Ramos' death did not occur in one day. The community organized peacefully as a whole and was able to protest police brutality meaningfully and intentionally without inciting more violence. This seemed to have been an efficient tactic, as it resulted in the community learning about Puerto Ricans' experiences with discrimination. Moreover, it allowed them to confront law enforcement directly and to express their voices without causing harm to other members of the community. They brought attention to the fact that violence perpetrated by police officers could happen to anybody. Non-violent protests were likely so popular because they brought attention to the community in a more positive light than if it had been a riot. Violent protests gave the media and politicians ammunition against their community. The community would be painted as criminals rather than the victims of police brutality. This is illustrated by the hundreds of community members in attendance at the funeral of Manuel Ramos and similarly the many that attended the protest at the police station. Furthermore, it allowed the entire community to demonstrate their political consciousness and their ability to organize to combat issues such as police brutality.

Police brutality cannot be considered in isolation of the formation of a Latino political consciousness. The foundation for the community's political awareness had its roots in the United States political climate of the 1960's. This was a tumultuous time for the United States. Across the U.S. youth activists were protesting the Vietnam War and various types of "isms." Latinos were dying in higher proportions to their population size in the United States and believed this was unjust. A widely circulated report by Ralph Guzman revealed that while the percentage of "Spanish surnamed" males of military age in the southwest was 13.8 percent of the total population, about 19.4 percent of casualties from

these states were "Spanish surnamed."⁵² A shocking report that came to the attention of Henry B. Gonzalez, a Democratic congressman from Texas, revealed that 62.5 percent of casualties from San Antonio in 1966 were Latino, yet the Latino population only accounted for 41 percent of the city's population.⁵³ Latinos were tired of risking their lives in the wars, and still facing discrimination when they came back home despite their achievements overseas. The political awareness of the Puerto Rican or Latino community of 1960's Chicago may have been influenced by this trend. People of all backgrounds were becoming better informed on social issues and organizing around these issues creating groups and collaborating, as in the case of the Rainbow Coalition.

The responses to these three critical instances of police brutality evolved over time and seemingly became more sophisticated and intentional toward the end. This is likely connected to the trend in youth activism across the United States as well. Non-violent protest was gaining popularity in the community with leaders such as Martin Luther King and Cesar Chavez being the apotheoses for marginalized communities. These tactics were embraced by marginalized communities because they allowed citizens to express their concerns without incriminating themselves. Members of marginalized communities were less likely to be framed as criminals if they protested peacefully, which likely gave them more credibility than inciting riots.

While the riot of 1966 may not have been the most effective form of protest for the community, it was still a protest. These riots sparked a conversation about the Puerto Rican community's plight. Finally they were receiving the attention they needed to spark discussion within their communities. Puerto Ricans had finally gotten the media's attention with the Division Street Riots, as several articles were published in newspapers such as the *Chicago Daily News*, *The New York Times*, and the *Chicago Sun Times*. They once again garnered the attention of the media with

the death of Manuel Ramos. Articles were printed in several newspapers, and the protest march that took place had thousands of demonstrators in attendance.

As far as a political consciousness the foundation had already begun, but the atmosphere of the times amplified it. This allowed the Puerto Rican community to become a part of this trend or movement in the United States of rejecting oppressive U.S. policies and discrimination. The combination of these factors contributed to their responses. First, the influence of the Black Power movement helped give this community the push it needed to take action. The Black Panthers helped politicize the Young Lords and in turn the Young Lords were able to mobilize the Lincoln Park community to protest the unjust death of a friend. Jimenez modeled the YLO after the Black Panthers, and the Black Panthers also gave the YLO informal political education classes.⁵⁴ Second, even though these actions were in response to police brutality the responses were about more than that; it was about their frustration with the treatment of marginalized communities in general. Latinos were frustrated about being stuck in the working class and living in the most deteriorated neighborhoods only to be displaced by urban renewal. These responses allowed them to express anger about all the discrimination and injustice they faced. Marginalized communities, such as the Lincoln Park community, just wanted their experiences validated.

The Puerto Rican community's responses reflected the development of a political consciousness. However, police brutality is not the only factor that contributed to this political consciousness. Puerto Ricans were part of a larger trend of the activism of this time period. All marginalized communities were voicing their concerns. Before the riots and responses to police brutality of the 1960's, there was a preexisting Puerto Rican political consciousness. It was not strictly Puerto Rican because it included other Spanish-speakers in the responses.

51. Michael Gonzalez, "The Revolution Has Come."

52. Felix M. Padilla, Puerto Rican Chicago, 144.

53. Ibid.

54. Michael Gonzalez. *Ruffians and Revolutionaries*, Ch. 3 <https://ylohistory.wordpress.com/>.

In the case of González and Burgos, *Los Caballeros de San Juan* argued on behalf of the whole Latino community. The Division Street Riots was first called the Puerto Rican Riot because it consisted largely of Puerto Ricans since it occurred in response to violence during Puerto Rican week.⁵⁵ However, the death of Manuel Ramos once again attracted the attention of a larger Spanish-speaking community. The protestors were largely Latino rather than just Puerto Rican.

Discussing issues of police brutality is significant in order to create a dialogue within the community. With police brutality dominating the news and media outlets, it's imperative to understand the history of this issue. It is useful to look at past instances of police brutality to reveal the persistence of this issue. We must remember the past and use the past when searching for solutions in the present. The extent of the relationship between these responses and the U.S. political climate needs to be explored further within the context of police brutality, the Young Lords, and the Latino community of 1960's Chicago. The 1960's provided the Latino community of Chicago the opportunity to make their voices heard, and they used their collective voice to ask to be treated like human beings.

55. Felix M. Padilla, *Puerto Rican Chicago*, 144.

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Regulatory Fit and Taste Perceptions



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One way we can increase the amount of fruits and vegetables individuals eat is by increasing enjoyment during the taste experience. Taste is a subjective experience that is not simply derived from the chemical composition of the food. A variety of situational factors can alter the taste experience. For example, the color and label information has been shown to change the perception of flavor in chocolate (Shankar, Levitan, Prescott, & Spence, 2009). If foods are perceived to taste better then it is likely that people would eat them. Psychological theories suggest ways that tastiness can be enhanced. Regulatory focus theory describes motivational orientations, namely promotion and prevention orientations that people take on during goal pursuit (Higgins, 1997). Promotion focus involves the desire for advancement, accomplishments, aspirations, and what can be gained by achieving a goal. It also deals with achieving ideals (i.e., what we want to do versus what we should do). Prevention orientation is concerned with protection, safety, responsibility, and what negative outcomes can be avoided from achieving a goal. It deals with what we ought to do versus what we want to do. When these orientations match aspects of the situation, regulatory fit occurs. For example, our methodology involved manipulating how a message was framed (i.e., either focused on the gains or the avoided losses that come along with eating a healthy food). Experiencing regulatory fit makes us “feel right” and this feeling may transfer to other judgments (e.g., how much a product is worth).

Our research tested whether regulatory fit can be applied to enhance the taste of foods. Using a mixed design, participants’ preexisting motivational orientations were measured and conditions of fit and non-fit were created by randomly assigning participants to either the gain or loss-framed message condition. Foods were then sampled and rated for enjoyment. The hypotheses we tested using regulatory foci as predictors of taste ratings, yielded nonsignificant

results. Behavioral Inhibition System (BIS) and Behavioral Approach System (BAS) scores were collected in addition to prevention and promotion scores. Hypotheses were tested using the BIS/BAS scale because they are conceptually analogous to prevention and promotion, respectively. We did find evidence of a fit effect in the loss-framed condition. As we predicted, as BIS scores increased so did ratings of taste, but only in the loss-framed condition. We did not find evidence of a fit effect in the gain-framed condition. In other words, BAS scores did not relate to taste ratings. We did find partial support for our hypothesis. This research contributes to past research by demonstrating fit can be applied to influence sensory judgments, like how enjoyable food tastes. This has important implications for how to help people maintain healthy lifestyles. For example, if someone’s motivational orientation is known, situations can be framed to induce fit so that enjoyment of healthy foods increases. If healthy foods tasted good, people would eat them. This research highlights the importance of paying attention to individual differences and controlling aspects of the situation to create more positive outcomes.

Unpacking the Social and Economic Disparities Among Disabled Black Mothers



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Black feminist scholarship contextualizes the historical degradation of Black women's bodies in the United States and its impact on contemporary understandings of Black womanhood (hooks; Adrienne Davis; Collins; Harris-Perry). Black women experience more aggressive racialized, patriarchal encounters, societal/cultural shame and economic disadvantages than white women and Black men (Brown, King, and Ransby; Harris-Perry). Nevertheless, this scholarship fails to address the taboo and oppression of disabled mothers within the Black community and greater American culture.

Deploying an intersectional framework, this essay elucidates the connections between Black Feminist Studies and Disability Studies. An intersectional approach accounts for how multiple social identities such as race, gender, socioeconomic status, and disability intersect at the micro- and macro-levels of individual experience to reflect interlocking systems of privilege and oppression (Crenshaw; McCall; Bowleg). Feminist Disability Studies scholarship rejects the dominant notion that women with disabilities are misfortunate, dependent people who cannot function in day-to-day life without a caretaker (Garland-Thomson; Grue and Laerum; Walsh-Gallagher, McConkey, Sinclair and Clarke; Höglund, Lindgren and Laesson). This research emphasizes changing public policy and cultural institutions rather than viewing the problems of disabled individuals as a result of their own supposedly inferior bodies (Garland-Thomson). Feminist Disability Studies contextualizes gender and disability and creates an intersecting framework to understand the differences and relationships of these two identity categories (Wendell; Linton; Fawcett; Garland-Thomson; Hall). Through this theoretical lens, disability is seen as a system for intellectual exploration versus a medical problem or bodily flaw (Garland-Thomson).

Within this essay, I contextualize the

connections between race, socioeconomic status, disability, and motherhood and their combined effect on the experiences of Black mothers. First, I trace the historical and contemporary stereotypes of Black women in U.S. popular culture. This examination increases our understanding of the implicit and explicit role of stereotypes in shaping government policies. Second, I explore Black women's political, social, and economic disenfranchisement, which hinders their upward mobility. Finally, I discuss the impact of stereotypical assumptions concerning Black motherhood and disabilities on the lives of these women and their children. The study contributes to an ever-expanding knowledge base concerning Black families in its examination of the stigmatization and devaluation of poor Black mothers' ability to parent and their access to welfare supports.

To better understand the lives of Black mothers with disabilities and their families, I draw upon survey data, existing federal and state policies, and health research. From June 2015 – July 2015, I conducted a pilot survey of the adult children of disabled Black mothers. Participants were recruited through 1) snowball sampling techniques; 2) solicitations on Facebook, including a note with the study's information on the primary investigator's Facebook page; and 3) email. Survey questions were designed to capture the lived experience of these now adult children within their families and provide real life examples of the impact of social welfare policies. I suggest that we need to challenge the status quo in public and health policy, which is "focused on finding simple solutions that are politically feasible and work within existing institutional frameworks and timeframes" (Manuel; See Hankivsky, O. and Cormier).

The Historical Political Devaluation of Black Motherhood

White supremacy regulates Black women's bodies and their reproduction

for capital gain. Beginning under slavery, Black women have been at the root of cultural and political dehumanization (Hernton; Morgan; Collins; Adrienne Davis; Givens and Monahan; Rousseau). The devaluation of Black motherhood occurred through sexual violence enacted upon their bodies by white men and the separation of mothers and children (Mann). Black women were considered factories of future laborers. Thomas Jefferson captures this sentiment, writing, “I consider a woman who brings a child every two years as more profitable than the best man of the farm, what she produces is an addition to the capital, while his labors disappear in mere consumption” (Jefferson). Reflecting on how Black women were only valued for their physical and reproductive labor, Melissa Harris-Perry notes, “The mythology of Black women as promiscuous was important to maintain the profitable exploitation of slave society” (Harris-Perry). The fact that they were seen as sexually immoral reflected how they were viewed outside of the Victorian ideal of true womanhood (Smith; Hernton; Bambara; hooks; McGruder).

Assumptions concerning Black women’s sexuality resulted in the formation of the hypersexual Jezebel narrative, which began during slavery. This stereotype arose to justify the physical, mental and sexual violence and objectification of Black women and their bodies. Consequently, Black women are at risk for abuse from men regardless of race (Cash; Angela Davis). Black women that are sexually assaulted receive little to no attention in mainstream media. And, in instances when these women find themselves in the media, rape culture and stereotypes of Black women perpetuate the notion of being at fault for experiencing sexual assault and rape.

Operating in conjunction with the Jezebel stereotype is the belief that when Black women display mothering tendencies it is towards white children in their care. This role has resulted in the Mammy stereotype – the jovial, asexual

motherly Black woman. Rarely is the Mammy seen taking care of her own family (Morgan; McElya; Ferris Univ Jim Crow Museum; Harris-Perry). Examples of the mammy include Aunt Jemima, the Pine Sol cleaning woman commercial, and the character Aibileen Clark (Viola Davis) in *The Help* (2011). Caring for white children was one of the few employment opportunities for Black women who were working to support their families. This position maintained the class-privilege gap between Black and white women by keeping Black women in nursing/domestic roles (hooks).

Furthermore, forced sterilization routinely denied Black mothers the right to parent (Roberts; Angela Davis). Compulsory sterilization was legal in 32 states from 1907 until the mid-1980s. Texas biologist and physician Gordon Lincecum proposed the first sterilization bill of undesirables in 1849 (Garcia). This invasive procedure primarily targeted women of color, lower class women, and disabled women. Black women who underwent sterilization were viewed as incapable of taking care of their children, received government assistance, or diagnosed as intellectually disabled. These women often were unaware of the procedure. For example, eighteen-year-old Nial Ramirez was sterilized after giving birth to her son in 1985 (Armstrong). In the first trimester of her pregnancy, a state-appointed social worker threatened that if she did not consent to the sterilization, her mother’s welfare benefits would be suspended. These benefits supported her mother and six siblings. Ramirez recalled the social worker saying, “I had to have this sterilization because if I didn’t, my brothers and sisters would have nothing to eat and no house to live in, and it would be all my fault” (Armstrong). Ramirez further explains that she was told that the procedure would be reversible. Similar to Ramirez, thirteen year old Lela Mae Dunston was sterilized after giving birth to her son. Their experiences are not unique. North Carolina has reported to sterilizing over 7,600 people (Armstrong).

In contemporary society, Black women continue to struggle over their reproductive freedom – the ability to choose when and if they want to have a child. The elimination of reproductive choices for Black women renders them vulnerable to social ostracization, humiliation, and political abuse. Dorothy Roberts argues that Black women’s reproductive liberation is more complex than the legal right and access to abortions. Welfare legislation negatively impacts Black women’s access to safe and affordable healthcare options (Roberts). Black women also find themselves coerced into accepting specific contraceptives such as Norplant and Depo-Provera as a means of regulating their fertility (Angela Davis). Yet Depo-Provera has been linked to dangerous side effects including sterilization and cancer (Angela Davis; Roberts).¹

Policymakers rely on reified stereotypes concerning Black womanhood to construct stories of what is “reality.” Black women’s economic status is blamed on their alleged fiscally irresponsible, promiscuous ways (Jordan-Zachery). This racist understanding of Black womanhood is rooted in Daniel Patrick Moynihan’s 1965 report *The Negro Family: The Case for National Action*. Moynihan references the Sapphire image of Black women, who are understood to be extremely loud, aggressive, threatening and argumentative (Jewell). These women emasculate Black men with frequent verbal assaults in a loud animated fashion. Moynihan also accuses Black women of failing to discipline their children, weakening their sons, and defeminizing their daughters. These inadequacies are believed to contribute to Black youth’s educational shortcomings. His myopic view not only suggested that Black women were the cause of their families’ inability to economically progress, but that they were emasculating matriarchs causing Black men to leave them and their children. These perceptions of Black women have been used throughout mainstream culture and in the policy making process.

1. Given the constraints to their ability to exercise reproductive freedom, some Black women elect not to have children because of the mental, physical and psychological abuse that mainstream American culture and law enforcement inflict on Black bodies. Black women must conduct difficult conversations about racism with their children. This is an indirect way of policing Black bodies. Mothers are faced with the hardship of teaching their children how to operate in a society that historically viewed Black people as incompetent and inferior.

Moreover, *The Negro Family: The Case for National Action* relied upon a single notion of family – a married, heterosexual family with a male breadwinner and female housewife. Patricia Hill Collins notes that politicians, including Moynihan, created a hierarchy of families, whereby the white heteronormative family served as the example of comparison. Yet, many families of color historically lacked the privilege of fulfilling these traditions because many wives and children worked outside of the home. Black women also depended on other-mothering, where grandmothers, aunts, and sisters served as social supports to Black women regardless of whether the father was present.

The detrimental perceptions of Black women created in *The Negro Family: The Case for National Action* left an impact on how future policymakers view the state of Black women's economic, and cultural status, while simultaneously adding new dehumanizing narratives of Black womanhood. Twenty years later, President Ronald Reagan echoed the description of Black women offered by Moynihan while governor of California and in his 1980 presidential campaign. Whereas Moynihan used the narrative of the emasculating Sapphire, Reagan pathologized Black women, conflating stereotypes concerning Black women's promiscuity and low socioeconomic status to form the welfare queen archetype. Reagan repeatedly discussed this mythical woman, stating, "She has eighty names, thirty addresses, twelve Social Security cards and is collecting veteran's benefits on four non-existing deceased husbands. And she is collecting Social Security on her cards. She's got Medicaid, getting food stamps, and she is collecting welfare under each of her names. Her tax-free cash income is over \$150,000" (Reagan). The Welfare Queen stereotype stigmatized all recipients as lazy, uneducated, and Black.

American culture created a narrative that welfare is a program designed for poor Black people who lack work ethic and are seeking a handout. At the forefront of this ideology is the Black single mother who has children by multiple men as means to continue

receiving support from taxpayers. This image of the Black woman suggests that she is the cause of her poverty because she lacks the ability to control her fertility (Harris-Perry). For example, Patricia Williams comments, "The signifying power of the black single mother.... As poor, drug addicted, and natively absent... is integral to the public articulation of fetal harm and abuse" (in Bower 1995: 144). Welfare policy is gendered and racialized to incorrectly label all Black women as welfare consumers. For example, 40.2 percent of Supplementary Nutrition Assistance Program (SNAP) beneficiaries were white in 2013 in comparison to African Americans, who represent only 25.7 percent of SNAP recipients (Delaney and Scheller).

The welfare queen stereotype erases the history of welfare as a mechanism to support the growth of the white middle class beginning with President Franklin D. Roosevelt's New Deal policies in the 1930s. Linda Gordon writes, "What once meant prosperity, good health and good spirits now implies poverty, bad health and fatalism. A word that once evoked images of pastoral contentment now connotes slums, depressed single mothers and neglected children and even crime" (1). American welfare policies not only created Social Security and unemployment, but new programs also resulted in the Federal Housing Administration's (FHA) establishment of the federal, financial mortgage system. FHA loans launched an entire generation of white home ownership, which established transferrable wealth between generations of white Americans that was routinely denied to African Americans and other families of color.

The misconception concerning who are welfare recipients is paired with American taxpayer concerns about not wanting to give "lazy" people money. According to the Department of Treasury, only 18.7 percent of 2014 taxpayer monies were allocated to Job and Family Security in comparison to the 23.91 percent of taxpayer monies allocated to National Defense. Of the funds allocated to Job and Family Security, only 4.08 percent of the funds supported Food

and Nutrition Assistance, 0.67 percent supported housing assistance, and 0.63 percent supported Temporary Aid for Needy Families. The changes in the distribution of tax dollars to public assistance programs must be considered in light of welfare reforms from the last twenty years. In August 1996 President Clinton signed the Personal Responsibility and Work Opportunity Act, commonly known as welfare reform.² Program recipients must work after two years on assistance, with few exceptions. Twenty-five percent of all families in each state must be engaged in work activities or have left the rolls in a fiscal year (Department of Human Services). Single parents must work for at least 20 hours per week the first year, increasing to at least 30 hours per week by FY 2000. Two-parent families must work 35 hours per week (Department of Human Services). This Act passively targeted single mothers in its focus on strengthening family structures and educating people on good moral and purity. The law also altered the amount of time that an individual family could receive federal cash assistance to five years. After this period, individual states have the option of exempting twenty percent of entire government assistance benefits.

Motherhood as an Ableist, Class Privilege Construction

As Black women, overall, experience constraints to their reproductive freedom to parent, disabled women are denied or discouraged from this reproductive role (Garland-Thomson). Disabled women's ability to mother has been challenged by society and healthcare providers (Walsh-Gallagher, Mc Conkey, Sinclair and Clarke; Höglund, Lindgren and Larsson). These mothers often do not feel as if they have autonomy of raising their children. They feel as though they have to go to great lengths to prove that they function "normally" due to a belief that if they do not live up to societal standards, their children would be taken away by states' Child Protective Services programs (Grue and Laerum). Nevertheless, Disability Studies scholarship overlooks how multiple identities (e.g., race or class)

2. This law changed welfare's name from Aid to Families with Dependent Children (AFDC) to Temporary Assistance for Needy Families (TANF).

along with a disability affect mothers and children. My research shifts this conversation in its intersectional approach to better understand Black women with physical and intellectual disabilities in its examination of their ability to parent.

This project is in conversation with Jennifer James and Cynthia Wu's discussion of the policing, socialization and political exclusion of the disabled body. James and Wu critically examine how the government allocates funds to mothers with disabilities as funding regulations directly affect their families' access to healthcare, education, and childcare. The complexity of being disabled and a Black mother has often left these women living in impoverished areas with little economic mobility.

Recipients of federal and state disability funds face limitations regarding outside employment. The financial qualifications to receive disability are defined as having limited resources and income, which together cannot gross more than \$2,000 worth of monthly income. In other words, individuals cannot have access to over \$2,000 in stocks, U.S saving bonds, land, personal property, or anything else that could be exchanged for food and shelter. Recipients also cannot exceed this financial limit from employment earnings or benefits from social security, Veterans Affairs, workers compensation, or unemployment (Supplementary Social Security Income).

Nevertheless, disability funds are oftentimes never enough for recipients. Predatory financial restrictions do not allow disabled mothers to become economically sufficient while receiving disability support. For example, a mother receives \$733 per month in Social Security Disability Income if she meets the disability eligibility regulated by the federal government. This stipend is less than the national rent average as a one-bedroom apartment is \$769 (Toscano).

More importantly, we need to consider this in conjunction with limited housing options for low-income Americans. According to the U.S Department of Housing and Urban Development's Office of Policy Development and Research, twelve percent of public housing recipients include nonelderly disabled adults, while

elderly and/or disabled persons represent 52 percent of all public housing users (United States Department of Housing and Urban Development). In 2012, the National Low-Income Housing Coalition found that 84 percent of disabled persons live in designated housing for low-income disabled adults, 33 percent of Blacks were placed in public housing, and 45 percent of Blacks were voucher users. Housing vouchers are designed for very low-income people, the elderly, and the disabled to have the option to live in single-family homes, townhouses, and apartments within the private housing market (National Low Income Housing Coalition). Public housing agencies pay a portion of the rent, and the individual receiving assistance is responsible for paying the difference. Blacks and disabled individuals are overrepresented in public housing, which is historically unsafe and hazardous. Dilapidated housing conditions also are linked to various poor health outcomes. In the case of disabled, Black women, if their financial and health concerns do not miraculously improve, their fixed incomes will require them to depend on housing assistance for most of the rest of their lives (NLIHC).

Similar cases across the world demonstrate how disabled women have not received access to necessary resources to guarantee sufficient housing and healthcare. For example, Canadian disabled women's rights were breached because of the inability to access equitable healthcare. The United Nations Convention on the Rights of Persons with Disabilities found that human rights violations occurred because these women lacked physical, social and psychological healthcare (Gibson and Mykitiuk). Healthcare professionals consistently maintain a negative attitude towards mothers with disabilities, specifically in regards to discussions of family planning, pregnancy, and childbirth (Blackford; Thomas and Curtis; Höglund, Lindgren and Larsson). Examining Sweden and Canada, respectively, Berit Höglund, Peter Lindgren, and Margareta Larsson, and Barbara Gibson and Roxanne Mykitiuk discovered that healthcare providers did not provide their disabled patients with autonomy to choose best practices and procedures. Their combined

results also found that providers were not knowledgeable of disabled women's bodies and "capabilities" to parent a child. Women with disabilities are often viewed as a homogenous group and not as persons with individual needs.

Conceptualizing Disability, Blackness and Motherhood

In order to understand the stigma, social and economic disparities experienced by Black women with disabilities and their families, I surveyed the adult children of mothers with disabilities. Twelve individuals completed the survey. To contextualize these preliminary findings, I draw from the results in Deborah J. Stokes' study *Triple Jeopardy: African American Women with Disabilities*. Stokes gives voice to African American women with developmental disabilities, making policy and community recommendations to better serve and support these women. Although not all of these women are mothers, Stokes' data offers a comparison to better understand the shared experiences of Black women with disabilities.

The preliminary results of my pilot survey indicate that 70 percent of these families went without governmental assistance such as food stamps and housing subsidies. Given that all of my respondents noted that their families' income was under \$50,000 annually, I infer that their families' income was subsidized by employment in the informal sector or formal employment with flexible hours (e.g., low paying janitorial positions and domestic work) (Stokes). According to their children, these mothers did not use government assistance although they met the financial requirements. I recognize that there may have been underreporting of government assistance because of the negative stigma associated with being a welfare recipient.

In addition, survey participants' mothers did not receive disability assistance. Rather their mothers relied on alternative support systems to help with any hardships. Fifty percent found refuge in churches, ten percent from local community or non-profit organizations, and ten percent from the community. Stokes noted similar results, which indicate a consistent trend concerning

accessibility to adequate resources and strong support systems for the women and their families. At the same time, these women experienced social exclusion from their communities, as they were perceived as not contributing to their communities. For example, forty percent of survey respondents noted that their mothers did not receive support at all from anyone outside of the immediate family. Yet this lack of support may be attributed to the fact that only one-quarter of participants noted that community members were aware of their mother's disability. Only 37.5 percent of participants disclosed that some community members were privy to the existence of a disability within the family. Non-disclosure with their communities reflects how children are left feeling defensive, embarrassment, resentment and confusion during childhood and adulthood. Cumulatively, the lack of consistent assistance marginalizes Black women with disabilities and may create mental and emotional despair, which may have long-term health complications.

Moreover, I suggest that shame and fear that Child Protective Services may remove their children stops these women from obtaining these benefits. Discussing her children, a mother notes: "I have two children and I see them on the weekend. My mother has guardianship of my children" (Stokes). Disabled women often undergo indirect screenings such as "off the record" questions by government and healthcare officials to determine if they are capable of supporting their families (Walsh-Gallagher, Mc Conkey, Sinclair and Clarke). These professional opinions are often made without prior knowledge and training that truly reflects disabled mothers, their bodies, and capabilities (Walsh-Gallagher, Sinclair and Mc Conkey; Walsh-Gallagher, Mc Conkey, Sinclair and Clarke). To this end, there is a lack of programs within the school system to advocate for families with disabled mothers. This does not mean that their mothers were uninterested in their children's educational success. Sixty-three percent of children reported that their mothers were involved with their education, and more than half of my respondents had mothers who maintained involvement in their extra-curricular activities.

Mainstream America is in dire need of addressing the structural racism, economic exploitation, political disenfranchisement and gendered violence against Black women and girls. Popular culture has been impacted greatly by racist understandings of Black motherhood from slavery to present day. Recognizing how these images circulate in mainstream society increases our collective knowledge regarding their implicit and explicit impact on federal policies. We cannot understand the current positioning of Black mothers in the U.S. without critically engaging racist stereotypes of Black women.

Racialized, gendered, and ablest policies create social and economic exclusion for disabled Black women, their children and caretakers. My pilot survey seeks to begin telling the narrative and provide holistic understanding of these women and families. Public policy must reflect the deeply complex lives of disabled Black women and employ an equitable approach to support mothers and their children. Future research should address the effects of how disability and blackness are seen in order to transform the way blackness and disability together is viewed. Policymakers need to root their analysis within a commitment of making disability "normal" and not denigrated in public discourse. Many disabled Black women are concerned that they would experience a backlash for critiquing existing policies similar to the treatment Black feminists receive for speaking out against misogynist and patriarchal behavior (Stokes).

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Perception of Events in Stories Guides Eye Movements during Reading: A Working Memory Load Hypothesis



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When people read stories they generate mental representations of the situations described, called situation models (Zwann & Radvansky, 1998). These mental representations are important to organize the dynamic experiences we read about (Zacks, Speer, Swallow, Braver, & Reynolds, 2007). A situation model is a representation of the narrative's situational features: spatial location, temporal information, causality, goals or motivational information, and protagonists and objects (Johnson-Laird, 1982 as cited in Zwann & Radvansky, 1998). Situation models are organized by events (Kurby & Zacks, 2008; Zacks et al., 2007, as cited in Swets & Kurby, 2015), or "segment of time at a given location that is conceived by an observer to have a beginning and an end" (Zacks & Tversky, 2001).

Readers tend to update their current situation model when situational dimensions change so that the current event model is representative of the current state of affairs (Gernsbacher, 1990; Zacks et al., 2007; Zwann & Radvansky, 1998). For example, when a narrative states, "a few days later," it indicates a change in the temporal dimension of the text. In addition to this moment-to-moment updating, readers segment their situation models into separate events when these situational changes occur.

The perception of an event boundary likely has a number of behavioral and cognitive consequences (Zacks et al., 2007). This updating may cause a working memory load as processing increases to incorporate that new information. Zwann, Magliano, and Grasser (1995) found that reading time slowed for sentences with shifts in situational dimensions. Given these findings, Swets and Kurby (2015) investigated the role of event structure's effects on eye movements during reading. Swets and Kurby (2015) found that reading time was slower for event boundaries according to measures of overall reading time, first pass, and first

fixation. Additionally, regressions back to previous clauses were significantly more likely to land on event boundaries. In alignment with a working memory load hypothesis, those with lower working memory capacity slowed down more at event boundaries whereas those with higher capacity did not. This suggests that segmentation does cause a load on working memory.

The goal of the current study was to directly test the working memory load hypothesis. In contrast to Swets and Kurby (2015), working memory load was experimentally manipulated by asking participants to maintain a verbal working memory load or a spatial load while they read (Fincher-Kiefer, 2001). The current study hypothesized that maintaining a working memory load would increase the effects of segmentation on reading behavior measured by eye movements. Undergraduate students read four texts while their eye movements were tracked, similar to Swets and Kurby (2015). Each student was randomly assigned to have a spatial load, verbal load, or no working memory load. After reading the assigned texts, participants completed three working memory span tasks to assess working memory capacity.

Means for our dependent measures show how some trends replicate Swets and Kurby (2015), yet the means do not support the working memory hypothesis. However, data collection is incomplete, and as such final conclusions need to be withheld until collection is finished.

Social Exclusion and its Effects on Physical Vulnerability



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Humans feel a need to belong (Baumeister & Leary, 1995). The argument that belonging is a need is based on several perspectives and findings within the social exclusion literature, all of which emphasize the interconnection between our need for belonging and physical security. First, researchers argue that our evolutionary ancestors needed to form and maintain social bonds because their physical safety depended on their inclusion in a social group (Wesselmann, Nairne, & Williams, 2011). Second, the absence of belonging has a number of negative consequences (DeWall & Bushman, 2011) including physical consequences such as erratic sleeping, decreases in blood pressure and possibly even early death (see Park & Baumeister, 2015). Third, because exclusion is experienced as negative and threatening, such threats evoke powerful psychological processes aimed at identifying threats and regaining a sense of connection (e.g., Molden, Lucas, Gardner, Dean, & Knowles, 2009). The current study contributes to this research by focusing on the motivational processes involved in regaining a sense of physical safety. Specifically, we hypothesized that social exclusion would motivate behavior aimed at achieving physical safety or preventing physical vulnerability.

One hundred and two participants recruited from Amazon's Mechanical Turk (MTurk) website participated in this study (i.e., 50 females, 52 males, M age = 32.05). Participants were paid \$2.00 for completing the 25-minute survey. For the experimental manipulation, participants were randomly assigned to either the social exclusion or the social acceptance condition. Those in the social exclusion condition received a prompt in which they were asked to imagine they were beginning a new job and their coworkers openly rejected them. Those in the social acceptance condition received a similar prompt only they were asked to imagine that their new coworkers openly accepted them. After rating their emotional reaction to the scenario and feelings

of exclusion (as manipulation checks), participants completed questionnaires assessing general security orientation (Lockwood, Jordan, & Kunda, 2002) and the degree to which they perceived a variety of social and physical activities as risky (Blais & Weber, 2006). Participants also completed measures of physically protective behavior. For the valuation task, participants indicated how much they would pay for consumer products that conferred a sense of physical safety. For the scenario task, participants imagined themselves making a series of decisions (i.e., 15 total, including social, financial, and physical risk decisions) between risky and safer options.

In general, the results that emerged were contrary to my hypothesis. Although general security orientation did not differ as a function of condition, excluded (vs. accepted) participants were less likely to perceive a situation as risky. Only two out of sixteen items on the valuation task were valued less by participants who imagined an exclusion (vs. acceptance); however, excluded (vs. accepted) participants made more risky choices in general and more physically risky choices in particular. Discussion centers on alternative explanations for these findings and future directions.

Modeling the Development of World Records in Track and Field



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I. INTRODUCTION

Previous researchers have used various analytical techniques to develop a model of world records in track and field events. This can be a difficult task considering that there is not a set time frame in which world records are broken. Some records have been broken several times within one year, while others have taken multiple years only to move very slightly (as in one-hundredth of a second or one-fourth of an inch). It is assumed that there is a limit in human performance for track and field events since it seems unreasonable that a runner can run a race in zero seconds or that a high jumper reaches 100 feet. The purpose of this study is to assess the trends of world records in track and field events over time and to discover the possible threshold in which world records start to approach for the events of the 100 m, 200 m, 400 m, long jump, and shot put.

World records are those that have been officially ratified by the International Association of Athletics Federations (IAAF). If the ratified world record is wind-aided over an altitude of 1,000 meters in an event where air has a positive effect, the unofficial best time or measurement is sub-listed (World Records-Men, 2015). Specific criteria of submitted qualifying marks must be satisfied for ratification such as the dimensions of the track and equipment used must conform to IAAF standards, events must be accurately measured by a certified measurer, and running events up to 800 meters in distance are required to have a photo finish fully automatic timing. It is of interest to the researchers to explore the patterns, differences, and influential factors of records in numerous events over time. It is assumed that there will be a significant improvement in the world records from the starting years of the sport to the most current years. The eventual goal of our research is to find the limit values that these times and measurements appear to be approaching and witness if there seems to be asymptotic convergence along these thresholds.

II. LITERATURE REVIEW

To comprehend the changes in speed of athletes based off of various distances with respect to time, “Models for Comparing Athletic Performances” was reviewed for modeling that is fitted to 1996 world records for various distances (Grubb, 1998). A developed three parameter model including speed at long distances, the maximum speed over distance obtained, and decrease in speed with respect to distance was used to compare performances by the same athlete at different distances to determine an athlete’s strengths and training effects (Grubb, 1998). This model was constructed given that every athlete is built differently, has different strengths, and different endurance levels. After data was collected, the composed model showed the decrease in world records over several years and predicted lower bounds on these records using various parametric forms. Given the fact that it is believed that there is a threshold for every track and field world record and that there will be asymptotic convergence above these thresholds, this was alluring information.

Since it is favorable to develop a model that displays asymptotic convergence, an article titled “Are there limits to running world records?” was examined in which world record breaking for men and women was assessed for modeling techniques (Nevill and Whyte, 2005). Instead of using a linear model, it was decided to use the “S-shaped” logistic curve to provide a better fit for world record data overtime. In this study, it was identified that there was a “slow rise” in world record speeds at the beginning of the century. This was followed by an acceleration period, which showed a major increase in speeds and decrease in times due to the enhancement of the sport and new technology. At the end of the century, there appeared to be a reduction in record breaking performances due to the challenges of beating previous times now that the sport is more advanced (Nevill and Whyte, 2005). Their model also hinted towards men’s world records reaching an asymptotic limit and that it is

highly unlikely that women's world records will reach those achieved by men.

After reviewing the two previous sources, the idea of asymptotic convergence and curve fitting techniques seemed appealing. In another literature source, "Modelling the Development of World Records in Running," the authors demonstrated the progression of world records for metric running events from the 100 meter dash to the marathon for men and women using time-series curves (Kuper and Sterken, 2008). Multiple curve fittings were examined including the linear model, exponential curve, logistic curve, and the Gompertz curve to identify the "best fit" for modeling world record data. The Gompertz-curve was ultimately chosen for modeling. This curve was used for sixteen events and implied limit values were computed for each event. After thresholds were determined, a log-log model was used and determined that if the distance increased by 10%, the limit value increased by 11%, not necessarily taking gender into account (Kuper and Sterken, 2008). Based off of this modeling, the researchers chose the Gompertz curve for analysis due to validation of the curve choice and the high R^2 values that were produced from their computed threshold limits. This study influenced the researchers to develop a model that compares using similar methodology to see the differences in limit value predictions.

III. RESEARCH DESIGN AND METHODS

The purpose of this research is to model the development of world records in track and field using statistical analysis. Throughout this process, raw data was obtained by records listed on the official websites of the Olympic Movement and IAAF organizations (iaaf.org and Olympic.org). Only officially documented records from these two organizations were used for analysis. The analysis of this data was conducted using the JMP statistical software package that produced a graphical representation for various events using a nonlinear curve fitting technique. A model was also produced to predict the thresholds of world records in various track and field events.

Initially, raw data on world records was acquired from the first officially docu-

mented world record to the most current on the following events: 100 m 200 m, 400 m, long jump, and shot put. The data collected included the following variables: Name, Time or Measurement, Record Year, and T . Record Year represents the year in which a world record was broken and T represents the current year (that includes every consecutive year from the first documented world record for that event until the year 2014). The data was then imported into JMP for analysis.

Next, various curves were reviewed based off of previous literature sources in an effort to identify the most appropriate way to model the development of world records in track and field. While a linear model was first examined, it was evident that the data did not follow a linear form because the world records were not constantly being broken at a steady rate. Because of this, the linear trend was declared as not a good fit for this type of modeling. The exponential curve was the next model explored for fitting the data. This curve was also problematic because the events did not produce a trend that is constantly decreasing or increasing until it reaches an asymptote.

The next type of curve that was reviewed was the logistic curve. The shape of this curve was appealing to this particular type of modeling because it has the potential to form an "S" pattern when graphed. This shape is favorable for world record data because there appeared to be a slow change in times/measurements in the beginning stages of the sport, followed by a more rapid change during its development stages as the sport progressed, and leveling off of records in the later years once the sport started getting perfected. Although the logistic curve seemed reasonable for modeling, it was identified that the Gompertz curve was the model of "best fit" for predicting the threshold limits. The form of the Gompertz curve facilitates the prediction of thresholds because it asymptotically approaches the upper bound and unlike the logistic curve, it is not symmetric about the inflection point (Kuper and Sterken, 2008).

After the Gompertz curve was selected, a four parameter growth model was produced to represent the rate of change of world records with respect to time. This model was then utilized on the data for five

events previously mentioned (100 m 200 m, and 400 m, long jump and shot put). The Gompertz curve growth model is given by:

$$Y_T = a + (b - a)e^{-e^{-c(T-d)}}$$

The lower asymptote (slowest time or measurement) is represented by a . The upper asymptote (fastest time or measurement) is represented by b . The growth rate of the times and measurements is denoted by c . The point of inflection of the produced curve is represented by d . The last component T represents the current year.

The implied limit values are computed as such:

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)e^{-e^{-c(T-d)}}$$

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)e^{-\frac{1}{e^{c(T-d)}}}$$

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)e^{-\frac{1}{\alpha}}$$

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)e^{-0}$$

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)1$$

$$\lim_{T \rightarrow \infty} Y_t = a + (b - a)$$

$$\lim_{T \rightarrow \infty} Y_t = b$$

Graphical output of the Gompertz curve and implied limit values were produced for the selected events and reviewed to ascertain the reasonableness of the fit. Produced R^2 values were used to assess how much variation is explained by the model and whether the limit values were reasonable estimates.

IV. RESULTS

The Gompertz curve was used to compute limit values for the following events: 100 m 200 m, 400 m, long jump, and shot put. The computed thresholds and their associated R^2 values for each event tested are listed in Table 1.

Table 1: Computed Limit Values

<i>Event</i>	<i>Men</i>	R^2 (men)	<i>Women</i>	R^2 (women)
100 m	9.36	.9668	10.06	.9513
200 m	18.69	.9325	21.32	.9894
400 m	40.58	.9516	47.54	.9549
Long Jump	29 ft 5.15 in	.9511	27 ft 0.41 in	.9552
Shot Put	77 ft 8.28 in	.9840	76 ft 9.65 in	.9636

World record data on the five tested events for men and women were fitted through the Gompertz curve for modeling. The figures below show the data for each event that is fitted through the Gompertz curve from the first world record until the year 2014.

Figure 1: Men's 100 m

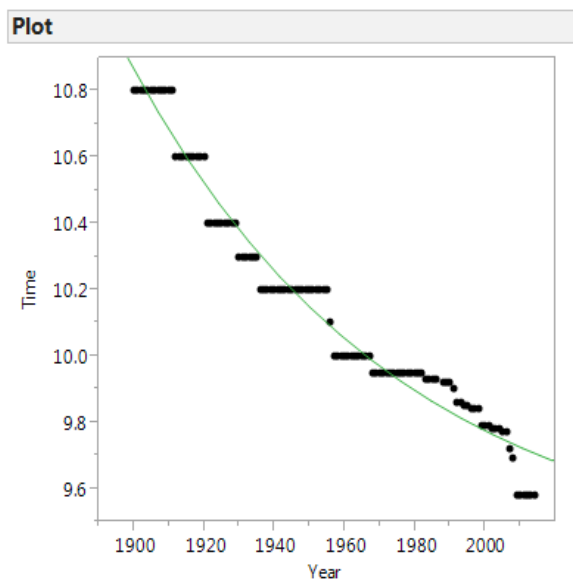


Figure 2: Women's 100 m

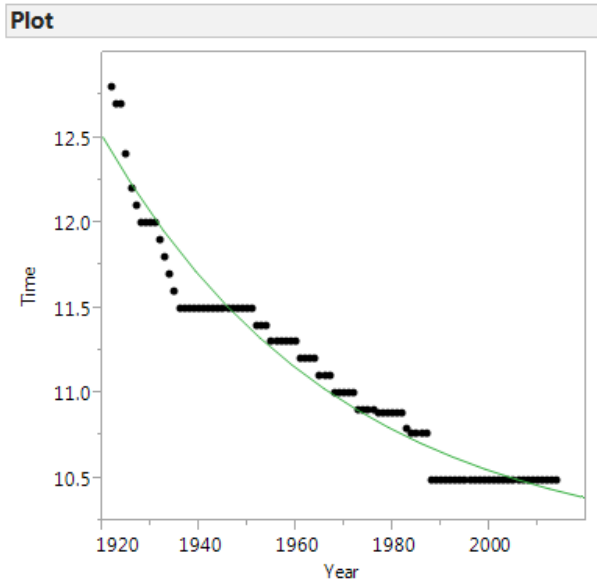


Figure 3: Men's 200 m

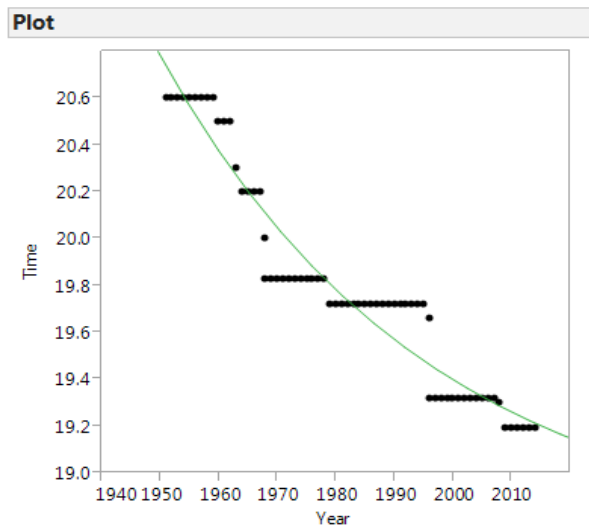


Figure 4: Women's 200 m

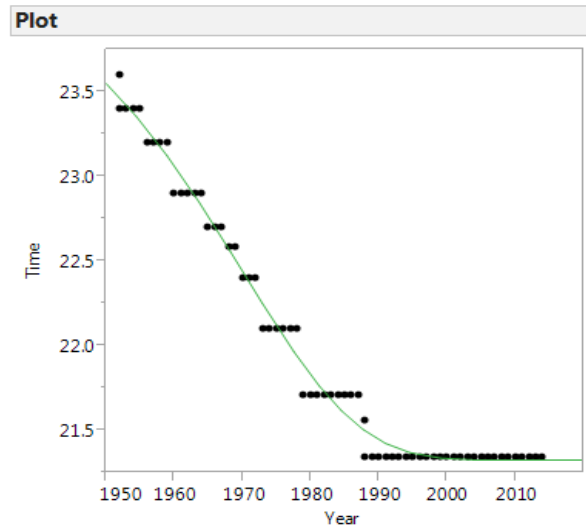


Figure 5: Men's 400 m

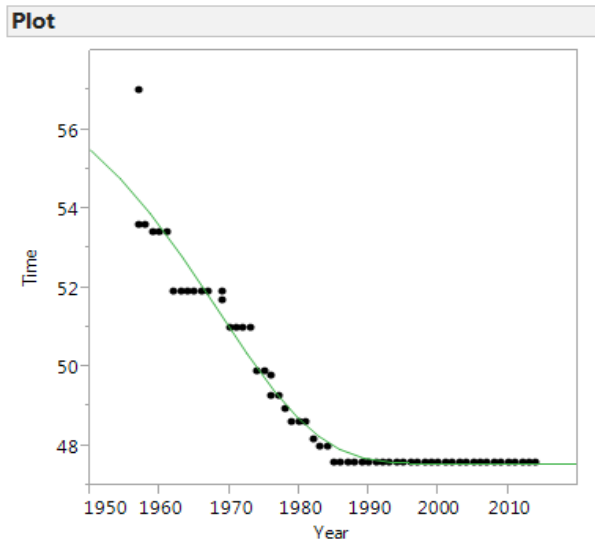


Figure 6: Women's 400 m

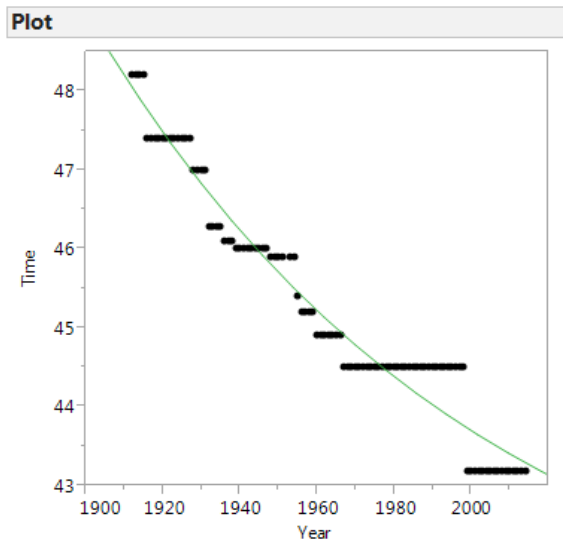


Figure 7: Men's Long Jump

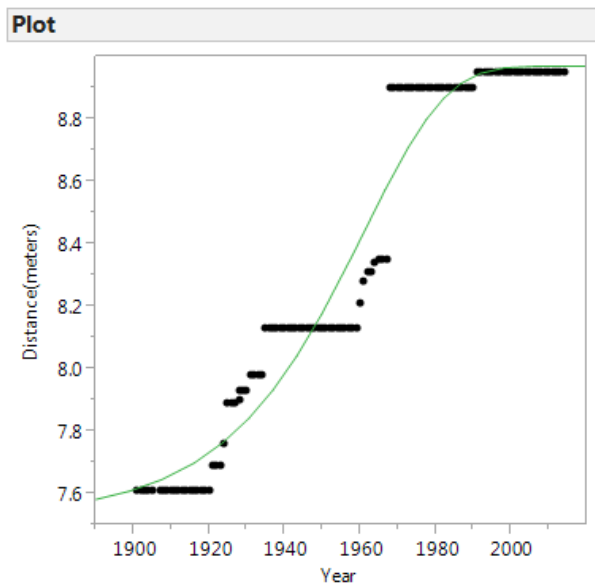


Figure 8: Women's Long Jump

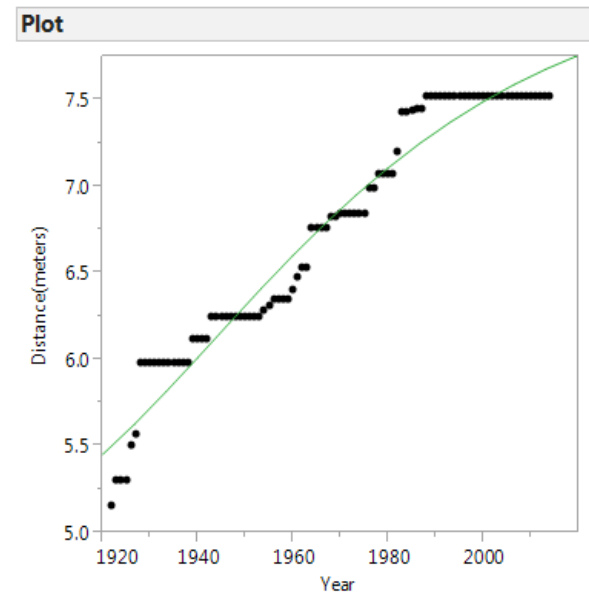


Figure 9: Men's Shot Put

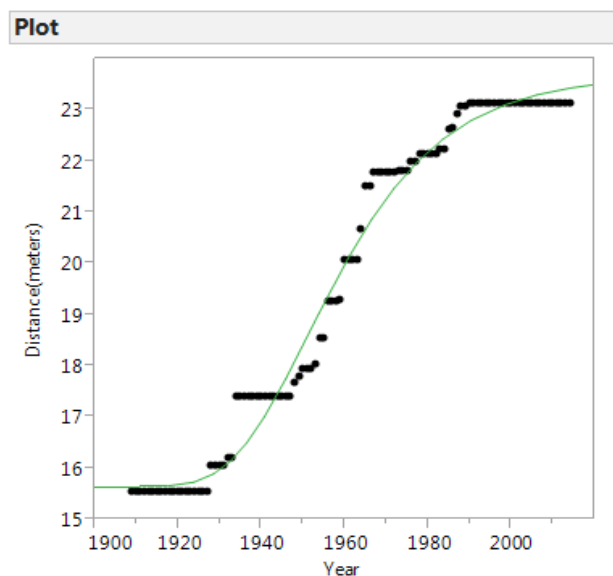
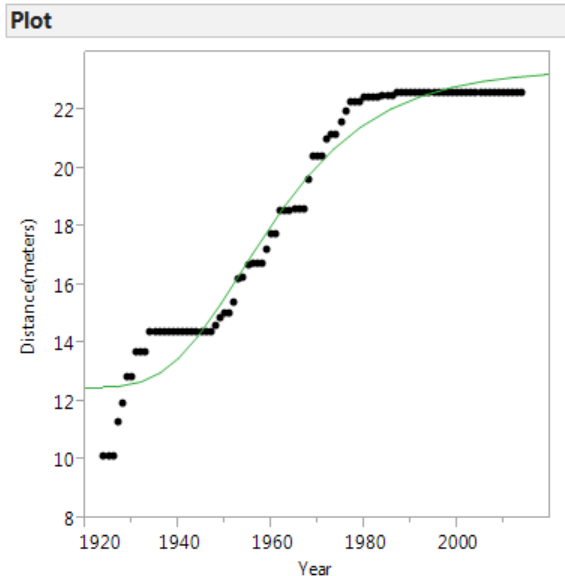


Figure 10: Women's Shot Put



V. DISCUSSION

Data was analyzed by the Gompertz model and computed limit values were produced indicated by the upper asymptote. These computed limit values were checked visually by the produced curve to see how well it fit the data. R^2 values were then evaluated to check whether there is a large variation of the data that is explained by the model, which could indicate that these computed limit values were “reasonable.” All of the produced R^2 values were between 0.9 and 1 which proved a very strong amount of variation that was explained by the Gompertz model. These R^2 values and curve fittings demonstrated that the Gompertz curve was a sufficient choice for modeling world record data and that the computed limit values were reasonable estimates.

Sensitivity analysis of three scenarios were then conducted on the men's and women's 100 M to demonstrate if these implied limit values will hold over time. These scenarios included extending the current world record by one hundred years, deleting the current world record holder's time and using the previously documented world record for computation of limits, and examining the steroid effect for the men's data by adding Ben Johnson's previous world record time of 9.79 seconds done in 1988. The computed limit values from the sensitivity analysis are represented in Table 2.

Table 2: Computed Limit Values Based on Sensitivity Analysis

<i>Scenario</i>	<i>Men</i>	R^2 (<i>men</i>)	<i>Women</i>	R^2 (<i>women</i>)
Scenario 1: 100 M Current world record extended 100 years	9.55	.9791	10.47	.9648
Scenario 2: Current world record deleted	9.57	.9767	10.65	.9559
Scenario 3: Steroid use	9.28	.9719	***	***

In scenario 1, the researchers extended the current world record for the 100 M as of the year 2015 for one hundred years for both men and women to see its effects on the computed limit values. The current world record for men is 9.58 seconds by Usain Bolt and 10.49 seconds by Florence Griffith-Joyner for the women.

As stated in Table 2, if Usain Bolt's record of 9.58 seconds for the 100 M (set in 2009) stood for one hundred years, the predicted threshold would change from 9.36 to 9.55 seconds. For the women, if Florence Griffith-Joyner's record of 10.49 seconds (set in 1988)

lasted for one hundred years as well, the predicted threshold would change from 10.06 to 10.47 seconds. This scenario demonstrates that the longer a current world record holds, the more the threshold limit gravitates toward that record. The model will keep readjusting itself over time to get closer to that time/measurement unless that record is broken again.

Figure 11: Men’s 100 M Current World Record Extended 100 Years

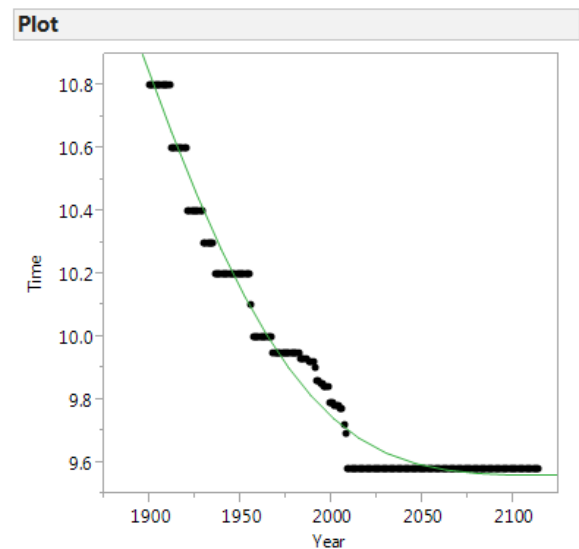
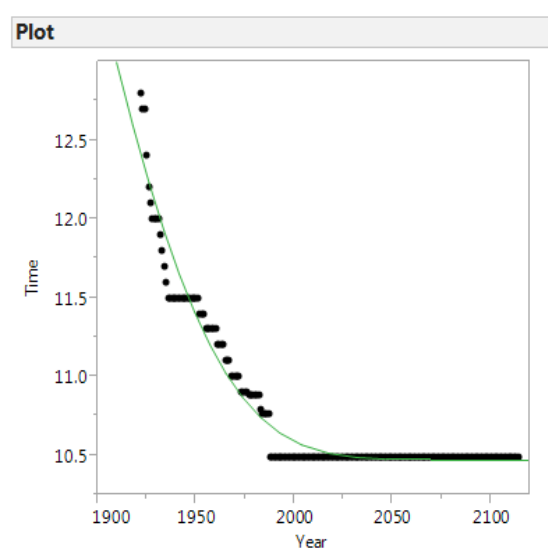


Figure 12: Women’s 100 M Current World Record Extended 100 Years



In scenario 2, there is a special case for the men’s 100 meters since Usain Bolt has both the current and previous world records with the times of 9.69 and 9.58 seconds. For this analysis, it was decided to test the effects if Usain Bolt did not exist at all as a world record holder. The last documented world record holder before Usain Bolt is Asafa Powell with a record of 9.72 seconds (set in 2007). For the women, if Florence Griffith- Joyner had not been a world record holder, the previously documented record holder would be Evelyn Ashford with a time of 10.76 seconds (set in 1984).

Figure 13: Men’s 100 m without Current World Record Usain Bolt

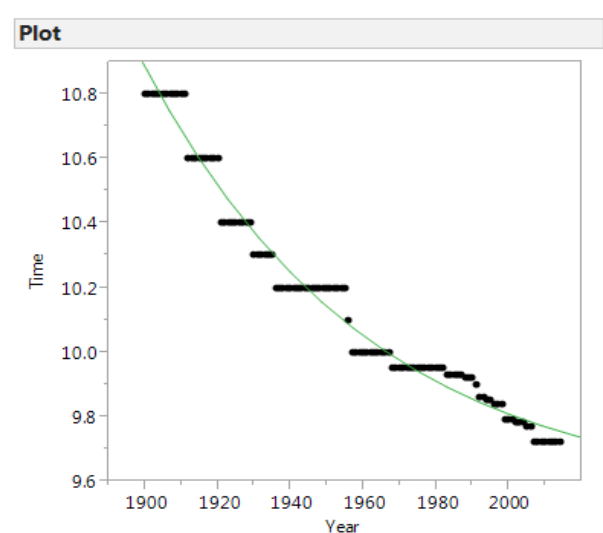
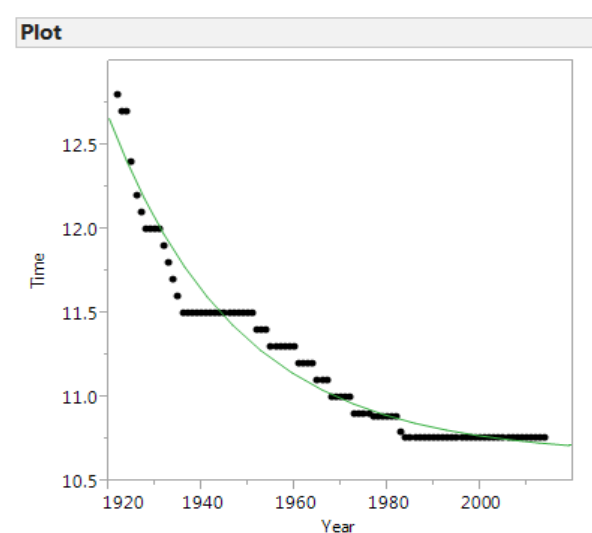


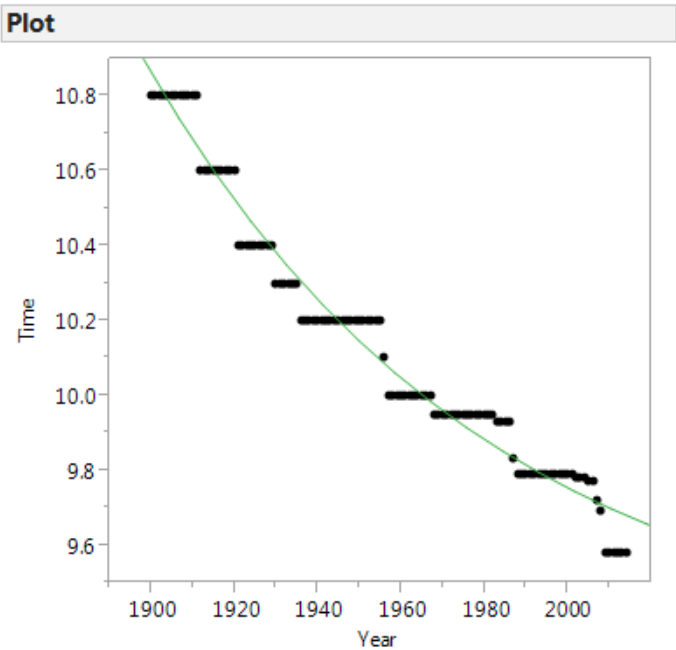
Figure 14: Women’s 100 m without Current World Record Florence Griffith - Joyner



Without the times of Usain Bolt and Florence Griffith-Joyner in the data used to predict the limit values, the limits would readjust and the new computed thresholds for the 100 M would be 9.57 seconds for the men and 10.65 seconds for the women (Table 2).

In the third and final scenario conducted using sensitivity analysis, steroid use was infused into the data to see its effects on the thresholds. Since this research deals strictly with world record data, the women were not used for this scenario. The only clear indication of steroid use in track and field is whether an athlete's world record is removed due to positive detection of steroids. There has not been any documented indication of steroid use for women involving world records. However, for the men's data Canadian runner Ben Johnson's world record of 9.79 seconds for the 100 M (set in 1988) that was stripped away due to the positive testing for anabolic steroids, was added to the data for new limit value computation (Cashmore, 2010).

Figure 15: Men's 100 m with Ben Johnson's Record



The inclusion of Ben Johnson's record appeared to have an effect on the threshold limit but not the curve itself. The Gompertz curve readjusted itself allowing for more performance improvement of future athletes. The limit value decreased from the originally predicted 9.36 to 9.28 seconds (Table 2).

After computing these limit values using both the original and altered data, it was found that there can be a wide range of computed limit values for track and field events. While in theory a definite limit value for track and field events exists, there is a level of uncertainty embedded in the Gompertz model since human performance fluctuates over time. Due to this uncertainty in human performance, thresholds for track and field events can change over time as well. This uncertainty in performance can also affect the prediction of when threshold limits will be met. Given the high R^2 values and curve fitting from the acquired data, it is believed that the computed limit values listed in Table 1 are reasonable estimates. However, due to this unpredictability in human performance, which was proven through sensitivity analysis in Table 2, it is shown that the original thresholds predicted by the researchers are not definite.

In summary, assuming that there is a limit in human performance, the researchers used the Gompertz curve as the chosen analytical technique to develop a model of world records over time and predict thresholds. Thresholds were computed using a four parameter growth model for the five selected events (100 M, 200 M, 400 M, long jump, and shot put) for both men and women. Given that the curve appeared to fit the data for these events quite well and all of the produced R^2 values were over 0.9, the researchers assumed that the predicted limit values were reasonable (Table 1). However, after sensitivity analysis was completed on the performance of the model, fluctuation in human performance proved a level of uncertainty is embedded in the model process (Table 2). Therefore, predicted threshold limits for track and field events are not definite and can vary over time.

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Childhood Antecedents of Perfectionism: Implications for Self-Esteem, Self-Confidence, and Life Satisfaction



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Larry Burns
Faculty Mentor

The purpose of the present study was to investigate possible origins of perfectionism with specific focus on the parental influences that may contribute to its development. Additionally, we aimed to further assess the potential adaptive benefits and maladaptive symptoms associated with positive and negative dimensions of perfectionism.

Familial variables, such as family environment and parenting style, have consistently been implicated as factors greatly influencing the development of perfectionism. It has been proposed that positive (i.e., adaptive) forms of perfectionism develop as a result of appropriate modeling, close relationships with emotionally important people, and encouragement from parents (or other significant people in a child's life) while negative (i.e., maladaptive) forms of perfectionism are fostered in disapproving environments with inconsistent or conditional approval and unrealistic parental demands and expectations. Furthermore, investigations into the origins of perfectionism have also implicated parental authority style (e.g., authoritarian, authoritative, and permissive) as a significant factor to the development of perfectionism.

In the study participants completed measures of perfectionism, parental authority styles, self-esteem, self-confidence and satisfaction with the self and life. It was hypothesized that authoritarian parenting would be correlated with negative perfectionism and authoritative parenting style would be correlated with positive perfectionism. Additionally, it was hypothesized that positive perfectionism would predict higher levels of self-esteem, self-confidence, and satisfaction with life, while negative perfectionism would have an inverse relationship with these variables.

As expected authoritative parenting style was correlated with positive perfectionism. This finding is in line with the current literature that suggests positive perfectionism is fostered in a democratic,

warm, responsive environment in which the child's self-reliance and autonomy are encouraged. Additionally, authoritarian parenting was positively associated with negative perfectionism. This is consistent with existing theoretical models that suggest negative perfectionism is learned during childhood in a demanding, harsh, overly critical environment where approval is based on an exceptional performance. We further hypothesized that positive perfectionism would predict higher levels of self-esteem, self-confidence, and satisfaction with life, while negative perfectionism would have an inverse relationship with these variables. As expected, our hypotheses were mostly confirmed by the data.

Overall these findings suggest that individuals who were raised by punitive, overly critical parents in a demanding environment not only develop perfectionist tendencies apparently motivated by a fear of negative evaluation, but they also report lower levels of self-esteem, less self-confidence, and feelings of dissatisfaction with themselves and their lives in general. On the other hand, individuals raised by parents who set appropriate limits, along with providing positive feedback consistently, reported higher levels of healthy perfectionist strivings motivated by the rewards of success. Correspondingly, children who reported being raised by authoritative parents also reported higher self-esteem, a greater degree of self-confidence, and were more satisfied with themselves and with the overall quality of their lives.

Social Influence and Information Processing as Moderators of a Narrative Message about Skin Cancer



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Tanning is popular yet has many negative health effects including an increased risk for skin cancer. In this study, we used a narrative message to increase risk perception of skin cancer and change behavior intentions for tanning. Social influence (i.e., social norms and social pressure) and information processing may play a role in how people internalize a narrative message and were therefore examined as moderators.

Ninety-seven participants were told that they were participating in two different studies, but in reality, the studies were connected. First, they were randomly assigned to complete sentence tasks designed to activate a cognitive or experiential processing system. For each sentence scramble task, participants saw 30 sentences. For the experiential task participants saw the words pajamas, her, was, warm, and approach. They were instructed to use four out of the five words in order to form a grammatically correct sentence. In this example the correct sentence is “her approach was warm.” For the cognitive task, participants saw similar words, but this time, the word “warm” was replaced by “systematic.”

After completing the sentence task, participants were asked to read a one-page narrative about a young woman who notices a change in her skin and decides to talk to her doctor about her risk of skin cancer. The narrative included various facts about skin cancer as well as a color photograph of a young woman.

After reading the narrative, participants completed a survey that assessed their tanning behavior intentions and risk perceptions. To assess social norms and social pressure, we also asked participants about their close friends’ tanning behaviors and attitudes. We hypothesized that people who reported a greater number of friends who tanned or felt more social pressure to tan would also report higher risk perceptions and behavior intentions after reading the narrative message. Further we expected

that when an experiential processing system was activated, participants who reported greater social norms and social pressure would report the highest risk perceptions and behavior intentions.

Linear regression was used to examine the effects of information processing and social influence on risk perceptions and behavior intentions. Across all risk perceptions and intentions, there were no significant effects of information processing. However, significant effects emerged for social influence. Across both social norms and social pressure, there were significant effects on comparative risk perceptions. These effects showed that as more friends tanned and increased pressure was felt, participants felt more at risk than an average person of their race, age, and gender. Another effect was that the more frequently pressure to tan was felt, participants saw themselves at an increased risk for skin cancer across every measure tested. Next, interactions between information processing and social influence on risk perceptions and intentions were examined. Only social pressure interacted with information processing to increase risk perceptions, but the trend only approached significance.

This research contributes to knowledge about developing effective interventions against tanning in the future. It also adds to the literature on narrative messages as a means to motivating healthy behaviors.

Relational ordinary conversation, relational perceived support, and affect: A replication study



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Individuals who perceive that family and friends will assist them in times of need (high perceived social support) have better mental health than individuals with low perceived social support. This is shown in various studies and reviews such as Finch, Okun, Pool, & Ruehlman (1999) where those with low perceived social support had higher negative affect and lower positive affect than those with high perceived support. In addition, those with low perceived social support were at a higher risk for major depression disorder than those with high perceived social support (Lakey & Cronin, 2008), and were more likely to have severe post-traumatic stress disorder symptoms (Brewin, Andrews, & Valentine, 2000). Moreover, those with low social support displayed higher rates of psychotic symptoms (Gayer-Anderson & Morgan, 2013) and a higher frequency of non clinical psychological distress (Barrera, 1986; Cohen & Wills, 1985).

Stress and coping theory (Lazarus & Folkman 1984) dominates much of social support research. Lazarus & Folkman (1984) describe how social support buffers the effects of stressors through the receipt of supportive behaviors (i.e., enacted support). These supportive actions must meet the demands of the stressor in order to alleviate the effects of stress (Barrera, 1986; Cohen & Wills, 1985). Stress buffering effects are interactions between support and stress. This enacted support thus buffers the effects of stress (Cohen & Hoberman, 1983; Cutrona & Russell, 1987).

Although stress and coping theory is appropriate for explaining stress buffering effects, it would be problematic in applying it to main effects (Lakey & Orehek, 2011). Besides the fact that stress buffering effects and main effects are different conceptually, perceived social support does not have a strong correlation with enacted support (Barrera, 1986; Haber, Cohen, Lucas & Baltes, 2007). Also those who receive enacted support rarely have better mental health (Finch et al., 1999). In fact, enacted support is

frequently linked with poor mental health (Bolger, Zucherman, & Kessler, 2000). Lastly, the main effects for perceived social support and mental health are larger and replicated more consistently than do stress buffering effects (Lakey & Orehek, 2011). This then suggests that stress and coping theory does not adequately explain the main effects between perceived social support and mental health.

In contrast, RRT (Lakey & Orehek, 2011) seeks to explain the main effects between perceived social support and mental health. RRT claims that recipients use ordinary social interactions (i.e., ordinary conversation and shared activity) with providers to regulate their own affect, behavior, and thoughts on a continual basis. These ordinary conversations include a range of topics such as sports, TV, games, relationships, or activities like watching movies, going on vacation, cooking, and exercising. Although these interactions and activities are ordinary, RRT asserts that such interactions are impactful in creating a link between mental health and perceived social support. RRT emphasizes that what regulates a recipient's affect is not the same from recipient to recipient—that is regulation is relational. For example, singing might regulate one person's affect well but singing might have the opposite effect for another individual.

There is indirect evidence for the role of ordinary conversation in perceived support's link to mental health. For example, generic relationship quality could account for the correlation between low distress and perceived support when enacted support was absent (Kaul & Lakey, 2003; Mak, Bond, Simpson, & Rhoads, 2010). Other researchers found that talking about stress and coping strategies was not linked to better mental health but talking about positive situations was (Hicks & Diamond, 2008), and that regular day to day conversations correlated with positive affect and relational satisfaction (Mehl, Vazire, Holleran, & Clark, 2010;

Schrodt, Soliz & Braithwaite, 2008). In addition, adjustment correlated highly with activities where relaxation and leisure were prominent, but enacted support was not (Hays & Oxley, 1986). Clark, MacGeorge & Robinson (2008) found that friendship was preferred over receiving enacted support from a provider. In addition, enacted support was less correlated with positive mental health than was companionship (Rook, 1987). The results from the literature seem to support the claims of RRT, but more research is needed. Many of the studies were not developed to assess the predictions of RRT. For example, in Kaul and Lakey (2003) generic relationship quality was studied but could not indicate the type of activities that facilitated the main effects between perceived support and mental health. Moreover, many of these studies did not test whether ordinary social interactions could account for the main effects between perceived social support and mental health.

The cornerstone of RRT is that perceived support and affect regulation is relational (i.e., what regulates a person is a reflection of the individual's unique idiosyncrasies). RRT uses the same definition of relational as the Social Relations Model (SRM; Kenny, 1994; Kenny, Kashy & Cook, 2006). Relational social support occurs when a recipient perceives a provider as more supportive than the recipient usually sees other providers and more supportive than the provider is usually seen by other recipients. For example, Tom (recipient) sees Justin (provider) as more supportive than he typically sees other providers. Tom (recipient) also sees Justin (provider) as more supportive than other recipients typically see Justin (provider). The equation: $R_{ij} = X_{ij} - R_i - P_j + M$ is how relationship effects are quantitatively defined. X_{ij} is recipient i's rating of provider j in regards to supportiveness quality. R_i is recipient i's rating of other providers in regard to their supportiveness quality, P_j is provider j's average supportiveness rating from all recipients, while M represents the grand mean.

The reason for such an emphasis on relational effects in RRT is that perceived social support is primarily relational (i.e.,

a matter of personal taste). Roughly 62 % of the variance explained in perceived social support is relational according to a recent meta-analysis (Lakey, 2010). This finding is replicated in studies where Dutch and Italian families rated each other on supportiveness (Branje, van Aken, & van Lieshout, 2002; Lanz, Tagliabue, & Rosnati, 2004), United States sorority sisters rated each other (Lakey, McCabe, Fiscaro & Drew, 1996; study 2), and British athletes rated the supportiveness of their coaches (Rees, Bell, & Bunney, 2012).

Moreover, the SRM defines not only relationship effects but also perceived social support's trait-like effects—Recipient and Provider effects. A recipient effect denotes a recipient's tendency to perceive providers as more or less supportive in comparison to other recipients, even though each recipient is rating the same providers. This is a characteristic of the recipients themselves rather than the qualities of providers. A provider effect is a provider's tendency to be rated consistently as either more or less supportive by recipients. This indicates the objective qualities of the provider as far as objectivity is measured through agreement among observers regarding a particular behavior. Both effects show the characteristics of the individual (i.e., some recipients are more or less lenient on their evaluation of others, while providers are either better or worse at being supportive). These effects are smaller than relationship effects; provider effects account for 7% and recipient effects account for 27% of the variance in perceived support (Lakey, 2010). Consequently, perceived support is largely relational but also involves the recipient's unique tendency to see others as more or less supportive. Also, there appears to be a small agreement among recipients on who is more or less supportive.

The claims of RRT are this: the main effect between perceived social support and affect primarily emerges through ordinary social interactions between recipients and providers. Testing this claim is the core of the current study. Affect was determined to be a construct of interest (i.e., both positive and negative affect) for it plays a major role in DSM defined anxiety and depressive disorders

which are two of the most common psychological disorders found in the general population (Clark & Watson, 1991; Watson, Clark, & Carey, 1988).

Method

Participants

This current replication is based on a subset of an existing dataset gathered during the winter of 2014 and consists of college roommates who have lived together for 3 months or more. Roommates were selected as our subjects because the design requires a sample that knows each other well enough to complete the measures of perceived support, affect, ordinary conversation, and perceived similarity.

Procedure

A round robin study was conducted consisting of 10 groups of four roommates who rated one another on supportiveness, affect when with a roommate, ordinary conversation quality, and perceived similarity with each roommate. This was conducted in a laboratory where each roommate sat at a desk that was distanced from the other three roommates so that ratings could not be observed. Each roommate was given a lanyard around his or her neck that had a number distinguishing each of the four roommates being rated. Participants were informed that roommates and social support are the topics of interest. Subjects were also given consent forms and other general information regarding the study.

Measures

Social Provisions Scale (Cutrona & Russell, 1987) was utilized to measure perceived social support. Participants rated one another on supportiveness. Items from this scale included "I have a sense of emotional security and well-being with this person," "This person viewed me as competent," and "I lacked a feeling of intimacy with this person."

Affect was measured through The Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) which includes words such as "interested," "irritable," "hostile," and "attentive" and asks participants to rate the extent to which they felt these emotions when

in conversation with each roommate. Ratings ranged on a 5 item scale (A-E), with A being “slightly or not at all” to E being “extremely.”

Quality of ordinary conversation was measured through the Ordinary Conversation Scale by Lakey et al. (in press). The questionnaire has items such as “I enjoy talking with my roommate because we have interesting conversations that last a while,” “It is difficult to find something that both of us like to talk about,” and “conversations with my roommate usually end quickly.”

Perceived Similarity Scale (Lakey et al., 1996) was used to measure the perception of similarity between roommates. Items on this scale included “This roommate is similar to me in values,” “This roommate is similar to me in hobbies and interests,” and “This roommate is similar to me in life experiences.”

Statistical Analysis

Moreover, the strength of recipient effects, provider effects, and relationship effects, were assessed with a round robin design. In addition, the correlations between constructs for all three effects were assessed. In this study, our main goals were to determine whether perceived social support and ordinary conversation were primarily relational and whether ordinary conversation shared the same pattern of correlates with ordinary conversation, perceived similarity, and affect, as does perceived social support. SPSS was used to compute correlational results, and SOREMO calculated relational, recipient, and provider effects (Kenny, 1998).

Results

Perceived support was primarily relational, accounting for 56% of the variance, with a recipient component accounting for 29%, and provider effects accounting for 13%; $p < .05$. Ordinary conversation was primarily relational as well, with a relational component of 60%, recipient effect of 20%, and provider influences of 18%. Positive affect was comprised of recipient effects primarily but had statistically significant provider and relational influences. Recipient effects were 73%, provider effects were

.09%, and relational influences were 17%; $p < .05$. Negative affect primarily reflected recipient effects as well denoting 47% recipient influences, .06% provider influences, and 45% relational influences; $p < .05$. Perceived similarity also reflected mostly recipient effects. Recipient effects were 45%, provider influences were at 19%, and relational effects were at a statistically significant 35%; $p < .05$. See table 1.

Moreover, it was found that the relational component of perceived support was significantly correlated with ordinary conversation ($r = .69$), positive affect ($r = .57$), low negative affect ($r = -.36$) and perceived similarity ($r = .81$). Furthermore, relational ordinary conversation was correlated with positive affect ($r = .50$), low negative affect ($r = -.36$), and perceived similarity ($r = .76$). In addition, positive affect had a highly inversed correlation to low negative affect ($r = -.64$) and a moderate link with perceived similarity ($r = .31$). Finally, negative affect was inversely correlated with perceived similarity at ($r = -.37$). All effects were statistically significant at $p < .05$.

Discussion

In this study I sought to assess the claims of RRT that perceived support and ordinary conversation were primarily relational and that relational ordinary conversation shared similar patterns of correlates with relational perceived social support. Our findings were that perceived support and ordinary conversation were primarily relational, which is confirmed not only by Lakey et al. (in press), but also in a recent meta-analysis (Lakey, 2010).

Furthermore, results showed that when a recipient saw a provider as unusually supportive, the provider elicited unusually high ordinary conversation, high positive affect, low negative affect and high perceived similarity to the recipient. In addition, when a provider elicited unusually good ordinary conversation with a recipient, the recipient also experienced high positive affect, low negative affect, and high perceived similarity when with the provider. Additionally, when a provider brought out unusually high positive affect in a recipient, low negative affect also was elicited, along with high perceived

similarity. Lastly, when a provider elicited unusually high negative affect in a recipient, the recipient found the provider to be unusually dissimilar to him or herself. All of which align with Lakey et al. (in press).

Various limitations impacting the project certainly emerged. Due to the fact that the current project had a 12 week time constraint, I was limited to using a sample of an existing data set of college roommates rather than gathering a new sample. Related to this point is that the sample size used in this project was smaller than desired, which may have buffered some effect sizes. Lastly, a major prediction of RRT is that through ordinary conversation and shared activity, perceived support and affect simultaneously emerge. The analysis used to assess whether perceived support and affect emerged from ordinary conversation was not conducted due to time restraints.

In the midst of such limitations, the current results are still essential in informing social support's link to mental health. The findings are necessary for supporting the main predictions of relational regulation theory, that (a) people regulate their affect on a continual basis through ordinary conversation and shared activity and (b) that regulation of affect and perception of family and peer supportiveness is primarily a matter of an individual's personal tastes (i.e., relational). This research could prove informative to mental health clinicians, as well as the implementation of mentorship programs. Moreover, this research may greatly inform intervention practices for mental health practitioners across various disciplines such as social work, clinical psychology, as well as counseling psychology. Finding perceived support to be primarily relational may also imply potential interventions such as forecasting uniquely supportive relationships that bring about more favorable mental health for individuals. The current research team's future project will involve forecasting uniquely supportive relationships, which may prove to be a useful intervention practice for those in need.

Appendix

Table 1

Proportion of Variance	
PSS	
Recipient	0.29
Provider	0.13
Relational	0.56*
OrdConv	
Recipient	0.20
Provider	0.18*
Relational	0.60*
PA	
Recipient	0.73
Provider	0.09*
Relational	0.17*
NA	
Recipient	0.47
Provider	0.06
Relational	0.45*
SIM	
Recipient	0.45
Provider	0.19
Relational	0.35*

* $P < .05$

Table 2

Relational Correlations among Constructs

	PSS	OrdConv	PA	NA	SIM
PSS	--	0.69*	0.57*	-0.36*	0.81*
OrdConv		--	0.50*	-0.36*	0.76*
PA			--	-0.64*	0.31*
NA				--	-0.37*
SIM					--

* $P < .05$

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Interaction of tetraspanin KAI1/CD82 and tetraspanin CD151 in hepatocyte growth factor c-Met receptor regulation in prostate cancer cell lines



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Cancer is a complex disease that is not well understood and alarmingly, according to a recent UK study published in 2015 in the British Journal of Cancer, one in two people will be diagnosed with the tragic disease. Understanding the types and stages of cancer leads the way toward generating effective and efficient treatments. The goals of standard cancer treatments today are incredibly aggressive in order to rid the body of the cancerous cells. These forms of treatment initially appear ideal; however, after further investigation, those methods come with unforeseen consequences and do not take other factors into consideration. In order for a treatment plan to be successful, it must deviate from the “one size fits all” mentality and consider the fact that cancer varies with each individual in regard to genetic mutations, specific protein expression, severity, location, type and etiology of the disease. Today’s standard treatment methods include surgery, chemotherapy, radiation and immunotherapy. A problem that is common in patients receiving these aggressive treatments is that their healthy cells are compromised causing adverse effects. The least recognized yet potentially the most effective of all methods is targeted drug therapy. Targeted drug therapies work by attacking specific cellular signals used by cancer to spread, grow and communicate without affecting healthy cells. For example, through previous studies the cellular signaling pathway of the gene CD82 was discovered to suppress cancer tumor metastasis per regulation of proteins: c-Met and Src kinases. During the studies, CD82 interacted with the gene CD151 and was found to have the opposite effects on metastasis compared to CD82. This pathway could ideally be targeted for the use of drug therapy; therefore, the research on this pathway is imperative.

The research focuses on observing changes in protein interactions involved in metastatic prostate cancer cells: CD151’s association with C-met in the

presence and absence of CD82. The results indicate that the overexpression of CD82 in a metastatic prostate cancer cell line significantly reduces the association and regulation between CD151 and C-met and thus inhibits metastasis at the molecular level. The effectiveness of the study was tested using two techniques that measure the changes in protein level expression called immunofluorescent staining and gel electrophoresis. Immunofluorescent staining allows for the protein expression on the cell surface to be visualized through fluorescent biomarkers. Three separate sets of two proteins were stained with antibodies to be evaluated through immunofluorescent staining. Set 1: CD82 with C-met; Set 2: CD151 with C-met; and Set 3: CD82 with CD151, cellular surface expressions were studied. Understanding the relationship between these three proteins propose a greater potential for understanding the mechanism of metastasis. Analysis of the specific molecules contributing to metastasis could orchestrate the development of successful targeted drug therapies as treatment for cancer. The uniqueness of this study allows for other researchers to piece the discovered information with known information to create a broader understanding in the field of cancer biology.

The Evolution of Military Systems during the Hundred Years War



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The Hundred Years War (1337-1453) was a crucial period in the evolution of European warfare. By the end of the conflict, the traditional means by which Europeans conducted warfare had changed dramatically. The age of the armored knight had essentially ended and military gallantry was replaced with practicality. The war ushered in a new age of warfare; the reliance on feudal levies diminished, making way for more professionalized, standing armies. This shift carried on into the early modern era, which military historians have categorized as a military revolution. The military revolution thesis argues that the emergence of professional, wage based armies, as well as the rising prominence of gunpowder weaponry created an unparalleled period of military innovation. Medieval military historians have successfully linked the Hundred Years War to the military revolution thesis; however, the majority of attention is given to the English. Their initial reliance on paid infantry coupled with an abundance of English centered scholarship has made the English connection to the military revolution clearly defined. French military efforts are discussed only in regard to Charles VII's military reforms that allowed the French to win the war. While Charles VII's military reforms were an important piece of the military revolution, the largely unanalyzed period of French resurgence during the reign of Charles V was just as revolutionary. The reign of Charles V, when France set aside traditional medieval tactics, had a significant influence not only on Charles VII's reforms, but the overarching evolution of European warfare.

In 1955, historian Michael Roberts introduced the idea of a military revolution. Roberts' idea of the military revolution, characterized the early

modern era, particularly 1560-1660, as a period of vast military change. As the medieval period came to an end, new weapons, tactics, and military systems were adopted by European countries. Out of the shadow of feudalism, professional, wage based armies emerged. Unlike the feudal armies of the medieval period, early modern military systems were formed on the idea that they would be standing armies. Though the men who composed these units may not have been professional troops from time of recruitment, prolonged enlistments molded them into highly effective and professional forces. According to Roberts, armies of the early modern era were unlike "a collection of bellicose individuals, in the feudal style; it was to be an articulated organism of which each part responded to the impulses from above."¹ A centralized command structure would prove far more effective than a horde of feudal levies.

Geoffrey Parker, in his work *The Military Revolution*, expanded the concept previously introduced by Roberts. What is particularly notable of Parker's work is the fact that he extended the revolution's reach. In his discussion of the increased reliance on infantry in the early modern era, Parker pays tribute to English archers during the 14th and 15th centuries. During the Hundred Years War, English archers essentially dominated in pitched battles. It was because of the reliance on missile weapons such as the English longbow during the latter medieval period that handheld gunpowder weapons were so attractive to early modern European armies.² Initial analysis of the Hundred Years War, coupled with the reliance on ranged weaponry, reveals that the English were among the first European nations to enter this period of military innovation. Analogous to English strategy at Crécy (1346) and Agincourt (1415), volley

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1. Michael Roberts, *Essays in Swedish History* (Minneapolis: University of Minnesota Press, 1967), 198.
 2. Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West 1500-1800*, 2nd ed. (Cambridge: Cambridge University Press, 1996), 16.
 3. *Ibid.*, 19.

firing became a benchmark of European warfare by the 16th century. These new armies, including those who opposed them, were required to spread themselves out in order to maximize the output of fire and to reduce their own casualties.³ As seen in the English victories of the Hundred Years War, those failing to take the proper precautions against massed missile fire were likely to meet disaster.

Among the most prominent analyses of military change in the Hundred Years War is Clifford J. Rogers' "The Military Revolutions of the Hundred Years War." Rogers argues that the military significance of the Hundred Years War can be attributed to two major revolutions; the infantry revolution and the artillery revolution. The infantry revolution, according to Rogers, is a concept adopted by the English; their use of longbowmen allowed them to dominate in pitched battles. Additionally, Rogers argues that the enfranchisement of men of lesser social status had large effects on the level of battlefield carnage. This large, wage based force, caring little for the chivalric ways of their social superiors, were much more likely to kill their enemy as opposed to capturing him.⁴ This led to tremendous numbers of casualties, particularly among the French, whose armies consisted mainly of feudal levies. Rogers also states that the failure on part of the French to produce an effective force of archers led to many of their failures throughout the war.⁵ According to him, the French would not enter the sphere of military revolution until the reign of Charles VII, when they adopted massed artillery.

Although artillery had been used throughout the war, Rogers argues that the artillery revolution truly manifested itself during the later years of the war and did so primarily in the French military. By 1453, the French were spending more than twice the money on artillery compared to other facets of the military.

This remarkable investment in artillery allowed French commanders to engage in pitched battles with the English without fear of being outgunned.⁶ The large artillery train assembled by the French proved deadly, especially at Castillon in 1453. The military doctrine of Charles VII was one centered on artillery and a large, professionalized standing army. With his newly reformed military, Charles effectively expelled the English from France, bringing an end to the war.

Rogers successfully links the Hundred Years War to the military revolution; however, the period of French resurgence in the latter half of the 14th century is left undiscussed. This is likely due to the small amount of scholarship dedicated to the French. Far more material is available from the English point of view; this influx of Anglo-centric scholarship makes the task of acknowledging French military accomplishments during this time difficult. With a lack of Franco-centric scholarship, biases emerge. An example of this can be seen in a discussion about Bertrand du Guesclin, Constable of France during the reign of Charles V. Du Guesclin, who will later be discussed in detail, carried out a guerrilla war against the English. Dismissal of his tactics is illustrated by French historian Edouard Perroy, who categorized du Guesclin as a "mediocre captain, incapable of winning a battle or being successful in a siege of any scope, just good enough to put new life into the bands of pillaging *routiers*."⁷ While Perroy's work on the Hundred Years War is a useful guide in any study of the war, a broad selection of source material is needed to accurately support the effectiveness of du Guesclin's tactics. The small amount of Franco-centric scholarship makes it difficult to paint an accurate picture of figures such as du Guesclin, regardless of a particular author's nationality. In order to avoid information gaps and cultural bias, a variety of scholarship must be utilized.

The need for French military reform was apparent from the first major engagements. The opening stages of the Hundred Years War proved devastating for the French. The tenacity of Edward III resulted in a resounding victory at Crécy in 1346. Historians have attributed Edward's victory at Crécy to his longbowmen. The longbow, a bow stave nearly six feet long with 100 to 150 pounds of draw force, proved deadly in the hands of a well-practiced Englishman. When positioned in an open field of battle, English longbowmen inflicted heavy casualties against any foe with the zeal to meet them head on. Edward's order of battle at Crécy on August 26, 1346, consisted of two bodies of longbowmen flanking a central force of dismounted men at arms.⁸ The French force under Philip VI, relying heavily on the shock factor of a large force of mounted knights, took heavy casualties as they charged Edward's position. These tactics proved futile, for when the battle was over, nearly 1,500 French knights lay dead.⁹ Crécy was a sign for both sides that the war would not be brief and that the traditional tactics of the mounted knight were becoming obsolete.

With the momentum leaning in favor of England, Edward, the Prince of Wales, otherwise known as the Black Prince, organized a series of raids in 1355 and 1356. His campaigns relied on a strategy referred to as a *chevauchée* (literally translated as cavalcade). The *chevauchée* was a strategy which used the destruction of farmlands, looting, rape, and murder as a means of demoralizing French rural populations and damaging their ability to support an army.¹⁰ Edward's grand strategy proved more lucrative than any Englishman could have imagined; apart from the loot taken from French towns, the English claimed yet another major victory over the French. During the 1356 raid, a French force shadowed the Prince of Wales, looking for the opportunity to

4. Clifford J. Rogers. The Military Revolutions of the Hundred Years' War. The Journal of Military History 57, no. 2 (April 1993): 256.

5. Ibid., 251.

6. Ibid., 274.

7. Edouard Perroy, The Hundred Years War (Bloomington: Indiana University Press, 1959), 148.

8. Jonathon Sumption, The Hundred Years War: Trial by Battle (Philadelphia: University of Pennsylvania Press, 1991), 526-527.

9. Ibid., 528-530.

10. H.J. Hewitt, The Black Prince's Expedition (Barnsley: Pen & Sword Books, 2004), 46.

11. Desmond Seward, The Hundred Years War: The English in France 1337-1453 (New York: Atheneum, 1978), 88-91.

avenge Crécy and the destruction of their lands. The English army positioned itself near the town of Poitiers and waited to receive the French, led by King John II, son of Philip VI. Unlike the French force at Crécy, John's army was almost entirely dismounted. The battle commenced with a French cavalry charge of 300 knights who were given the task of eliminating the English archers, enabling the infantry to approach the English men at arms unchallenged. The cavalry charge ultimately failed and as a result, the infantry attack took merciless fire from the English flanks. As devastating as the arrow fire was, the English struggled to keep the numerically superior French at bay. Fortunately for the Prince of Wales, a force of 150 mounted men at arms and archers under the Captal de Buch, hit the French from behind. John's army, thinking the Captal's troops were more numerous than they actually were, retreated in confusion.¹¹ The battle of Poitiers was a humiliating French defeat that resulted in the capture of King John II. The simple act of dismounting the army was far from the military reform France required. These tactical shortcomings allowed the English to expand their holdings in France to more than twice what they had been prior to 1337. However, with John II out of the picture, his son Charles took control. Charles, unlike his predecessors, knew how to neutralize the combat effectiveness of an English army. It was during his reign that France set aside the chivalric ideals of medieval warfare and began to fight a different war.

Edward III's last campaign in 1359 saw the early stages of a new French strategy. The campaign was an immense logistical undertaking. Knowing that the French countryside, particularly the Champagne region, was devastated by the conflict, Edward arranged a supply train of over 1,000 wagons.¹² Edward's 10,000 man force set out from Calais on November 4th 1359; less than two weeks

into the campaign, supplies dwindled. In order for Edward to effectively maintain his army, foraging became necessary; however, the French Dauphin Charles (who would later become Charles V) made foraging increasingly difficult. In his strategy to combat Edward's advance, Charles adopted a scorched earth policy. At the command of the Dauphin, the French countryside in the path of the English army was abandoned and burned; the citizens who lived in these areas were ordered to take what supplies they could carry and move into larger fortresses. Supplies that the inhabitants could not carry were burned, denying Edward's army the supplies they desperately needed. The French populace lying in the path of the English advance stayed within the confines of fortresses. Additionally, mounted troops were often sent forth from the towns to harass English foragers.¹³ With this simple, yet prudent strategy, Charles began to effectively neutralize the English force. Without proper supplies, Edward's time in France became increasingly limited, creating a dire need for a tactical victory.

The need for logistical support turned Edward's grand campaign from one of conquest to one of desperation. From December 4, 1359 to January 11, 1360, Edward's army encircled the city of Rennes. Fortunately for the city's defense, Charles' scorched earth policy left the besiegers lacking in supplies. Having failed to take the city by storm in January, Edward was forced to retreat.¹⁴ Logistical deficiencies kept Edward's army relatively inactive until early March when they moved toward the city of Paris in hopes of forcing Charles to sue for peace. On April 7, Edward's army arrived just south of Paris to find that the Parisians had burned the southern suburbs of the city and retreated behind the walls. For several days, the English attempted to draw the French army into the open; the dauphin's troops did not take the bait. On

April 12, after failing to bring the French to battle, Edward withdrew from the city. By the end of the month, Edward's forces had reached their breaking point, forcing Edward to call a diplomatic meeting, one which resulted in the treaty of Brétigny.¹⁵ Charles' strategy had not only prevented a disaster the likes of Crécy, it had also birthed a period of French military reform.

Though the English had not suffered a devastating loss on the level of Crécy or Poitiers, the invasion of 1359 was largely a failure. The Dauphin Charles had learned from the mistakes of his father and grandfather. The scorched earth policy Charles enacted took the initiative away from the English who, due to their difficulties in supplying large armies, depended on foraging for survival. If Crécy and Poitiers had taught the French anything, it was that the current French military system was unfit for open field combat with English archers. While one can attribute Charles' unwillingness to fight a pitched battle to a possible lack of manpower following the disaster at Poitiers, the effectiveness of his strategy cannot be ignored. The English invasion of 1359 proved that the French were clearly capable of success as long as they possessed a willingness to adapt. Although Charles' military doctrine was just beginning to form during this time, it was clear that under his authority, France had a fighting chance.

The Treaty of Brétigny introduced a period of peace as well as a new challenge for the French monarch. The state of the English economy was such that maintaining a large standing army was out of the question. Bands of unemployed mercenaries who had previously fought in English armies, known in France as the *routiers*, wrought havoc amongst the French populace. What made these "free companies" particularly threatening was the fact that they were professional soldiers. Composed of English, Breton,

12. Jonathon Sumption, *The Hundred Years War: Trial by Fire* (Philadelphia: University of Pennsylvania Press, 1999), 425.

13. *Ibid.*, 427

14. *Ibid.*, 431

15. Sumption, *Trial by Fire*, 442-444.

16. Perroy, *The Hundred Years War*, 154.

17. *Ibid.*, 155.

18. Seward, *The Hundred Years War*, 106.

19. Richard Vernier, *The Flower of Chivalry: Bertrand du Guesclin and the Hundred Years War* (Woodbridge: The Boydell Press, 2003), 21.

Spanish, and German mercenaries, these companies ran rampant through the French countryside.¹⁶ The *routiers* made their living in the exploitation of civilians; their activities included kidnapping French citizens for ransom, storming towns and villages, selling safe passage on the roads, as well as theft of food supplies.¹⁷ The *routiers* also had a tendency to form large groups known as the “Grand Companies”. These companies such as those led by the infamous Arnaud de Cervole, the Archpriest, accrued large amounts of wealth from the relentless theft and murder of French civilians.

During the early 1360s, the French government lacked the power to solve the *routier* problem militarily. The absence of a French response forced lords to pay these companies off in order to prevent the destruction of their property. Other than a crusade against the Turks that never materialized, few efforts were made to rid France of the *routiers*.¹⁸ Luckily for Charles, the year 1365 presented him with an opportunity to solve the problem of the companies. Rather than attempting the laborious task of quelling the *routiers* by force, Charles incorporated them into the expeditionary force sent to the Iberian Peninsula to fight a war of succession in Castile. The man who led this army thrived in the warfare style of the *routiers*; his name was Bertrand du Guesclin.

Du Guesclin, unlike the common French lord, was not born into gallantry. The only surviving record of his childhood shows that his parents wished him dead, for he was an especially ugly child.¹⁹ An outsider from birth, du Guesclin found solace in warfare and violence. Rising to prominence during the Breton Civil War, du Guesclin proved that he was more than capable of effectively fighting the English. One of

the most notable of Bertrand’s exploits during this time was performed during the siege of Rennes in 1342. The English-held city was retaken by du Guesclin in a manner uncustomary to the chivalric ways of the time. Posing as woodcutters, du Guesclin and his men were admitted into the city. Upon entry du Guesclin and the accompanying force dispatched the English garrison.²⁰ This Trojan horse style of fighting exemplified du Guesclin’s military ethos. Throughout the early stages of his military career, du Guesclin made a name for himself as a guerrilla fighter. It was only fitting that Charles V, whose military practices in 1359 reflected this asymmetrical warfare, went to him for assistance in ridding France of the *routiers*.

War between England and France perpetuated well beyond the boundaries of the two respective countries. In the latter half of 1365, civil war erupted in the Iberian country of Castile. France had been on good terms with the Castilians until Charles V’s sister-in-law Blanche de Bourbon, wife to the unfaithful King Pedro of Castile, died by mysterious circumstances. To deteriorate relations further, Pedro (often referred to as Pedro the Cruel) signed a treaty, aligning himself with King Edward III.²¹ The French would seek recompense for the death of Blanche de Bourbon, the demise of Pedro, and the accession of Enrique de Trastamara, an illegitimate son of Pedro I’s father, to the throne. In support of Enrique, Charles V ordered du Guesclin to organize an army of *routiers* for an expedition into Castile. The *routiers* composing this force included many from the Breton region, men who had fought against du Guesclin during the Breton Civil War. Additionally, those who either occupied fortresses or were likely going to remain in France, were chosen for

this army. With the addition of a small number of French knights, du Guesclin’s army numbered nearly 12,000 men.²² The recruitment of the *routiers* not only relieved Charles V of a great headache, it also put du Guesclin at the head of an army of professional soldiers.

The professional nature of the *routiers* was not the sole characteristic that separated them from the traditional Feudal levies that fought the English at Crécy and Poitiers. Similar to the armies fielded by Edward III and the Black Prince, the *routiers* were wage based troops. In order to effectively bring them under an appropriate level of control, du Guesclin organized a system of payment. This task seems to be one to which he was well suited; according to popular legend, du Guesclin was very successful in acquiring payment from Charles V for these troops.²³ His ability to acquire payment for this *routier* force was a large factor in the army’s success. Du Guesclin’s correspondence shows that he was in fact successful in acquiring money from the French monarch for this army:

A touz ceuls qui ces presentes lettres verront, Bertran du Guerclin, chevalier, conte de Longueville, chambellan du Roy de France, mon tresredoubté et souverain seigneur, salut. Savoir faisons que parmi certaine somme de deniers que le dit roy mon souverain seigneur nous a pieca fait bailler en prest, tant pour mettre hors de son royaume les compaignies qui estoient es parties de Bretagne, de Normandie et de Chart[r]ain et ailleurs es basses marches....²⁴

The money allocated by Charles allowed du Guesclin to recruit the larger, more organized groups of these companies from various areas throughout France. By the end of 1365, du Guesclin and his army of *routiers* departed for

20. Vernier, *The Flower of Chivalry*, 43.

21. *Ibid.*, 84.

22. Sumption, *Trial by Fire*, 529-530.

23. Vernier, *The Flower of Chivalry*, 89.

24. Michael Jones, ed., *Letters, Orders and Musters of Bertrand du Guesclin, 1357-1380* (Woodbridge: The Boydell Press, 2004), 40-41. Translation: To all whom these letters will be presented, Bertrand du Guesclin, Count of Longueville, Chamberlain of the King of France, my most my most respected and sovereign lord, salutations. Be it known that this sum of money from the king my sovereign lord has been advanced to send out of his kingdom the companies from parts of Brétigny, Normandy, the Chartrain, and other areas...

25. Vernier, *The Flower of Chivalry*, 90.

26. Sumption, *Trial by Fire*, 533.

27. Jones, *Letters Orders and Musters of Bertrand du Guesclin*, 55.

28. Vernier, *The Flower of Chivalry*, 96.

29. Vernier, *The Flower of Chivalry*, 106.

Spain. The brutal nature of the *routiers* made it impossible to completely eliminate their violent tendencies as they moved south; however, there was no large scale destruction of towns or villages as seen prior to their recruitment into the French military.²⁵ As the campaign progressed, it became increasingly evident that the prospect of payment was the only true shield against their fury.

The brutal nature of the *routiers* required a nearly constant flow of payment. Though the prospect of wages kept a large amount of the companies invested in the campaign, their destructive nature could not be completely controlled. The army entered Spain through the French allied kingdom of Aragon, then ruled by King Peter IV; the 12,000 man force was the largest army that had entered Iberia in over a hundred years.²⁶ In order to keep the level of destruction under control, Peter IV contributed vast amounts of money to du Guesclin's army. On one particular occasion in February of 1366, Peter authorized a large payment to one of du Guesclin's esquires in order to prevent the destruction of the modern-day city of Huesca.²⁷ The conduct of the *routier* army imposed a significant time restraint on du Guesclin for neither the French nor the kingdom of Aragon could afford to keep the *routiers* under one banner forever. Fortunately, once the campaign to place Henry of Trastamara on the throne began in late February in 1366, things came to a rather swift conclusion. After little more than a month, the campaign concluded and Enrique of Trastamara was made King of Castile. Du Guesclin's army had encountered little resistance, likely due to the horrific reputation of the *routiers*.²⁸

The French success in Castile in 1366 was largely due to the ability of du Guesclin and his allies to supply the army with wages. Though rather unorthodox, this professional force achieved far more than the French feudal levies of Crécy and Poitiers.

As successful as du Guesclin and his army of *routiers* had been in 1366, the following year brought new troubles. Pedro I had survived the exploits of 1366 and sought out an alliance with the English, hoping to reclaim Castile. As a result of the pact with Pedro, the English recalled the *routiers* back into service, threatening the confiscation of any holdings in England if they refused.²⁹ Without the professional army at his back, du Guesclin and his Castilian allies suffered a defeat at the battle of Nájera on April 2, 1367. Du Guesclin was captured by the Black Prince and remained in captivity until late 1369. The Prince of Wales, having once again recruited the men of the free companies, turned the tide of the conflict in favor of Pedro I. However, the English war effort required the constant flow of funds.³⁰ Pedro I had promised to fund the Black Prince's expedition but was unable to acquire proper funding. This lack of reimbursement forced the Black Prince to tax his French holdings in Aquitaine; the English campaign in Spain had been an economic failure.³¹ In 1369, after English support had been withdrawn, Pedro I was cornered by Enrique and the recently released du Guesclin at the castle of Montiel where he was killed by Enrique himself.³² The ultimate triumph of Enrique de Trastamara, despite the unfortunate setback that was Nájera, was not only another success for Charles V,

but the beginning of a French resurgence.

The English financial debacle in Castile provided Charles V with the perfect opportunity to begin the task of reclaiming southwestern France. The Castilian expedition had cost both the English and the French a large amount of treasure, but the French allies were far more financially accommodating than Pedro I. As a result of Pedro's failure to deliver on his promises, the Black Prince looked to his lands in France for tax revenue. The Prince of Wales implemented a hearth tax upon his holdings in Aquitaine. Naturally, his subjects were infuriated at the idea of paying for a campaign that yielded little financial gain.³³ Despite the treaty of Brétigny, inhabitants of the Prince's holdings began to flock to Charles with appeals. The Black Prince was summoned to Paris in January 1369 to answer for this unjust tax. The reply Charles received was "Sirs, we will gladly go to Paris, but I assure you that it shall be with helmet on our head and 60,000 men."³⁴ The insolence of the Black Prince, coupled with a refusal to strike down the hearth tax, resulted in the renewing of the war in June 1369.

If recent French military doctrine was any indication, one could ascertain that the French would certainly fight differently than they had prior to John II's capture in 1356. Charles V's new strategy needed a commander, one who was proven in guerrilla warfare. In 1370, Charles appointed du Guesclin Constable of France.³⁵ The appointment of du Guesclin was but a piece of Charles V reform of the French military. The Castilian affair had shown how effective an army could be if the troops

30. Seward, *The Hundred Years War*, 107.

31. Gordon Corrigan, *A Great and Glorious Adventure: A History of the Hundred Years War and the Birth of Renaissance England* (New York: Pegasus Books, 2014), 176.

32. Jean Froissart, *Chronicles*, trans. Geoffrey Brereton (London: Penguin Books, 1968), 173.

33. Vernier, *The Flower of Chivalry*, 148.

34. Seward, *The Hundred Years War*, 110.

35. Corrigan, *A Great and Glorious Adventure*, 177.

36. Jones, *Letters, Orders and Musters of Bertrand du Guesclin*, 142. Translation: Bertrand du Guesclin, duke of Molines, Constable of France, to our friend Etienne Braque, treasurer of wars of the king or his lieutenant, salutations. We send this enclosed under our seal; 1,135 men at arms we selected to serve the king our lord in these present wars under our authority, of which there are four knights banneret, 51 knights, and 1,080 men at arms received by us in Paris on January 1, 1370.

If you will please quickly send the payment in an appropriate manner. Given under our seal beginning on the above mentioned date. The Constable

37. Charles Oman, *A History of the Art of War in the Middle Ages: Volume II 1278-1485* (New York: Burt Franklin, 1924), 198.

38. Seward, *The Hundred Years War*, 111.

39. Oman, *A History of the Art of War in the Middle Ages*, 198-199.

40. Jonathon Sumption, *The Hundred Years War Part III: Divided Houses* (Philadelphia: University of Pennsylvania Press, 2009), 75.

41. David Nicolle, *The Great Chevauchée: John of Gaunt's Raid on France 1373* (Oxford: Osprey Publishing, 2011), 22.

were provided with monetary incentive. Rather than maintaining an army by feudal means, the French soldiers under the constable were paid. Du Guesclin successfully maintained this small, professional French force, with money allocated by the French government:

Bertrand du Guesclin, duc de Molines, connestable de France, à nostre amé Estienne Braque, thresorier des guerres du Roy nostre sire ou à son lieutenant, salut. Nous vous envoions enclose sous nostre scel du secret le monstre de onze cent trente et cinq homes d'armes, lesquels nous avons retenus pour server le Roy nostre sire en ces presentes guerres sous nostre gouvernement, dont il y a quatre Chevaliers Bannerets, cinquante et un Chevaliers Bacheliers, et mil quatre vingt Escuiers de nostre compaignie reçeus par nous à Paris le i. jour de Janiver l'an 1370. Si vous mandons que pour toutes lesdites gens vous nous faciez prest et paiement de leurs gages en la manière qu'il appartiendra. Donnè audit lieu sous nostre secret l'an et jour dessus dit. Par mons, le Connestable³⁶

This system of pay allowed du Guesclin to maintain a standing and well-disciplined army composed of French soldiers. The fact that these troops were recruited for long term use as opposed to a brief campaign, implies that they embodied a level of military professionalism similar to the armies of the military revolution. With this small, exclusive fighting force, du Guesclin implemented a strategy that was ultimately successful in turning the tide against England.

Du Guesclin would conduct warfare reminiscent to what the French had done during Edward III's 1359 campaign.

This strategy, commended by English historian Sir Charles Oman, involved the familiar willingness to sacrifice French lands.³⁷ This strategy proved effective once again in the summer of 1369 and in 1370 when two consecutive raids were conducted by Sir Robert Knollys and John of Gaunt. Both men achieved relative success in destroying French lands; however, the reluctance of Charles V to give battle prevented any major gains.³⁸ Despite the reluctance to give battle, du Guesclin's strategy was far from defensive. Rather than meeting the English in a pitched battle, du Guesclin and his band of professional soldiers, conducted a guerrilla war. His policy included quick assaults on small garrisons, night attacks, and raids on English supply lines. Above all, du Guesclin would refuse battle with the English even if he held a numerical advantage.³⁹ Du Guesclin knew that England could not maintain a war with an enemy that could not be brought to battle; therefore attrition was key. He, along with other French commanders, was able to do this by moving quickly and maintaining strict discipline amongst small bodies of troops.⁴⁰ Perhaps the most notable instance of this strategy at work was the 1373 raid of John of Gaunt.

The largest invasion during this period of the war was John of Gaunt's raid of 1373 which saw the full effect of Charles V's military doctrine. John of Gaunt, the third son of King Edward III, intended to lead a large force from Calais to the beleaguered English holdings of Aquitaine in southwestern France.⁴¹ John of Gaunt's force of 5,000 to 8,000 men, divided into three columns, departed the city of Calais on August 4, 1373. Strangely, they did not travel directly south but instead traveled southeast around Paris through the Champagne region. Though they had wrought a

notable level of destruction upon the French countryside, they were failing to lure French commanders into open battle.⁴² Reminiscent of Edward III's 1359 campaign, the French populace was ordered to remain inside walled cities; the advice of French commanders to Charles V was to "Let them go on. They cannot rob you of your heritage with fires and smoke. They will grow tired and crumble away to nothing."⁴³ By early September, after nearly a month of raiding, John of Gaunt was still on the move, but had failed to bring the French out into the open.

The raid began to truly decline when the English reached the city of Troyes on the 21st of September. John of Gaunt's army devastated the outlying area of the city while the French remained behind the walls. After failing to force the French into battle before the walls of the city, the English moved into the suburbs to attack. As the English proceeded, the French garrison launched a counterattack that claimed a number of English lives (estimates range from 120 to 600).⁴⁴ To make matters worse, the western column of the army (the English force had reformed into two columns by this time) was ambushed on September 27th. Though the French largely avoided battle during the raid, contingents of French cavalry shadowed the English advance south. The trap was set by French commander Olivier de Clisson near the city of Sens. A small force of 200 French cavalry was positioned nearly a mile away from the main French force of nearly 1,500 men near Sens. In pursuit of the retreating cavalry, the English ran into de Clisson's main body and suffered nearly 600 casualties.⁴⁵ Clisson's ambush was the most devastating loss for the English during the raid and was irrefutable evidence that John of Gaunt was failing his mission.

42. Barbara W. Tuchman, *A Distant Mirror: The Calamitous 14th Century* (New York: Penguin Random House, 1978), 286.

43. Froissart, *Chronicles*, 188.

44. Nicolle, *The Great Chevauchée*, 55.

45. *Ibid.*, 58.

46. *Ibid.*, 59.

47. Sumpson, *Divided Houses*, 194.

48. Nicolle, *The Great Chevauchée*, 68.

49. Tuchman, *A Distant Mirror*, 287.

50. Sumpson, *Divided Houses*, 139-141.

51. Perroy, *The Hundred Years War*, 168.

52. Seward, *The Hundred Years War*, 116-117.

53. Corrigan, *A Great and Glorious Adventure*, 183-184.

As with Edward III's expedition in 1359, it was obvious that an English army conducting such a long campaign in France would rely on foraging for the acquisition of food and other supplies. In early October, the French populace near Avallon were ordered to bring all food supplies into walled cities as well as deconstruct mills in order to deny their use by the English.⁴⁶ In addition to the shortage of food supplies, the French were still in pursuit of the English as they crossed the Loire and Allier rivers. In order to maintain distance, the English left their entire baggage train at the bank of the Allier. The loss of the baggage train came at the worst possible time, for the English force continued on through the winter months in territory with few inhabitants and bereft of food.⁴⁷ By the time the expedition reached Bordeaux on Christmas Eve of 1373, most of the horses had died. Many of the men entered the city without mounts or armor.⁴⁸ John of Gaunt's great raid, covering nearly 900km of French countryside had been a monumental failure. The failure of the *Chevauchée*, due largely to the unwillingness of the French to fight an open battle, proved once again that English tactics reminiscent of the Crécy and Poitiers campaigns were ineffective against Charles V's France.

Charles V, along with commanders such as Bertrand du Guesclin had by 1374 reduced English holdings to what they had been previous to the battle of Crécy in 1346. Looking back on the Crécy and Poitiers campaigns, it is clear that the French were capable of victory. English tactics during Charles V's reign were largely identical to what they were when the war began; however, the lack of a centralized command structure under Philip VI and John II prevented wise tactical decisions from being made. This period of French resurgence was

due to Charles V and du Guesclin's ability to recognize the failures of their predecessors and adapt. Their tactics, though considered "the direct antithesis of combat for honor"⁴⁹ were effective in bringing about French victory.

The French had made a tremendous comeback; however hostilities continued through the 1370s. These included the 1377 French raids on the English homeland. A period of French naval dominance was initiated by the naval victory of La Rochelle in late June 1372 where a large allied Castilian fleet defeated an English fleet under the Duke of Pembroke.⁵⁰ During the years following La Rochelle, French naval efforts grew; along with a large requisition of merchant ships for conversion, the *Clos des Galées* at Rouen launched over forty warships between 1376 and 1377.⁵¹ Along with this newly christened fleet, French naval officer Jean de Vienne took control of naval affairs with the purpose of maintaining French control of the English Channel. During the summer months of 1377, the Franco-Castilian fleet raided the English coast, burning villages and claiming plunder until they were repelled by English forces at Southampton.⁵² This strategy, although not as successful as the *chevauchées* of the Black Prince, was an undeniable sign that the tables had turned. English endeavors during the latter 1370s included a failed *chevauchée* by the newly crowned Richard II's uncle the Duke of Buckingham who, like John of Gaunt, failed to bring the French to battle.⁵³ The hostilities came to a close in 1389 when a truce was signed; though it was only meant as a temporary halt to the war, no major campaigns would be conducted until late 1415 when Henry V reignited the war.

As heroic as this period of French resurgence is, military revolution theorists tend to dismiss the military doctrine of

Charles V and du Guesclin. Why is this? Surely the tactics of Charles V and the preference toward a professional force rather than a feudal one fit into the larger military revolution. The easiest explanation for this dismissal lies within Henry V's victory at Agincourt in 1415. What overshadows the late 14th century changes in French military policy is not the fact that Agincourt was an English victory, but that the French essentially abandoned Charles V's military ideals and reverted to tactics that had failed them at Crécy and Poitiers. The battle of Agincourt would have never happened during the reign of Charles V, but his time had ended and so had French dominance.

Henry V landed in France in August 1415 and besieged the city of Harfleur between August 18 and September 22. The siege of Harfleur, which had taken far longer than Henry had hoped, was hardly a worthy prize for such a momentous campaign; Henry wanted more. Despite the fact that the army had suffered tremendous losses both from the fighting and dysentery, Henry decided to take his ragged army on a *chevauchée* toward the English garrison of Calais.⁵⁴ During the long trek, the French army marched parallel to Henry's force as they sought a crossing of the Somme. Using tactics similar to John of Gaunt's raid in 1373, the French pursued the English, making river crossings difficult.⁵⁵ French maneuvering prevented large scale destruction as Henry marched; however, on October 25th, previous tactical doctrine was tossed aside as the French accepted an open field challenge.

The battle of Agincourt is considered one of England's greatest victories. Estimates for the English strength vary from 5,000 to 8,000 while the French numbered an estimated 30,000. Similar to the English Crécy and Poitiers, Henry's army was positioned with men at arms

54. Christopher Hibbert, *Agincourt* (New York: Cooper Square Press, 2000), 70-71.

55. *Ibid.*, 81-82.

56. Anne Curry, *Agincourt: A New History* (Gloucestershire, Tempus Publishing, 2005), 246-247.

57. Curry, *Agincourt*, 255.

58. *Ibid.*, 251-252.

59. Hibbert, *Agincourt*, 121.

60. Corrigan, *A Great and Glorious Adventure*, 259-260.

61. Seward, 125.

62. Kelly DeVries, *Joan of Arc: A Military Leader* (Brimscombe Port Stroud: The History Press, 2011, first published in 1999), 76-83.

63. *Ibid.*, 174-176.

64. Paul Douglas Solon, "Charles VII and the Compagnies D'ordonnance, 1445-1461: A Study in Medieval Reform" (PhD diss., Brown University, 1970), 22.

in the center with a wing of archers on each flank. Abandoning all tactics of the du Guesclin era, the French commenced their attack with a cavalry charge as they had done over sixty years earlier at Crécy. Over 1,000 mounted knights charged the English lines in hopes of cutting down the longbowmen and were subsequently shot down.⁵⁶ Following the failed cavalry attack, the main French attack came in the form of dismounted men at arms. Thousands of heavily armored French knights, in a manner reminiscent of John II's main attack at Poitiers, trudged through the muddy field over the bodies of their dead comrades, all while taking constant arrow fire from the English flanks. By the time the attack reached the English center, the French knights were exhausted; they had little chance against the English men at arms who had simply waited for their approach.⁵⁷ The only French success at Agincourt was an attack made on the English baggage train. However, evidence shows that the attack was made by lowly thieves rather than armored knights, for the French could not spare them. Henry's lines were in no way compromised by the raid on the baggage, which accomplished little more than the theft of some of the king's personal belongings.⁵⁸ Agincourt was a disaster for the French army; their losses numbered nearly 10,000 with over 1,500 taken prisoner while English losses totaled no more than 500.⁵⁹ Agincourt was a failure on the part of the French command to maintain the discipline that had been learned during Charles V's reign. As a result of this setback, the English would have the upper hand for the next decade.

Agincourt inaugurated a period of English dominance; by 1420, the English had claimed the throne of France, accomplishing what Edward III had set out to do nearly a century before. On May 19, 1420, the Treaty of Troyes was signed. The treaty recognized Henry as the heir of King Charles VI, while the dauphin (Charles VII) lost his claim.⁶⁰ Henry V's victory at Agincourt and acquisition of the French throne, muddled French military accomplishments during

Charles V's reign. Why did the French combat Henry's army at Agincourt with tactics that had proved so disastrous against Edward III and the Prince of Wales? Why did they give battle at all? The answer to this question lies within the simple fact that Charles V had essentially ended the war. As mentioned previously, English holdings had been reduced to what they had been before Edward III's first successful invasion.⁶¹ Despite a few raids conducted by both sides, the fighting would not be reignited in earnest until Henry's invasion in 1415. There was no need to expend large amounts of time and treasure implementing a new military doctrine during peacetime. As a result of this hiatus, Charles V's tactics faded from memory. By the time the war began anew, the French, now fractured by civil war and under the ineffective leadership of Charles VI, reverted to what they knew best, traditional feudalism. Though the French had abandoned Charles V's military policies, the suffering wrought by Henry V was only temporary. The French would once again rise and a military doctrine similar to that of Charles V's would emerge.

The year 1429 initiated a period of resurgence for the French. The French dauphin, Charles VII, was approached by a young woman from Lorraine who claimed to be sent by God to relieve the French city of Orléans on the Loire River. The young woman, Jeanne d'Arc, broke the siege of Orléans rather quickly; conducting all out assaults on the English defenses rather than setting up for a prolonged encirclement.⁶² In July of 1429, Jeanne and her army had successfully reached the city of Reims where Charles VII was crowned king of France. Jeanne's success, however great, was to be short-lived; during the siege of Compiègne in 1430, Jeanne was captured by the Burgundians and soon sold to and executed by the English.⁶³ As tragic as Jeanne's death was, it was not a major detriment to the French war effort, for under Charles VII, France would soon claim the final victory.

The reign of Charles VII brought

about a new age for the French military. The military reforms enacted by Charles were key factors to the French end game. Among these changes was the military reform of 1439; this reform or "Ordonnance" enacted a military system based on paid, professional troops. Unlike the English soldiers of the war who were released from service at the end of a campaign, the new French army was to be maintained both in time of war and peace.⁶⁴ The new military was divided into what were known as the *Compagnies d'ordonnance*; the men of these companies were experienced soldiers. Like the *routiers*, these companies had the tendency to cause havoc throughout the French countryside; however, a system of monthly payment was arranged to keep up moral standards and discipline.⁶⁵ Artillery was also a major component of Charles VII's military reform and as Rogers expresses, a crucial component in the final stages of the Hundred Years War. What made this large adoption of gunpowder weaponry unique was the fact that a large number of artillery pieces were being brought together. Additionally, artillery officers were appointed, such as Jean and Gaspard Bureau, who ensured a level of professionalism amongst French artillerymen.⁶⁶ The French artillery train, coupled with professional artillerymen won the final victory on July 16, 1453 at the battle of Castillon. The battle began when English Lord John Talbot led an attack on a French force near Castillon. After forcing a part of the French army to retreat, Talbot ordered an attack on a nearby French artillery park where a large number of guns had been arranged. As the English approached the park, the French cannon inflicted devastating losses on the English who were soon defeated. By the end of 1453, the English held only a sliver of land near the city of Calais.⁶⁷ Charles VII's military reforms had successfully ended the war.

Charles VII's military system, besides the massed artillery, bears a strong resemblance to the armies under Charles V and du Guesclin. A significant difference between these two systems is the level

65. Ibid., 43-44.

66. Kelly DeVries, *Gunpowder Weaponry and the Rise of the Early Modern State*, *War in History* 5 (1998): 132-133.

67. Corrigan, *A Great and Glorious Adventure*, 278-279.

of credit ascribed to them. Historians find it difficult to consider du Guesclin and Charles V's era as part of a larger military evolution because of Henry V's successes and the French failure to permanently adopt Charles V's military policies. Rogers' discussion of Charles VII's adoption of massed artillery is likely due to the fact that they were a large part of the final French victory and subsequently a much more visible example of a larger progression in European warfare. Despite this fact, one cannot ignore the similarities that Charles VII's military doctrine bears to that of his grandfather. Without Charles V's military doctrine, Charles VII would have had no model to follow, and as a result, his military reforms may have been quite different.

The Hundred Years War brought about many military changes one can accurately attribute to Roberts' military revolution. The wealth of Anglo-centric scholarship illustrates a clear relationship between the English military system and the military revolution while a much less diverse pool of sources makes French military change far less defined. Through careful analysis, it becomes increasingly clear that French military innovation throughout the latter half of the 14th century can be accurately categorized as revolutionary. The guerrilla tactics of Charles V and Bertrand du Guesclin paired with their preference towards wage-based troops were successful in rendering English tactics useless.

Additionally, they promoted a level of military professionalism that largely prevented the failures of Philip VI and John II from being repeated. Though these ideals were not carried over to the early 15th century, Charles VII's military reforms, largely reflecting his grandfather's military ethos, allowed France to claim the final victory. The overarching influence of Charles V's military ideals earns him a rightful place in the military revolution.

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Fragment-Based Drug Discovery of a Novel Inhibitor of OXA-24 β -Lactamase



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β -lactam antibiotics are the most commonly prescribed antimicrobials. This class of antibiotics includes penicillin, cephalosporin, and carbapenem. In these drugs, there is a strained four membered ring with an amide bond known as a β -lactam ring that is important for the reactivity of β -lactams. β -lactam antibiotics act by inhibiting penicillin binding proteins (PBPs), an enzyme native to bacteria, and disrupt biosynthesis of the bacterial cell wall leading to cell lysis and death. Unfortunately, bacteria have developed mechanisms that eliminate the β -lactam's potency, subsequently leading to resistance.

Among the mechanisms bacteria employ for resistance, the expression of β -lactamases is the most common. These enzymes confer resistance to β -lactam antibiotics by hydrolyzing the lactam ring through a two-step acylation-deacylation mechanism. Once the β -lactam ring is hydrolyzed, it is inactivated. There are four classes of β -lactamases: A, B, C, and D. Classes A, C, and D employ a serine based mechanism to hydrolyze the β -lactam ring, while class B β -lactamases are metalloproteins that require zinc for their activity. Although all classes of β -lactamases are of clinical importance, class D β -lactamases, also known as OXAs, are the least understood. A particular subset of the class D enzymes is of particular concern: the carbapenem-hydrolyzing class D β -lactamases of which OXA-24 is a member. In OXA-24 mechanism, a carboxylated lysine is used to hydrolyze carbapenems, which is a troubling trend, as carbapenems are the newest antibiotics and often used as a last resort.

In an effort to combat antibiotic resistance against β -lactams, combination therapies consisting of a β -lactam antibiotic with a β -lactamase inhibitor have been employed. However, current β -lactamase inhibitors also contain a β -lactam ring. Due to this structural similarity to β -lactam antibiotics, inhibitors are also susceptible to existing resistance mechanisms of bacteria.

Currently, there are no commercially available inhibitors for class D β -lactamases. The main objective of our research is studying class D β -lactamases to discover novel inhibitors that are structurally different from β -lactam antibiotics. In this effort, creating novel inhibitors would serve as an advantage against bacteria by circumventing the traditional β -lactam resistance mechanisms.

To discover a novel inhibitor for OXA-24, we took a structure-based approach to optimize an identified lead fragment. In the beginning stages, a molecular docking program, DOCK, identified a non-covalent fragment (Fragment #5) showing some signs of inhibition against OXA-24 with a K_i of 3.53 mM. For optimizing this lead, commercially available analogs were ordered and tested for inhibition against OXA-24. So far, nine analog compounds have been experimentally tested against OXA-24. Of the nine analogs, one inhibits with a K_i of 0.100 mM, showing improved binding affinity of 35 fold over the lead. As a continuing focus, we will look at further optimizing this series of novel inhibitors to improve binding, ultimately working towards developing a clinically-relevant novel inhibitor.

Testing Novel BIBR 1532 Derived Telomerase Inhibitor



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Cancer is one of the leading causes of death among Americans. It is estimated that approximately one-third of all Americans will be diagnosed with some form of cancer in the next 20 years (World Health Organization [WHO]). There are numerous types of cancer but the most common types are lung cancer, breast cancer (women) and prostate cancer (men), which also happens to have the highest mortality rate (WHO). Because these three forms of cancer are very dangerous, it is important to learn more about cancer to find a cure.

Unlike normal cells, cancer cells have the enzyme telomerase which prevents telomeres from degenerating so that the cell continues to divide (El-Daly et al., 2005). One of the drugs often used to treat cancer patients are telomerase inhibitors, but cancer cells are becoming increasingly resistant to the drug. BIBR 1532 is a known telomerase inhibitor and is currently in clinical trials for treating cancers. For a drug to be a good telomerase inhibitor like BIBR 1532, it must have a carboxylic acid structure bonded to an aromatic ring and a conjugated amine.

There were 18 drugs synthesized in the Department of Chemistry in the labs of Dr. Robert Smart and Dr. William Schroeder based on the structure of BIBR 1532. These drugs have been tested in our lab to see whether they show any antiproliferative effect. Out of the 18 drugs screened, about 4-5 drugs (4-43A, WS 1248, WS 76, WS 648, WS 1214) have shown an antiproliferative effect when tested against metastatic prostate cell lines that have known high telomerase activity. The drugs identified with anti-telomerase activity will be tested first at different concentrations to find the optimal concentration that inhibits proliferative activity. After the optimal concentration is identified, all the cells will be treated at this concentration and the treated cells will be frozen until further use for telomerase assay. Those drugs with antiproliferative effects will be further tested to see if they are good telomerase inhibitors by subjecting them

to telomerase assays. The cell will be lysed and analyzed using TRAP assay to test whether the telomerase present in the cancer cell is inhibited by the drug or through a different mechanism.

This research is important because if the drugs tested are proven to be good telomerase inhibitors then they could be used to effectively treat prostate, breast and lung cancer, which are known to have high telomerase activity and are known to be fatal.

Modification of the LRB E3 Ligase



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Plants utilize a complex system of light responsive pathways to initiate discrete changes in the plant cell's growth and development. The Light Regulating BTB (LRB) E3 ligases are utilized in the ubiquitin-proteasome system (UPS) to target a group of photoreceptors, the phytochromes, for degradation. The UPS allows for the selective tagging and degradation of proteins in the cell. The Phytochrome B complex is stable in far-red light but is recognized by the LRBs and broken down in red light by the LRBs. Evidence suggests that the LRBs become activated in R by forming a complete E3 ligase complex which includes the protein Cul3. We propose to investigate how the LRBs become activated and bind to Cul3 in red light in the model plant *Arabidopsis thaliana*. Genetic sequence alignments suggest the LRBs may be modified by the Nedd8 protein (a protein used to activate a small group of other proteins in eukaryotes) in response to red light. This project proposes to investigate whether the LRBs are modified by the Nedd8 protein by using an in vitro neddylation assay. The results of this assay will improve our understanding of how LRB E3 ligases function in modifying light responses in plants and also provide insight into neddylation and its effect on protein activity.

To test our hypothesis that the LRB proteins are neddylated, an in vitro assay using recombinantly expressed proteins will be used which eliminates the need for the genetic transformation of *Arabidopsis* to express the necessary tagged proteins. Neddylation is thought to be controlled by N-terminal end of the LRBs; therefore, we can test this hypothesis by using separate parts of the proteins. We will probe for neddylation using full-length LRB, as well as C terminal and N terminal portions of LRB. As a negative control the C-terminus end of LRB1 will be assayed for neddylation as that domain is not hypothesized to be involved in the neddylation process. For a positive control CUL3 will be used as

CUL3 is shown to be neddylated under standard in planta conditions. RBX1 may also be included in any neddylation assay since it has been found to be a catalytic intermediate. The assay will be performed using the Abcam Neddylation assay kit that includes Nedd8 and other components necessary for neddylation with in vitro testing.

The results to date do not influence the hypothesis of whether neddylation occurs on the LRB protein. The current stage of our research is having cloned genes transfected into *E. coli*. We will be expressing the proteins in the hopes that we can purify them to use in the neddylation assay. Therefore, no direct findings as to the ability or inability of neddylation on LRBs have been found. The results of the protein production and preparation are progressing, and the purification of the LRB-full length was successful, providing the first substrate for the neddylation assay. This progress is in support of the future investigation of neddylation on the LRB E3 ligase.

Structural and functional characterization of the antibiotic, Linezolid



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As bacteria continue to gain resistance to a broader spectrum of antibiotics, it is imperative that scientists design and synthesize novel antibiotics in order to combat the growing problem with resistance. There are many different ways to kill bacteria, one of them being to prevent bacteria from synthesizing proteins. Just like humans, all bacteria have DNA that contains their genetic information. This information is used by the bacteria to make the proteins they need to survive. The process of protein synthesis, known as the Central Dogma of Microbiology, involves transcription, translation and translocation; each step of this process has been the target of different antibiotics.

Recently, the antibiotic Linezolid has been proven effective in treating antibiotic resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA), multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB) and vancomycin-resistant *Enterococcus* spp. (VRE). Linezolid belongs to a class of antibiotics known as Oxazolidinones, and it prevents protein synthesis by stopping the translation of mRNA into protein. This translation process is mediated by the bacterial ribosome, which is the target of Linezolid. The bacterial ribosome is made up of two subunits: the large (50s) subunit and the small (30s) subunit. The bacterial ribosome is distinctly different from that of a humans allowing species specificity. Linezolid binds to the peptidyltransferase center (PTC) of the 50s ribosomal subunit and halts protein synthesis. Without the proteins necessary to regulate processes within the cell, the bacteria dies. Unfortunately, approximately 1 year after its initial use, some bacteria have presented with resistance to Linezolid.

The design and synthesis of novel analogues of Linezolid with an increased binding affinity may combat bacterial resistance to Linezolid. The structure of Linezolid bound to its target indicates there was only one key hydrogen bond between its morpholine ring and a neighboring uracil group on the ribosome. We hypothesize that we

can increase the binding affinity of our analogues by increasing the number of potential hydrogen bonding sites that can interact with the key uracil group or surrounding bases. The goal of this project is to incorporate cyclic dipeptides to introduce the necessary functionality.

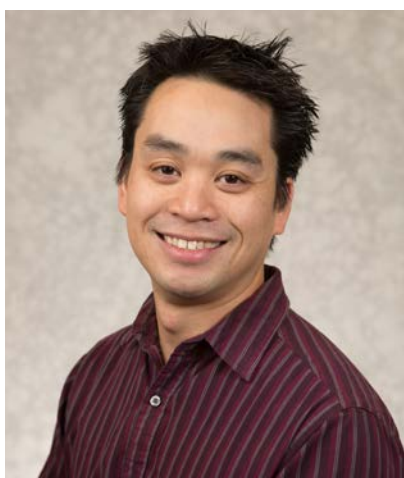
The synthesis was designed to utilize a core intermediate allowing for functionalization at each end. Initially, the construction of this core intermediate was investigated. Several attempts to form the key oxazolidinone were performed; however, this process needs to be optimized. A model system was used to evaluate the coupling reaction to attach the required cyclic dipeptide. The coupling of glycine anhydride was successful utilizing a copper (II) catalyst, but this reaction needs to be optimized.

After investigating the oxazolidinone ring formation and copper coupling reactions, biological tests will be performed in hopes that the novel derivatives of Linezolid will present with antibacterial activity. Further studies will indicate whether these derivatives can be used to treat drug resistant bacteria.

Naltrexone Regulation of Stress Enhanced Alcohol Self-Administration



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Alcohol abuse is a substantial public safety and health concern affecting our population at a global level. In the United States alone, alcohol use disorders lead to approximately 75,000 deaths and cost society nearly \$200 billion annually (Bouchery, Harwood, Sacks, Simon, & Brewer, 2011). A majority of Americans are affected by alcohol use disorders either by their own personal experience or that of a family member (Alcohol and Drug Abuse Affects Everyone in the Family, 2015). Significant obstructions in the process of recovery from alcoholism are alcohol craving and a chronic relapsing disposition (Seo & Sinha, 2014). Clinical studies have suggested that a common cause for relapse is rooted in the ability of alcohol to reduce negative mood symptoms associated with stress (Hershon, 1977; Cloninger, 1987; De Soto, O'Donnell, & De Soto, 1989; Annis, Sklar, & Moser, 1998). Thus, it is a priority that the neurobiological systems associated with alcohol-related stress are classified in a way that provides a valuable strategy in the long-term prevention of relapse.

Animal models demonstrate that stress produces transient effects on voluntary alcohol consumption (Vangelienne et al., 2003; van Erp & Miczek, 2001). Two stress induction techniques have been previously established as physical and psychological stressors in rodents, namely the forced-swim test and inescapable footshock (Vangelienne et al., 2003; Le et al., 1999). The forced-swim test is a procedure in which rats are placed into cylindrical plastic tanks filled with water. The amount of time spent swimming versus time spent immobile is measured, and increased immobility is thought to be indicative of a heightened stress response. Inescapable footshock is performed by placing rats into chambers connected to a metal rod floor construction that delivers shocks at a varied rate for several seconds, randomized by software. Vangelienne et al. (2003) reported that stress induced by inescapable footshock and forced

swim led to significantly increased rates of alcohol consumption. These results demonstrate that stressors are a significant factor in enhanced alcohol self-administration.

The chronic nature of relapse in alcohol use disorders is cause for serious concern in regard to alcoholism, despite recent neurobiological research in pharmacological treatment strategies (Johnson, 2010). With regard to alcohol use disorders and addiction, one of the main neurochemical systems responsible is the endogenous opioid system (Herz, 1997). This opioid system has been connected to pain relief and rewarding properties produced by alcohol consumption (Hay, Jennings, Zitzman, Hodge, & Robinson, 2013). Previous work has shown that alcohol reinforcement may be partially due to activation of opioid mechanisms that are closely linked to increased dopamine transmission in the mesolimbic pathway (Herz, 1997; Johnson, 2010). Due to the reinforcing properties of alcohol and sensitivity to relapse, it is essential to examine behavioral studies involving alcohol self-administration.

The opioid-receptor antagonist naltrexone (NTX) has been shown to decrease alcohol consumption (Herz, 1997; Hay et al., 2013) and is an approved pharmacotherapy for various alcohol use disorders (Johnson, 2010). Previous clinical studies and preclinical models have shown that NTX appears to eliminate rewarding properties previously produced by alcohol consumption (Kreek, LaForge, & Butelman, 2002; Ripley & Stephens, 2011). In clinical studies of alcohol-dependent participants, NTX was reported to decrease relapse (O'Malley, Krishnan-Sarin, Farren, Sinha, & Kreek, 2002). The success of this opioid antagonist is attributed to the ability to decrease cravings of alcohol by interfering with the rewarding properties previously experienced with consumption (Hay et al., 2013). Further, NTX has been reported to reduce alcohol seeking and drinking behavior in preclinical models

(Hill & Kiefer, 1997; Le et al., 1999; Hay et al., 2013). A study by Hay et al. (2013) utilized NTX to reduce alcohol-seeking behavior and reported a reduction in self-administration in rats conditioned in goal-directed (immediately rewarded) drinking behavior. Rats trained to self-administer alcohol showed a decrease in lever presses and alcohol consumption after receiving NTX. Thus there was a decreased preference for the previously rewarding effects produced by alcohol consumption. Due to the success of previous work, it is evident that stress is a significant factor in alcohol consumption and rate of relapse. Additionally, NTX is successful in blocking the rewarding properties experienced with alcohol drinking that leads to continued consumption.

As a result of multiple factors contributing to relapse, these studies can be interpreted to suggest that NTX, as a pharmacological therapy, may be an effective tool in relapse prevention. Due to alcohol consumption relieving negative symptoms associated with stress, it is of crucial importance to discover a technique in order to eliminate this association. Due to previous work supporting both stress as a significant factor in relapse and NTX effects on blocking rewarding properties, there is a need for a therapy that promotes a decrease in alcohol consumption enhanced by stress. We hypothesize that the use of the opioid antagonist NTX will block stress enhanced alcohol self-administration. Using these results, we intend to aid in the development of improved medications in the treatment of alcohol abuse and relapse prevention.

METHOD

Animals and Housing

Male Wistar rats ($n=11$, Charles River, Kingston, NY) weighing 150-200g upon arrival were used in the current study. Rodents were housed (2-3 per cage) with food and water available *ad libitum* except at the initiation of self-administration training as described below. The colony was sustained by a 12-hour reverse light/dark cycle with lights coming on at 10:00 p.m. Prior to conducting experimental procedures, animals were habituated to colony housing for 7-14 days as well as handled and weighed daily. A statistical

power analysis was utilized for the configuration of an appropriate number of rodents required for the current procedure in conjunction with previous reported studies with similar methods. All procedures were approved by the Grand Valley State University Institutional Animal Care and Use Committee (Protocol #13-01-A).

Ethanol Self-Administration Training

Rats were trained to lever press for ethanol solutions by utilizing an adapted sweetened solution fading procedure (Samson, 1986) that ultimately resulted in animals consuming unsweetened 10% ethanol solution that produced pharmacologically sufficient blood alcohol levels (Roberts et al., 1999). At training initiation, rats were water restricted in home cages for three days. During this time, rats began self-administration training in operant boxes. Response on one lever resulted in the delivery of a 10% sucrose solution and response on another lever resulted in the delivery of water. Following the initial three-day training period, water restriction was discontinued. Ethanol concentrations gradually increased from 3% to 10% in conjunction with a 10% sucrose solution as sessions advanced. When stable levels of responding for 10% sucrose/10% ethanol solution were established, sucrose concentration was gradually decreased until rats consumed strictly 10% ethanol solution. It was maintained throughout the training procedure that response on one lever produced ethanol/sucrose solution and the other resulted in water. In order to counterbalance solution delivery, half of the operant cages dispensed ethanol/sucrose solution following left lever response and the other delivered solution following right lever response. Water was concomitantly available on an opposing lever, respectively, in order to control for general fluid intake. Training sessions were conducted for 30 minutes Monday-Friday.

Footshock Stress

Operant conditioning chambers equipped with ethanol self-administration units utilized metal grid floors connected to

electric shock generators to administer mild stress. A constant-current of intermittent, inescapable electric footshock was delivered for 5 minutes prior to the ethanol self-administration test sessions. Each footshock (0.8 mA) lasted for 0.5 seconds. Shock exposure was delivered under a variable time schedule at irregular intervals ranging from 10-70 seconds between shocks.

Drug Administration Procedure

All subjects were initially exposed to shocks following a saline injection in order to associate alcohol consumption with stress relief without pharmacological manipulation. Treatment solution NTX was then rotated between animals each day. Rats received either NTX (10 mg/kg s.c.) or saline 10 minutes prior to shock exposure. Rats were counterbalanced by a condition of shock or no shock in conjunction with a NTX treatment or saline solution injection every other day. Subjects were placed in operant chambers following shock/no shock exposure and provided with ethanol access for 30 minutes. Data were collected and compared against saline consumption levels in order to measure for any difference in self-administration following shock.

Data Analysis

Statistical reliability of results were analyzed using a repeated measures ANOVA, with NTX and shock exposure as within subjects factors.

Results

There was no significant interaction between NTX and shock condition on ethanol response [$F(1, 10) = 0.17$; $P = 0.68$]. Further there was no main effect of shock [$F(1, 10) = 0.06$; $P = 0.81$] on ethanol response (see Figure 1). Although not statistically significant, a main effect of NTX on ethanol responding appeared to approach significance [$F(1, 10) = 3.39$; $P = .096$] evidencing suppression in ethanol self-administration. Additionally, there was no significant difference between the pre-shock and the post-shock exposure on ethanol responding (see Figure 2).

Discussion

There were no interactions or significant main effects between shock condition and NTX treatment on ethanol responses (see Figure 1). However, there was a trend towards decreased responding for ethanol following treatment with NTX regardless of shock condition. Further, no significant differences were observed between baseline ethanol responding during training and responding following shock exposure (see Figure 2). Contrary to what we predicted, there was no main effect of footshock on ethanol self-administration. Work from previous studies has revealed mixed results in regard to shock increasing ethanol responses, such that there is greater success in repeated shock exposure prior to testing. For instance, studies reviewed reported using repeated footshock stress used over three consecutive days in ethanol dependent rats. The results showed a significant increase in alcohol consumption among rats. This supports the notion that an increase in ethanol response can be effected by duration of stress exposure and has a large inter-individual variability (Vangeliene et al., 2003.) Acute shock exposure, as was conducted in the current study, has a greater likelihood of being confounded by rats displaying a fear conditioning response, also known as a freezing response. Because it is a natural response for rodents to initially freeze when experiencing a stressful situation, had we used repeated exposure to shocks in order to familiarize the rats, we may have extrapolated significant results. Although significant levels were not met, those in the treatment condition with shock exposure were approaching significance. Therefore, NTX may reduce ethanol self-administration, consistent with previous literature (Hay et al., 2013). Overall, NTX led to a suppression of behavior approaching significance regardless of stress condition. Therefore, it is possible that NTX may reduce ethanol self-administration, which is consistent with work that has been done before (Hay et al., 2013; Hill and Kiefer, 1997; Le et al., 1999).

Limitations within the current study were a result of time constraints, small sample size, acute stress exposure and use of a non ethanol-dependent sample.

Due to time constraints, a repeated stress exposure of footshock was not plausible, defaulting to an acute exposure. Previous research reports that repeated exposure to stress is significant in yielding an increase in ethanol self-administration. Further due to time constraints, rats were not made ethanol dependent prior to stress exposure. Previous studies show that ethanol dependent rodents consume significantly more alcohol when exposed to stress (Vangeliene et al., 2003). Pilot data collected previously in the lab observed acute shock exposure yielding an increase in self-administration following long-term withdrawal in ethanol dependent rats. The pilot procedure delivered a liquid diet over four weeks, known to be sufficient in inducing physical dependence in animals. Unreported observations revealed that rats consuming an ethanol liquid diet compared to a control diet had significantly higher ethanol responses following acute stress exposure after protracted withdrawal. As a result, the current study intended to induce ethanol dependence as well as a protracted withdrawal period, but we were unable due to time. Finally, not all rodents were successful in operant training therefore limiting the initial sample size from 18 to 11, resulting in an insignificant number of subjects to observe effects of treatment conditions. The lack of significant results in the current study may be attributed to these shortcomings.

Moving forward, future work should look to address the effects of repeated exposure in self-administration as previous work reveals as more reliable. Additionally, the differences in self-administration should be investigated between rodent samples that are ethanol dependent compared to samples that are non dependent. Previous work has shown that rats with a history of physical ethanol dependence are more consistent in establishing an association between alcohol consumption and an alleviation of stress symptoms. Though the current study imposed intoxication evidenced by sufficient blood alcohol levels, the level of intoxication was not significant enough to witness withdrawal symptoms identifying alcoholism. Looking forward, ethanol dependence and repeated exposure of mild stressors should be established when

measuring alcohol self-administration.

Acknowledgments

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Figure 1. Ethanol Responding to Shock/No Shock Following Administration of Naltrexone or Vehicle Solution. Rats ($n=11$) were trained to self-administer ethanol. Once stable consumption levels were achieved, rats were then injected with saline vehicle or naltrexone (10 mg/kg, s.c.). Following, rats were exposed to a shock/no shock condition and then measured for responses for ethanol self-administration. Data are expressed as mean+SEM

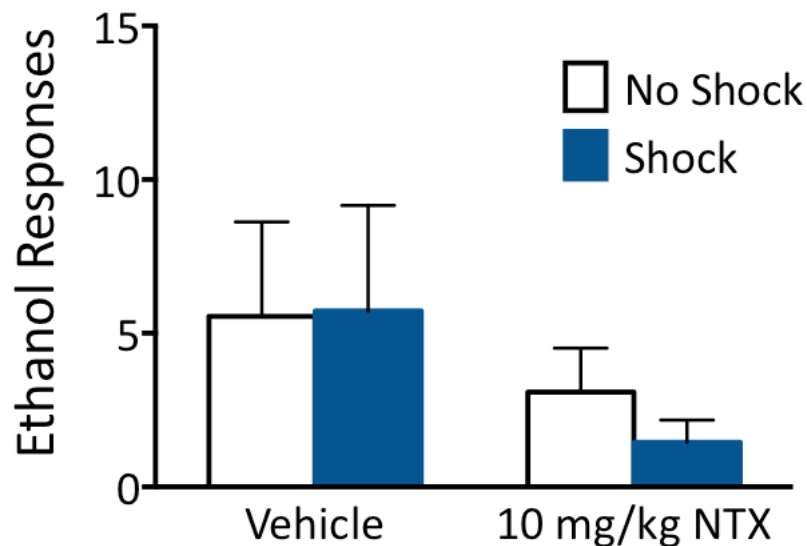
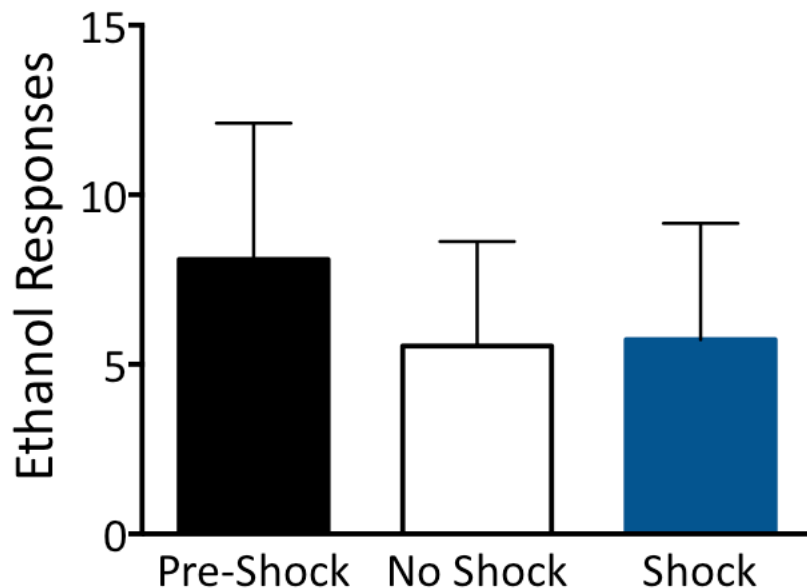


Figure 2. Ethanol Responding to Pre-Shock, Shock and No Shock Exposure. The pre-shock condition represents ethanol responding on the final day of training before the initial shock exposure. The no shock and shock conditions represent responses following saline injections after stable self-administration levels were achieved. Data are expressed as mean+SEM.



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No Soft Doctrine: Royce on the Problem of Evil



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Introduction

The problem of evil arises when two statements are conjoined: (1) “If God exists, God is omniscient, omnipotent, and omnibenevolent,” and (2) “evil exists.” If God is omniscient, then God must know if evil exists. If God is omnipotent, then God could eliminate that evil, given the desire to do so. And finally, if God is omnibenevolent, then God must in fact desire to eliminate evil, or, at the very least, all unnecessary evils. In order for evil to exist, God would either have to not know about existent evil (which is inconsistent with omniscience), not have the power to remove it (which is inconsistent with omnipotence), or not be willing to do so (which is inconsistent with omni-benevolence). Yet, evil exists. This seems to imply that God either does not have the three traditional attributes as defined or does not exist.¹

Arguments from evil exploit the fact that, supposing God exists, God knows evil exists, could eliminate it, and should have the desire to do so, but does not. The arguments aim to prove that the existence of evil is grounds for the claim that God does not exist.² For the purposes of this paper, I will focus on moral evils and alert the reader if I reference an instance of natural evil.³

There are three traditional ways to answer the problem of evil: through a total refutation of the problem, a defense, or a theodicy.⁴ A theist putting forth a

total refutation denies that the existence of evil is grounds for the claim that God does not exist. In other words, they aim to prove that God’s existence is not at all problematic given the existence of evil. For example, they might argue that God exists by metaphysical necessity or argue that evil does not actually exist. A theist putting forth a defense, on the other hand, concedes that there are *prima facie* grounds for doubting God’s existence given the existence of evil. However, defenses only aim to prove the *possibility* that God could have justified reasons for allowing evil to exist. Due to space constraints, this paper will not discuss specific total refutations or defenses. It will focus on theodicies.

A proponent of theodicy concedes that there are *prima facie* grounds for doubting God’s existence given the existence of evil. However, they hold that any inconsistency can be reconciled by arguing that there are justified reasons why God would allow evil to exist. In section 2, I outline two forms of theodicy: free will theodicies and soul-making theodicies. I then present two problems with these theodicies. In the first place, they presuppose a conception of God that is not actually omnibenevolent, which is self-defeating for a traditional theistic answer to the problem of evil. Second, I argue that the individualized emphasis of the free will and soul-making theodicies downplays the significance of communities in the process of overcoming

1. Michael Tooley, “The Problem of Evil,” in *The Stanford Encyclopedia of Philosophy* (Summer 2015 Edition), Edward N. Zalta, ed. accessed July 16, 2015, <http://plato.stanford.edu/archives/sum2015/entries/evil/>, Introduction.
2. See Tooley, Section 1.2. It is possible to formulate incompatibility arguments from evil or evidential arguments from evil. An incompatibility argument is an attempt to prove that conjoining the statements “God is omnipotent, omniscient, and omnibenevolent” and “evil exists” amounts to a logical contradiction. An evidential formulation is an attempt to prove that the true statement, “evil exists,” makes God’s existence extremely unlikely when conjoined with the statement, “God is omnipotent, omniscient, and omnibenevolent.” Royce’s career antedated the incompatibility/evidential distinction. As such, this paper will evaluate the traditional answers and Royce’s answer as hypotheses rather than as proofs or probability analyses.
3. See Todd Calder, “The Concept of Evil,” in *The Stanford Encyclopedia of Philosophy* (Winter 2014 Edition), Edward N. Zalta, ed., <http://plato.stanford.edu/archives/win2014/entries/concept-evil>. In the article, Calder defines natural evils as bad states of affairs which are not caused by the actions or negligence of a moral agent, using hurricanes and toothaches as examples. Moral evils are bad states of affairs which are caused by the actions or negligence of a moral agent, such as stealing or declining to inform someone of imminent danger. The “broad” understanding—encompassing both natural and moral evils—is typically used in the arguments from evil and responses to them.
4. Tooley, “The Problem of Evil”, Section 4.

evil. In section 3, I present Royce's answer to the problem of evil as found in *The Sources of Religious Insight* and *The Problem of Christianity*. Afterward, I argue that Royce's answer addresses the deficiencies in these theodicies. Royce's answer to the problem of evil is better than the aforementioned theodicies for two reasons: (1) it does not presuppose the problematic conception of God that the theodicies do, and (2) it adequately emphasizes the role of community in the process of overcoming evil.

The Argument From Evil and Traditional Responses

Recall that arguments from evil exploit the apparent inconsistency that arises when supposing the coexistence of God (as traditionally defined) and evil. The arguments cite the existence of evil as grounds for the claim that God does not exist. However, the existence of evil supports that claim only if two implicit claims are true. First, that there are bad states of affairs which make it *prima facie* unreasonable to believe in God's existence. Second, that there are no justified reasons why God would allow the existence of evil.⁵ Theodicies accept the first claim and reject the second. They all share the presupposition that a world with evil can be better than a world without evil, so long as that world also contains some specific valued good.

Soul-making theodicies presume that human spiritual development culminating in the achievement of a spiritual ideal ordained by God is supremely valuable. God created human beings for the expressed purpose of attaining that ideal and earning the right to dwell with God.⁶ However, spiritual development comes at a price. People must endure evil in order to acquire the character traits necessary to develop according to God's plan. Since God created a world where people can develop through their struggles with evil and (at least potentially) achieve the spiritual ideal, God remains morally perfect. With this understanding, the existence of God is consistent with the

existence of evil. Now, we move to free will theodicies.

Free will theodicies presume that libertarian free will—when it is used to worship God and when in accordance with God's moral dictates—is supremely valuable. God created people with free will so that they could worship and act morally of their own accord. Though people misuse their free will and act immorally, the great value of its proper use more than justifies the existence of evil. It follows that God must have created people with free will in order to create a morally perfect world and that the existence of God is not inconsistent with the existence of evil. It will be beneficial to consider a hypothetical instance of evil in order to see how the theodicies function to answer the problem of evil and then to highlight the deficiencies.⁷

Tammy arrives home after working late one night. The house is dark, and her family does not seem to be home. The eerie silence is broken by a phone call. The caller identifies himself as a police officer investigating a fatal two-car accident. One driver, it appears, was Tammy's husband. There were two bodies in the back seat. Tammy knows immediately that the two bodies are those of her children.

The officer informs her that the other driver, Matthew, is alive and was rushed to the hospital. It is likely that Matthew was driving under the influence of alcohol. For months, Tammy struggles just to survive. She is consumed with pain over her loss and with anger at the man who took her family from her. Finally, Matthew is well enough to stand trial. He is sentenced to 12 years in prison. Going through the process of the trial only makes Tammy's pain worse, and she finds no peace after the sentencing.

Eventually, one of Tammy's friends offers to take her to church. Tammy has never considered religious belief rational, and even married a nonbeliever in order to maintain a thoroughly secular household. In desperation and knowing

that nothing else has helped her, Tammy reluctantly agrees to go. After the service, Tammy speaks with the pastor about her case. The pastor sympathizes and tells Tammy of Christ's atonement for sin and God's unimaginable forgiveness. Despite initial skepticism, Tammy takes the lesson to heart and works to forgive the man who killed her family.

After much prayer and spiritual guidance, Tammy is ready to go to the prison and openly forgive Matthew. Tammy finds Matthew a broken man. He has fallen into self-hatred so deeply that he feels even prison is too good for him. He expects to get lambasted by Tammy for what he has done, and even welcomes the idea. Tammy, however, offers him her forgiveness. She tells Matthew of God's forgiveness which set her free from hatred and hopes that Matthew will also find his way to God. Tammy meets with Matthew once a month to read Bible verses and pray, until he is released and devotes his life to serving God.

A theist interpreting this scenario by way of a soul-making theodicy would evaluate Tammy's state after dealing with the accident and look for signs of spiritual development. The accident and all its attendant evils provided the impetus for Tammy to strive to become more forgiving, compassionate, and peaceful. Tammy learned of God's forgiveness of sin and eventually decided to model herself after that example and forgive Matthew. In this way, she developed spiritually and became more like the ideal person she was created to be, thus getting closer to achieving her purpose.

An obvious objection to this scenario is that not all the evils in this case were beneficial for the purpose of soul-making. For example, shouldn't we consider whether Tammy's husband and children developed morally and spiritually given the events of the scenario? Tammy's children died horrifically in a car accident and don't seem to have had a chance to develop any godly character traits from that. Further, Tammy's husband was not

5. Ibid., Section 4.

6. René Van Woudenberg, "Chapter 12: A Brief History of Theodicy," in *The Blackwell Companion to the Problem of Evil*, ed. Justin P. McBrayer and Daniel Howard-Snyder (Somerset, NJ: John Wiley & Sons, Incorporated 2013), 177.

7. The reader should note that, while this scenario makes use of specifically Christian terminology, the pertinent features of the case are also applicable to soul-making theodicies and free will theodicies from the Islamic or Judaic perspective.

8. See, for example, David C. Cramer, "John Hick," *Internet Encyclopedia of Philosophy*: ISSN 2161-0002, <http://www.iep.utm.edu/hick>, Section 3A.

a theist. If evil exists to make people into spiritual beings worthy of communion with God, it fails to meet that end if people die without believing in God.

To this, proponents of soul-making theodicies could argue that spiritual development does not cease at death.⁸ People may continue to become more god-like after death—either by reincarnation or transfer to another realm of existence. In this way, Tammy's husband and children could still have opportunities to attain the spiritual ideal set out for them by God. We will now move to a free will interpretation of this scenario.

Recall that theists value libertarian free will because it is a prerequisite for freely loving and obeying God. A theist interpreting this case under the free will theodicy would evaluate Tammy's actions in response to the evils she faced in order to see how her life improved by making the right choices. Tammy chose to set aside her skepticism and seek spiritual guidance. Then, she extended the love and forgiveness that she received from her newfound faith to Matthew. Further, she chose to help Matthew along his spiritual journey by meeting with him once a month. The loss that Tammy suffered provided the opportunity for her to strive toward her highest purpose—a life freely devoted to the service of God.

One could object that Tammy would not have had to suffer her loss if God had created a world without free agents. If God had created righteous automatons instead of the occasionally evil individuals that truly exist, Matthew would never have driven drunk and killed Tammy's family. However, this possibility exchanges the alleviation of suffering for the possibility of morally meaningful action. Agents who are determined to perform good actions are not as valuable as ones that freely do so. Without the capacity to choose evil humans could not be responsible for all the good that they do, thus lowering their value in the eyes of God.

The reader has surely noted a

common theme between these two theodicies. On both views, God is responsible for the existence of unnecessary evils. In the case of soul-making theodicies, God created the world as it is such that people could develop virtuous traits (such as mercy, compassion, and love) by overcoming evils, but some of these evils are unnecessary for this purpose. In the case of free will theodicies, God created human beings with free will because it is necessary for a morally good and valuable world, though it often leads to unnecessary evil and suffering. Let us return to Tammy's case to make the point explicit.

With regard to the soul-making account, God is responsible for the suffering required by the developmental process as it exists now. It may very well be that Tammy grew spiritually by undergoing the trials that she did. But if that is so, it is only because God designed the world in such a way that suffering was necessary for her growth. All other things being equal, a world where people do not have to suffer to acquire godly character traits is better than one in which they must. Being omnipotent, God could have just as easily designed a soul-making process that did not involve the experience of suffering—sparing Tammy the loss of her family—but chose not to do so. Now, we will consider the free will account.

If someone had watched Matthew stumble out of the bar, fumble with his keys, and proceed to drive away clearly intoxicated, that person would be held accountable for not intervening if he were able to do so. Of course, an omnipotent, omniscient, and omnipresent God is perfectly able to intervene whenever and wherever that God desires. So, even if the value of free will is granted, God could ensure that cases of innocent suffering such as this did not happen. A mere gust of wind could have set Matthew's vehicle on a course that did not intersect with Tammy's husband and children, which would be well within God's ability to arrange. Matthew's poor decision-making

need not have caused suffering in anyone's life but his own. A parenting analogy is sometimes used to characterize the God/human relationship, in part because of the inequalities implied but also due to God's supposed unconditional love for human beings. However, it should be clear from the preceding discussion that the parenting analogy is critically flawed.

A parent who takes the training wheels off his child's bicycle when the child has had some practice riding is acting out of love. In an imperfect world, it is necessary to challenge people in order for them to develop perseverance and responsibility. On the other hand, if that parent had removed the training wheels and allowed the child to ride in traffic that would not be an expression of love. Pushing the child into a busy intersection to test his reflexes and pain tolerance would be maniacal.⁹ The theodicies propose that God tests the innocent by letting them suffer at the hands of the guilty, and purifies their souls through pain. Those are not expressions of omnibenevolence. Because of this, neither a free will theodicy nor a soul-making theodicy can rescue the traditional conception of God from the problem of evil.

Moreover, the theodicies are inadequate because they frame overcoming evil as an individual achievement rather than a communal one.¹⁰ For example, in soul-making theodicies, an individual overcomes evil by acquiring the necessary godly character traits and striving to be the person God wants her to be. In free will theodicies, an individual overcomes evil by resisting temptation and acting in accordance with God's will. Salvation is meted out to those who meet God's spiritual standards on an individual basis. The effects that godly dispositions and actions have on others are secondary to their status as individual achievements.

To be clear, neither theodicy takes a *radically* individualistic view where evil is overcome without regard for, or

9. It must also be noted that, in this analogy, the human parent is not indirectly responsible for the existence of bicycles and motor vehicles, nor does he write the laws of physics that make their engagements tragic.

10. Of course, the foundation for the individualized emphasis in the theodicies is the doctrine of the soul. It is far beyond the scope of this paper to offer a full argument towards adopting an alternative model of the self against traditional doctrines of the soul. Rather, in this section I will point out that we can give a conceptually richer account of the role that evil plays in human life by employing a communal framework for interpreting instances of evil, which follows from the assumption of a relational model of the self.

at the expense of, others. Soul-making theodicies, for instance, value mercy as a godly character trait. This implies an interpersonal dimension to overcoming evil because a person can only be merciful to another person. Rather, these theodicies are inadequate because they do not take into account the *fundamentally* relational nature of the individuals in question.

On a communal understanding, instances of evil primarily serve to estrange people from one another. People overcome evil in much the same way that they do on the individualized understanding: They acquire character traits such as compassion, benevolence, and temperance. The difference is that, on the communal view, those dispositions and actions are primarily valuable because they serve to bring people together into a community, not only because they are individual achievements. Let us turn to Tammy's case and its theodicy-inspired readings one last time in order to compare this communal understanding against the individualized one.

The theodicy readings posit a stable core to Tammy that remained fundamentally unchanged by the loss of her family. She had the same soul before and after the loss of her family; otherwise, it would not be correct to say that *Tammy* developed spiritually or that *Tammy* was responsible for making the good choices that she did after the accident. On the communal reading, when Matthew drove drunk and killed Tammy's husband and children, he not only severed Tammy's relationships with her family but also destroyed a major part of her identity.

Tammy did not develop spiritually or act morally in a vacuum. She was a mother, wife, friend, and eventually a member of a church. In the wake

of disaster, people need psychological, emotional, and spiritual support from others, not ample personal fortitude. Tammy endured her hardships by relying on the relationship she had with her friend and forming a relationship with the pastor of the church. Eventually, she was able to overcome her hatred, forgive Matthew, and help him along his own journey to God. She overcame evil by establishing beneficial relations with others, which maintained her spiritual strength and gave her new opportunities to act in a god-like fashion.

The case is not fully explained by either theodicy reading because they both miss the cooperative element at work in it. A network of actors worked to bring about the reconciliation. That is not to say that Tammy bore no responsibility for her actions. After all, they would not have come about without her. It is simply to say that the experience of evil and its overcoming is a communal one as much as it is an individual one. An answer to the problem of evil that omits that fact does so arbitrarily and to its own detriment. In summary, the traditional answers to the problem of evil are inadequate. They imply the existence of a God which does not escape the problem of evil and they unduly omit the communal aspect of the process of overcoming evil. To prefigure the discussion of the next section, Josiah Royce's answer to the problem of evil does not suffer from these deficiencies.

Royce's Answer to the Problem of Evil

Before I discuss Royce's answer to the problem of evil, it will be beneficial to briefly explain how he frames the issue. The reader should keep in mind that Royce explicitly rejects the three-omni conception of God that is presupposed by the traditional theodicies.¹¹ We will discuss

Royce's conception of God toward the end of this section, after the foundation of Royce's views on evil has been laid. Royce understands evil in the typical sense, but with a pragmatic twist. "Evil" describes any bad state of affair which serves to undermine the purposes of a rational agent.¹²

While Royce agrees with traditional monotheists that people exist in a fallen state, fall short of an ideal life, and need a savior to achieve that life,¹³ people are not evil by nature. They perform evil actions because they are morally detached individuals.¹⁴ If left unrecognized and unattended, this detachment leads to a state called "social blindness,"¹⁵ which is to be irresponsive to the needs of others and too proud in one's own strivings to see the value in conflicting strivings.¹⁶ In order to find the cure for the affliction of social blindness, let us consider the origin of the "morally detached individual."

People are morally individuated in three ways: by the distinctness of their experience, the outward inaccessibility of their thoughts and intentions, and by the presumption that "deeds and their doers stand in one-one correspondence,"¹⁷ which is to say the presumption that collective *action* is merely the sum of individual *actions*. Royce argues that this idea is of recent vintage and is not supported by experience in daily life.¹⁸ In Royce's view, a community is a superhuman being that is composed by, but is not reducible to, its members and whose actions are more than the sum of its individuals' actions.¹⁹ A community acts in the world through its members, has a past, and will have a future. Members are united in the "spirit" of their community and overcome their social separation by taking up shared values and purposes. A community need not

11. Jacquelyn Ann K. Kegley, *Josiah Royce in Focus*, (Bloomington, Ind.: Indiana University Press, 2008), 80.

12. Josiah Royce, *The Sources of Religious Insight*, (Washington D.C.: Catholic University of America Press, 2001), 216.

13. *Ibid.*, 28-29.

14. Josiah Royce, *The Problem of Christianity*, (Washington D.C.: Catholic University of America Press, 2001), 194.

15. *Ibid.*, 378.

16. Kegley, *Josiah Royce in Focus*, 93.

17. Royce, *Problem of Christianity*, 238.

18. *Ibid.*, 240.

19. Royce, *Problem of Christianity*, 123.

20. See Chapter 2 of Kegley's *Josiah Royce in Focus* for a thorough explication of Royce's views on the self.

21. Royce, *Problem of Christianity*, 269. See also: Frank Oppenheim, *Royce's Mature Philosophy of Religion*, (Notre Dame, Ind.: Notre Dame Press, 1987), 142. "Higher life" here is meant in two senses. First, in the sense that devotion enriches a person's life, and, second, in the sense that the person's life becomes more attuned to the divine life.

be heroic to bring its members together; however, a youth soccer league illustrates the idea nicely.

Imagine that, some years ago, a group of parents decided that the local neighborhood children should have more opportunities to play and get to know each other. The parents pitched in to buy a vacant field and soccer equipment and started holding games every weekend. The parents form a community by acting together for the sake of a shared purpose. Each member takes the past actions of the league as events in his or her own past, and the future actions of the league into his or her own future. For example, Bill and Sarah both remember painting the lines on the field before the very first game, and look forward to the day that the league can afford a scoreboard. The sum of all those shared and anticipated experiences—and the meanings those events hold for the members—constitute the “self” of the community.²⁰ Yet, not every community has the same peaceful existence as the soccer league we have been discussing. Often, the purposes of a community are subverted by (or existentially opposed to) instances of evil, and members must thwart that evil. Royce calls people’s practical devotion to a higher communal life—including struggling together against evil—“loyalty,”²¹ and it is to that concept that we turn now.

Recall that an instance of evil is any state of affairs that undermines the purposes of rational agent. Under this category, we would do well to include pain, disease, and pestilence. Finite beings can only survive within a very narrow range of acceptable conditions and are severely limited in their abilities to maintain those conditions. Because human beings are so limited in their individual experience and knowledge of the world, they form communities to

survive. But, as a matter of course, these communities create and follow moral codes that vary widely. The practices of one community are often considered evil by another. In order to avoid arbitrariness in the discussion of evil, we need a regulative principle that is logically prior to the moral code of any one community, but at the same time does not invalidate those moral codes.

That principle is this: recognize “the spiritual unity of all the world of reasonable beings”²² as the true cause of loyalty. Then, seek to actualize it through the particular, and necessarily contingent, causes that make up one’s communal life. It is necessary and honorable to devote oneself to one’s community. However, communities that are rooted in hating and destroying other communities are not objects of genuine loyalty. A community that exists to divide people from one another does not further the true cause of loyalty, which is divine in nature. Communal loyalty, then, is more than a principle of morality, so long as it is genuine. For Royce, it is a religious disposition which serves a dual purpose: establishing individuals and establishing communities.²³

A community demands the unique contributions of talented individuals.²⁴ A person cannot properly serve a community’s cause without establishing herself as a unique individual, because she acquires knowledge and skills in the process.²⁵ I invite the reader to contrast people working on an assembly line with a group of medical researchers working to produce a malaria vaccine. The first social arrangement is designed to eliminate individuality through standardization, making the members more or less interchangeable. The second is designed to stimulate the creative problem-solving capacities of the members, who are experts. Far from being a loss

of individuality, true community is the guarantor of it.

However, we have so far been treating evil as something that simply should not exist. Yet, Royce’s keenest insight into the experience of evil is perhaps that this conceit is blatantly false. That seems counterintuitive. After all, curing 100% of malaria cases is necessarily better than curing 99% of malaria cases (assuming, of course, that eliminating the remainder did not involve doing anything terribly imprudent). Still, there are experiences of evil that no one would wish to remove from their lives Royce defines those experiences as *sorrows*.²⁶

Whether they occur through conscious separation or accidental death, the evils that cause the most psychological, emotional, and spiritual damage are the losses of loved ones. Supposing that an unfaithful spouse or a friend-turned-enemy can be forgiven, their actions cannot be forgotten. Even so, that grief is not something we would want to be rid of entirely. One might wish to numb oneself to the pain if it is unbearable, but not to the sensitivity that causes the pain. Spiritual strength is acquired by recognizing this sensitivity through the grief and using it to deepen relations with others.²⁷ The result of that struggle is sorrow.

In order to recognize the strength that sorrows offer, it is necessary to take a step back from the pain of grief and recognize why it exists. A severed tie between intimately connected people is the worst imaginable pain. This, obviously, implies the capacity to be intimately connected with someone, which could only be present in profoundly social beings. Sorrow’s unsettling prevalence presents a religious insight. Spiritual strength is not won by merely avoiding possible suffering because, in this world, everyone will have sorrows. Neither one’s world

22. Royce, *Sources of Religious Insight*, 205. Emphasis removed from the original.

23. *Ibid.*, 357.

24. *Ibid.*, 264.

25. Royce, *Sources of Religious Insight*, 197.

26. *Ibid.*, 239.

27. *Ibid.*, 252.

28. *Ibid.*, 253.

29. Royce, *Problem of Christianity*, 180.

30. *Ibid.* 204.

31. *Ibid.* 180.

nor one's fellows are perfect. Spiritual strength is won by developing the patience and courage to face a future full of meaningful relations without bitterness and resentment.

With this in mind, the next step is to endure the hardship. Finally, it is necessary to draw upon the insight of sorrow and reinvest oneself in social reality. One must deepen relationships or form new ones while remaining aware that sorrow in the future is guaranteed. New and renewed loyalty to meaningful causes are gifts that can only be won through suffering.²⁸ Of course, the loyalty of finite beings has its limits.

A member's betrayal of a community is an especially painful sorrow and it is often fatal for the community. The losses incurred by sorrows are permanent because the deeds cannot be undone. Further, any love that the members can extend to the traitor, or the one who betrays the community, will be scarred by the memory of their action. However, the aftermath of a betrayal is fertile ground for the creative power of communal action. Members who are willing to bear the sorrow and work to reestablish their community bring about goods that would have been impossible had the betrayal not taken place. This is how members manifest the spirit of their community, which guides the process of atonement.²⁹

In the *Problem of Christianity*, Royce illustrates his idea of atonement through an interpretation of the Biblical story of Joseph.³⁰ Joseph's brothers were jealous of the preferential treatment he received from their father and sold Joseph into slavery. Years later, during a time of great famine, Joseph's brothers travelled to Egypt (where Joseph had become Pharaoh's trusted advisor) to buy supplies. Joseph revealed his identity to his brothers and sent them back to their father with ample provisions. In Royce's view, Joseph providing for his family was an act of atonement.

There are three central elements to Roycean acts of atonement. The first is

that the act is performed by some person other than the traitor. The second is that the act would be impossible without the specific betrayal that it atones for. The third element is that the act of atonement makes the world better than it was before the treason.³¹ In this case, Joseph could not have helped his brothers if he were not sold as a slave. Joseph chose to see through his grief, endure it, and make it part of a process of reconciliation. Coincidence may have brought them together spatially, but only Joseph's actions could have reunited the family spiritually. Now that the foundation of Royce's views has been laid, we can make the divine thread running through the discussion explicit.

Recall that, for Royce, a community is a superhuman being. As such, communities can be afflicted by a kind of social blindness like the one which we discussed at the beginning of the section. When members set out to do things on behalf of their community, they are expressing love for one another and for that being that unites them.³² However, the love of a community can itself become a stumbling block on the path towards creating more inclusive communities. The horrors that malevolent communities have inflicted upon the world throughout history need not be regaled here. Suffice to say that people are in constant danger of allowing the love they have for their community to become obsessive and exclusionary.³³ This happens when they mistake their finite, fallible community for the highest good. In Royce's view there is an *actual* highest good. That highest good is the Spirit of the Universal Community, which functions in Royce's religion of loyalty like the God of monotheism functions in those religions.

The Spirit is the divine being that calls upon individuals to conquer evil by exercising their loyal devotion to communities, including through atoning deeds. People are receptive to the will of

the Spirit and learn to feel the difference between communal love and the evil of hatred.³⁴ The social sensitivity that allows people to look beyond their narrow self-interest and band together into finite communities is the first hint of the ideal that is the Universal Community. Members have a duty to stay vigilant against encroaching blindness and ensure that their finite communities remain inclusive, uplifting, and faithful to the Spirit of the Universal Community.

Individuals and communities are engaged in the temporal, yet endless task of overcoming evil. The task is temporal because it takes place within the processes of the world, as the Spirit overcomes evil step by step through the triumphs of its members. The task is endless because, while individuals can work towards actualizing the ideal of the Universal Community, they will necessarily fail. So long as there are finite beings, there will be conflict and evil. The claim that every instance of evil will be met with its fitting act of atonement cannot be proven. Rather, it is asserted by all those who act as if it were true and strive to bring lasting peace to a hurting world.³⁵

Unlike the traditional conception of God, the Spirit of the Universal Community does not create the world but expresses itself through the existing processes of the world.³⁶ This means that the Spirit cannot conceivably bear responsibility for the existence of evil. Further, while the traditional conception of God allows evil to exist to suit its own salvific tastes, the entire aim of the Spirit is to overcome evil by bringing finite beings together in community.

This leads us straight away to the individualistic emphasis of the traditional theodicies, which I argue is their second deficiency. Royce's answer to the problem of evil stresses the interconnectedness of individuals and the fact that reconciling evil is a communal process. People depend on one another for the strength and means to persevere against evil, so it is

32. Ibid. 265.

33. Kegley, Josiah Royce in Focus, 93.

34. Oppenheim, Royce's Mature Philosophy of Religion, 142.

35. Royce, Problem of Christianity, 186.

36. See Kegley, Josiah Royce in Focus, 157-8. For a brief summary of Royce's views on the monotheistic doctrine of creation.

only fitting that they should overcome evil together as well. In conclusion, Royce's conception of God does not fall prey to the problem of evil, and he offers a communal model for the process of overcoming evil. For these reasons, the answer to the problem of evil that Josiah Royce proposes in his later writings is better than the traditional theodicies we have been discussing.

Conclusion

In this paper, I introduced the problem of evil and two traditional answers to that problem: soul-making theodicies and free will theodicies. After outlining the theodicies, I used them to interpret a hypothetical scenario. Using that scenario and evaluating how proponents of soul-making theodicies and free will theodicies would interpret it, I argued that the theodicies failed to answer the problem of evil adequately for two reasons. Firstly, they presuppose a conception of God that is not omnibenevolent, which is self-defeating for a traditionally theistic theodicy. Secondly, they omit the communal aspect of the process of overcoming evil. Then, I explicated the answer to the problem of evil as found in Josiah Royce's later writings, *The Sources of Religious Insight* and *The Problem of Christianity*. I argued that Josiah Royce's answer is superior to the answers given by traditional theodicies because it does not presuppose a problematic traditional conception of God. Also, it adequately emphasizes the communal aspect of the process of overcoming evil.

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