

# McNair Scholars Journal 2015

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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.

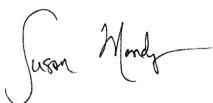
We congratulate each of the McNair Scholars whose research and scholarship is presented in this journal. This work represents your intellectual efforts, your persistence, and your limitless potential as future scholars. We are grateful for the faculty mentors who have worked so closely with our McNair 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,



Robert P. Smart, Ph.D.  
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***

The Ronald E. McNair Post-baccalaureate Achievement Program is a TRiO Program funded through the United States Department of Education and Grand Valley State University.



# Table of Contents | McNair Scholars 2015

6	<b>Crisol Beliz</b>  <b>“They Do Not Treat Us Like Human Beings”: Latino-Police Relations in 1960’s Chicago</b> Faculty Mentor: <i>David Stark</i>
7	<b>Lauren Berry</b>  <b>Regulatory Fit and Taste Perceptions</b> Faculty Mentor: <i>Ernest Park</i>
8	<b>Dionna Cheatham</b>  <b>Unpacking the Social and Economic Disparities Among Disabled Black Mothers</b> Faculty Mentor: <i>Kim McKee</i>
9	<b>Kelsie Colley</b>  <b>Perception of Events in Stories Guides Eye Movements during Reading: A Working Memory Load Hypothesis</b> Faculty Mentor: <i>Chris Kirby</i>
10	<b>Darian Farrell</b>  <b>Social Exclusion and its Effects on Physical Vulnerability</b> Faculty Mentor: <i>Kristy Dean</i>
11	<b>Marie Griffith</b>  <b>Modeling the Development of World Records in Track and Field</b> Faculty Mentor: <i>Paul Stephenson</i>
12	<b>Amaya Guthrie</b>  <b>Childhood Antecedents of Perfectionism: Implications for Self-Esteem, Self-Confidence, and Life Satisfaction</b> Faculty Mentor: <i>Larry Burns</i>
13	<b>Sarah Hayes</b>  <b>Social Influence and Information Processing as Moderators of a Narrative Message about Skin Cancer</b> Faculty Mentor: <i>Amanda Dillard</i>
14	<b>Sultan Hubbard</b>  <b>Relational ordinary conversation, relational perceived support, and affect: A replication study</b> Faculty Mentor: <i>Brian Lakey</i>

15	<b>Marina Ibarra</b>  <b>Interaction of tetraspanin KAI1/CD82 and tetraspanin CD151 in hepatocyte growth factor c-Met receptor regulation in prostate cancer cell lines</b> Faculty Mentor: <i>Suganthi Sridhar</i>
16	<b>Taylor Lewis</b>  <b>The Evolution of Military Systems during the Hundred Years War</b> Faculty Mentor: <i>James Smither</i>
17	<b>C'arra Miller</b>  <b>Fragment-Based Drug Discovery of a Novel Inhibitor of OXA-24 <math>\beta</math>-Lactamase</b> Faculty Mentor: <i>Rachel Powers</i>
18	<b>Bikash Mishra</b>  <b>Testing Novel BIBR 1532 Derived Telomerase Inhibitor</b> Faculty Mentor: <i>Suganthi Sridhar</i>
19	<b>Aron Rottier</b>  <b>Modification of the LRB E3 Ligase</b> Faculty Mentor: <i>Matt Christians</i>
20	<b>Stacie Stuut</b>  <b>Structural and functional characterization of the antibiotic, Linezolid</b> Faculty Mentor: <i>Matt Hart</i>
21	<b>Chela Wallin</b>  <b>Naltrexone Regulation of Stress Enhanced Alcohol Self-Administration</b> Faculty Mentor: <i>Glenn Valdez</i>
22	<b>Brandon Wright</b>  <b>No Soft Doctrine: Royce on the Problem of Evil</b> Faculty Mentor: <i>Dwayne Tunstall</i>
23	<b>Grand Valley State University McNair Scholars who have received their Ph.D.'s as of August 2016</b>

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



**Crisol Beliz**  
*McNair Scholar*



**David Stark**  
*Faculty Mentor*

Violence seems to be an endemic problem in the United States; news and media outlets constantly report on incidents of police brutality against unarmed communities of color. These news reports have garnered worldwide attention and people have begun to protest the excessive use of force by police. Police departments everywhere have maintained a reputation for targeting marginalized communities, in particular African-Americans. However, despite their reputations for targeting marginalized communities, Latinos are often forgotten in the discussion of community-police relations. The Puerto Rican community of 1960’s Chicago dealt first-hand with the impact of hostile policing against the Latino population, most notably in the cases of Celestino A. González and Silvano Burgos, Arcelis Cruz, and Manuel Ramos. Chicago’s Latino community brought attention to their struggle with police violence. A Puerto Rican consciousness slowly emerged in the 1960s, beginning with a letter-writing campaign, then a violent protest, and culminating with a coalition of activists raising their collective voices to unite the community against police brutality.

Many Puerto Ricans began migrating to Chicago after World War II and quickly had difficulty navigating Chicago’s racial hierarchy. The choice to migrate to Chicago was largely the result of a job recruiting agency set up in Puerto Rico in 1946, and the declining economic opportunity in cities like New York. Upon their arrival to Chicago they encountered frequent discrimination in housing and employment. They were relegated to some of the most run-down neighborhoods in the city and barred from living in White neighborhoods. Puerto Ricans maintained close ties to their homelands preventing them from forging ties within their new communities. Furthermore, they accounted for only 32,000 inhabitants in a city of over 3 million by 1960. Police brutality soon came to be a concern for many Puerto Rican residents.

One of the earliest cases of police hostility to gain the community’s attention was that of Celestino A. González and Silvano Burgos in 1965. They were brutally beaten by officers until González lost consciousness and woke up in a Chicago hospital tied to a bed. An outraged Puerto Rican community demanded an investigation. Another pivotal moment in community-police relations was the Division Street Riot of 1966, initiated by the shooting of Arcelis Cruz. This three-day riot earned the Puerto Rican community the media’s attention. Finally, the shootings of Manuel Ramos and Rafael Rivera in 1969 united the entire community with the help of the Young Lords Organization and the Black Panthers. These three responses reflect the development of a Latino political consciousness to police brutality.

Trends in U.S. political activism influenced the responses of the Latino community. Community-police relations cannot be considered in isolation when discussing the development of a Latino political consciousness because it responded to discrimination as a whole. Latinos expressed their frustration with housing and employment discrimination. As time progressed the community became more sophisticated, adopting the tactics of non-violent protest that allowed communities to voice their concerns more effectively. Understanding the various responses of the Latino community in combatting issues of police violence is significant in order to find solutions and to explore issues of police brutality today. Further research should explore the relationship between the U.S. political climate of the 1960’s, the Young Lords Organization, and community-police relations.



# Regulatory Fit and Taste Perceptions



**Lauren Berry**  
*McNair Scholar*



**Ernest Park**  
*Faculty Mentor*

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



**Dionna Cheatham**  
*McNair Scholar*



**Kim McKee**  
*Faculty Mentor*

The intersections of race, socioeconomic status, disability, and state and federal welfare, health and housing policies greatly impact the experiences of Black mothers and their families. Black women, historically and in contemporary society, experience constraints to their reproductive freedom to parent as a result of legacies of slavery that resulted in the forced separation of Black mothers and children and racist conceptualizations of “good” motherhood that persisted in the 20th and 21st centuries. Additionally, women with physical and intellectual disabilities are denied or discouraged from motherhood. Disabled women’s ability to mother has been challenged by society and health care providers. Deploying an intersectional framework, this essay elucidates the connections between Black Feminist Studies and Disability Studies in its focus on motherhood and families. By studying the historical devaluation of Black motherhood, I bring new attention to narratives concerning the portrayal of physical and intellectual disabilities and Black motherhood. 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 existing federal and state policies, health research, and data from a pilot survey of adult children of mothers with disabilities. Survey findings include fourteen participants ranging in age from 18-45.

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.

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 their families. The inclusion of their voices provides a new lens to consider how these families are explicitly and implicitly shaped by federal and state policies.

By incorporating feminist disability and black feminist theoretical frameworks, this research seeks to promote increased dialogue concerning better methods to support these families. 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 discuss the Feminist Disability Studies research and its intersections with Black feminist scholarship on motherhood. Finally, I discuss the impact of assumptions concerning Black motherhood and disabilities on the lived experiences of Black disabled mothers and their children.

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



**Kelsie Colley**  
*McNair Scholar*



**Chris Kurby**  
*Faculty Mentor*

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



**Darian Farrell**  
*McNair Scholar*



**Kristy Dean**  
*Faculty Mentor*

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



**Marie Griffith**  
*McNair Scholar*



**Paul Stephenson**  
*Faculty Mentor*

Assuming that there is a limit in human performance and that there will eventually be a threshold in world records for every track and field event, the researchers used analytical techniques to develop a model of world records over time. Data for world record events were collected from both the official Olympics and the International Association of Athletic Federations (IAAF) websites. The data collected included the following variables: Name, Time or Measurement, Record Year, and Each Year. The variable Record Year stands for the year in which a world record was set and Each Year represents every consecutive year from the first documented world record of that event until the year 2014. Various curve fitting techniques such as the linear model, exponential curve, logistic curve, and the Gompertz curve were investigated in an effort to identify the curve that best fit the data.

After examination, it was identified that the Gompertz curve was the model of best fit for predicting the human threshold limit. This model included four parameters: the upper asymptote, the lower asymptote, the growth rate of the curve, and a point of inflection which affected curve direction. The upper and lower asymptote stands for the highest or lowest time/measurement for each event. This model was then utilized on data for the men's and women's 100, 200, and 400 meter long jump and shot put. After the limit values were computed, the estimates were verified based on visualization of the curve produced and the  $R^2$  values. The closer that the  $R^2$  values were to 1, the more the model explains the variation of the data. The computed  $R^2$  values in these analyses were all between 0.9 and 1.

Once limit values were computed for each event, the researchers also completed a sensitivity analysis on the performance of the model. This was done to adjust for possible steroid effect in the given data and to test whether these limit values will truly hold over time. Steroid effect was tested by including

records from athletes who have tested positive for steroid use into the data set to see its effects. This inclusion appeared to eliminate times or measurements that were weaker in subsequent years and either raised or lowered the limit value.

The researchers also extended the current world record for hundreds of years to see how the limit values are affected. It appears that the longer the current world record holds, the more the limit value gets pulled toward that record. This allows for a smaller expanse for future improvement. However, if the current world record is broken again, the limit value readjusts itself and decreases the threshold time for a running event or increases a threshold measurement for a field event. This sensitivity analysis has shown there is a level of uncertainty embedded in the modeling process since human performance fluctuates over time. Therefore, while in theory a definite limit value for track and field events exists; this uncertainty suggests that the thresholds for these events can vary between time periods.



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



**Amaya Guthrie**  
*McNair Scholar*



**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



**Sarah Hayes**  
*McNair Scholar*



**Amanda Dillard**  
*Faculty Mentor*

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



**Sultan Hubbard**  
*McNair Scholar*



**Brian Lakey**  
*Faculty Mentor*

Perceived social support is the belief that family and friends will provide assistance in time of need and is linked to a vast amount of mental health outcomes. Individuals with high perceived social support typically have better mental health than those with low perceived social support across stress levels. Those with high perceived support also report experiencing fewer psychotic symptoms, fewer major depressive symptoms, less post-traumatic stress disorder symptoms, low negative affect (emotion), high positive affect (emotion), lower mortality rates, and report a greater sense of happiness. Relational Regulation Theory (RRT) was designed to explain the main effects between perceived support and affect. A main effect between perceived support and mental health is observed when those with high social support have better mental health (low negative affect and high positive affect) than those with low perceived support regardless of stress levels. RRT posits that one's ordinary social interactions (i.e., ordinary conversation and shared activity) with family and friends accounts for most of the main effect between perceived social support and affect. RRT claims that the people and conversations that regulate affect are primarily a matter of an individual's personal tastes. In this current study we sought to replicate the findings of Lakey, Vander Molen, Fles, and Andrews (2015) that a) perceived support and ordinary social interaction are primarily relational and b) that ordinary conversation shares the same pattern of correlations with affect as perceived support. It is important to note that there are at least three components of perceived support, one of which is relational effects. A relational influence in perceived support is indicated when a recipient perceives a provider as more supportive than the recipient sees other providers, and the provider is seen as more supportive than they are typically seen by other recipients.

The current sample was extracted from an existing data set that utilized

Grand Valley State University (GVSU) roommates as subjects. Participants completed measures in a round robin design, in which each roommate rated the other respective roommates on supportiveness, quality of conversation, affect when with that roommate, and perceived similarity to any particular roommate. It was found that perceived support and ordinary conversation were primarily relational. Positive and negative affect, as well as similarity had statistically significant relational components. Moreover, it was found that when a recipient perceived a provider as relationally supportive, the provider then elicited high positive affect, low negative affect, good conversation and high similarity in the recipient. In addition, when a provider elicited relationally good conversation in a recipient, the recipient experienced high positive and low negative affect, as well as high perceived similarity with the recipient. These findings are consistent with RRT hypothesis that a) perceived support and ordinary conversation are primarily relational and b) that ordinary conversation has the same pattern of correlations with affect as perceived support. Since perceived support is related to overall well-being, learning more about this construct may assist in creating more effective interventions.



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



**Marina Ibarra**  
*McNair Scholar*



**Suganthi Sridhar**  
*Faculty Mentor*

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



**Taylor Lewis**  
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In 1955, historian Michael Roberts introduced the concept of a military revolution. He labels this as a characteristic of the time between 1560 and 1660. According to Roberts, advances in gunpowder technology, as well as the professionalization of military systems that were made during this segment of the early modern era characterized the period as revolutionary. Later expanding on the concept, Geoffrey Parker, in *The Military Revolution*, addressed a larger period (1500-1800). Giving further details to naval and siege warfare, Parker's work effectively broadens the concept of the early modern military revolution.

In 1993, military historian Clifford J. Rogers addressed the revolutionary nature of the Hundred Years War (1337-1453). Rogers attributes two major revolutions to the war, these being the infantry and artillery revolution. The infantry revolution, classified primarily as an English achievement, was described in terms of England's effective use of archers in pitched battles. The longbow allowed the English to dominate in large engagements against mounted French knights. The artillery revolution is a characteristic Rogers gives to French military in the 15th century. Although artillery had been used throughout the war, it was not until Charles VII began allocating large amounts of capital to this technology that it began to be truly effective in battle. As large amounts of artillery were consolidated under the French banner, the English were finally removed from the country.

While there is validity in Rogers' revolution argument, changes beyond the extent of infantry and artillery were being made throughout the war's entirety. The most significant change lies within the concept of military professionalism. As Roberts and Parker discussed, the early modern army was far more professional than the medieval armies of the Hundred Years War. However, a close analysis of the war, particularly the period between the battles of Poitiers (1356) and

Agincourt (1415), reveals that profound changes were occurring that would inevitably steer Europe toward early modern professionalism.

Ample attention has been given to the English military and the movement away from the feudal system towards a wage-based system. This is a concept also seen in the French military during the reign of Charles V. Bertrand du Guesclin, constable of France under Charles, recruited bands of unemployed soldiers (i.e., free companies) to fight for the French cause. Interestingly, despite France's reliance on feudal means of recruitment, the constable's army resembled a more modern system. It was during this stage of the war that a large amount of English territorial gains were lost to the French; this is likely due to the ability of the French, if only for a short time, to think beyond feudalism. Although the French reverted back to feudal means of recruitment to meet the English invasion of 1415, they once again embraced professionalism during the reign of Charles VII (1429-1461). This was accomplished by consolidating large amounts of gunpowder weaponry for use by professional artillerymen. The role of professional artillerymen was crucial to the final French victory in 1453 and is subsequently the most notable piece of a larger pattern of change. With France's shift from the traditional means of recruitment to more professional means of raising armies, the French military system of the Hundred Years War is accurately categorized as a predecessor of the early modern army.



# Fragment-Based Drug Discovery of a Novel Inhibitor of OXA-24 $\beta$ -Lactamase



**C'arra Miller**  
*McNair Scholar*



**Rachel Powers**  
*Faculty Mentor*

$\beta$ -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  $\beta$ -lactam ring that is important for the reactivity of  $\beta$ -lactams.  $\beta$ -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  $\beta$ -lactam's potency, subsequently leading to resistance.

Among the mechanisms bacteria employ for resistance, the expression of  $\beta$ -lactamases is the most common. These enzymes confer resistance to  $\beta$ -lactam antibiotics by hydrolyzing the lactam ring through a two-step acylation-deacylation mechanism. Once the  $\beta$ -lactam ring is hydrolyzed, it is inactivated. There are four classes of  $\beta$ -lactamases: A, B, C, and D. Classes A, C, and D employ a serine based mechanism to hydrolyze the  $\beta$ -lactam ring, while class B  $\beta$ -lactamases are metalloproteins that require zinc for their activity. Although all classes of  $\beta$ -lactamases are of clinical importance, class D  $\beta$ -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  $\beta$ -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  $\beta$ -lactams, combination therapies consisting of a  $\beta$ -lactam antibiotic with a  $\beta$ -lactamase inhibitor have been employed. However, current  $\beta$ -lactamase inhibitors also contain a  $\beta$ -lactam ring. Due to this structural similarity to  $\beta$ -lactam antibiotics, inhibitors are also susceptible to existing resistance mechanisms of bacteria.

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



**Bikash Mishra**  
*McNair Scholar*



**Suganthi Sridhar**  
*Faculty Mentor*

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



**Aron Rottier**  
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**Matt Christians**  
*Faculty Mentor*

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



**Stacie Stuut**  
*McNair Scholar*



**Matt Hart**  
*Faculty Mentor*

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.

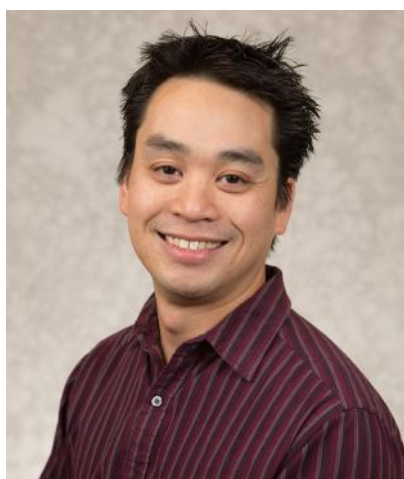
The synthesis was designed to utilize a core intermediate allowing for functionalization at each end. Initially, the construction of this core intermediate was investigated. Several attempts to form the key oxazolidinone were performed; however, this process needs to be optimized. A model system was 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



**Chela Wallin**  
*McNair Scholar*



**Glenn Valdez**  
*Faculty Mentor*

Alcoholism has a major effect on public health, safety and the economy. One of the biggest contributors to ongoing alcohol consumption is its ability to relieve negative mood symptoms associated with stress. Clinical studies have reported that exposure to mild stressors increase the rate of relapse in alcoholics. Using this knowledge, the goal is to examine the neurobiological systems related to alcohol consumption enhanced by stress. Of these, the opioid system is highly significant because it is linked to the rewarding properties of drugs such as alcohol. One pharmacological treatment that has been examined in regard to this issue is the opioid antagonist naltrexone. Preclinical models have well characterized naltrexone and its reduction in the positive reinforcing effects of alcohol and consequently, alcohol consumption. However, much less is known regarding its ability to reduce alcohol consumption when enhanced by stress.

The current study's objective was to investigate the ability of naltrexone in reducing alcohol self-administration when provoked by stress. In doing so, a preclinical model was utilized to investigate naltrexone, stress and alcohol self-administration. Rodents ( $n=11$ ) were trained by standard operant procedures to self-administer ethanol solutions by using a sweetened solution fading procedure. Stable consumption levels were established in order to produce pharmacologically significant blood alcohol levels. Following this training procedure, rats were exposed to an initial session of inescapable electric footshocks. Each footshock lasted for 0.5 seconds and was delivered under a variable time schedule at irregular intervals ranging from 10-70 seconds between shocks. This initial exposure session allowed rats to experience an association with alcohol following stress without pharmacological manipulation. Following this initial exposure, rats were injected with a saline vehicle or naltrexone treatment (10mg/kg s.c.) 10 minutes prior to being placed in the operant chambers. Rats were

then exposed to inescapable footshocks as described above or were allowed to remain in the operant chambers undisturbed for 10 minutes. Rats were then tested and allowed ethanol self-administration for 30 minutes.

A repeated measures ANOVA was used with naltrexone and shock exposure as within subject factors in order to determine statistical significance. Results indicated that rodents pretreated with naltrexone had no significant differences in ethanol self-administration compared to pretreatment of a saline vehicle. Though results did not support the hypothesis at a significant level, those pretreated with naltrexone did show a trend approaching significance. This result of suppressed responding is consistent with literature that naltrexone does reduce goal-seeking behavior. Limitations of the current study involved time constraints as well as a low number of subjects. Previous research has shown that reactions to shocks can be inconsistent; however, there is a tendency to see an effect with repeated days of shock exposure as opposed to acute exposure, as done in the current study. Additionally, rodents were not ethanol dependant. Previous pilot data from the lab shows that acute shocks on ethanol dependent subjects will increase self-administration following protracted withdrawal. Future work should look to utilize chronic stress as opposed to acute stress prior to self-administration as well as establishing ethanol dependence.



# No Soft Doctrine: Royce on the Problem of Evil



**Brandon Wright**  
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**Dwayne Tunstall**  
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The typical conception of God in monotheistic religions is that of an omnipotent, omniscient, and omnibenevolent creator. God created people so that they might come to know and love God. However, the existence of evil makes the notion of an omnipotent, omniscient, and omnibenevolent God problematic.

The problem of evil arises when two statements are conjoined: (i) “If God exists, God is omniscient, omnipotent, and omnibenevolent” and (ii) “evil exists.” If God is omniscient, then God must know if evil exists. If God is omnipotent, then God could eliminate that evil, if God desired 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 evil. 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 omnibenevolence). Yet, evil exists. This seems to imply that God either does not have the three traditional attributes as defined or does not exist.

Traditionally, there are three ways to argue that the existence of God is not inconsistent with the existence of evil. An apologist can put forth a total refutation, a defense, or a theodicy. This paper will outline two forms of theodicy—soul-making theodicies and free will theodicies.

A soul-making theodicy presumes that God created human beings so that they might develop toward a spiritual ideal, and the only way to attain that ideal is by struggling with and overcoming evil. A free will theodicy presumes that God created human beings with libertarian free will (and hence the ability to perform evil actions) so that they might freely choose to love God and act morally. These answers to the problem of evil are insufficient because they imply that God is responsible for the existence of evil. Furthermore, these theodicies are too individualistic because they do not emphasize the role of community in the

process of overcoming evil.

American philosopher Josiah Royce (1855-1916) rejects the traditional theodicies’ conception of God and proposes a different solution. Unlike traditional theodicies, Royce offers a communal answer to the problem of evil in *The Sources of Religious Insight* and *The Problem of Christianity*. In those two writings, Royce argues that evil is primarily the result of the actions performed by morally detached individuals. Communities unite individuals into superhuman beings for the purpose of helping them overcome evils and achieve their need for salvation. However, these communities can also commit evil acts due to their separation from other communities. The Spirit of the Universal Community (or what traditional theists would call God) is what motivates individuals and communities to work together to perpetually struggle to overcome evils. Because Royce’s answer to the problem of evil is not individualistic and does not rely on the problematic conception of God, I contend that it is better than the traditional theodicies.

## Grand Valley State University McNair Scholars who have received their PhD as of August 2016:

Name	GVSU Major	Graduate School	Year
Dr. Shanel Bishop (Bryant)	Psychology	University of Tennessee—Knoxville	2016
Dr. Heather Danhof	Cell & Molecular Biology	University of Texas Health Science Center—Houston	2016
Dr. Rachel Dudley	Sociology	Emory University	2016
Dr. Jeffrey Chivis	Anthropology	Michigan State University	2015
Dr. Delia Fernandez	History	Ohio State University	2015
Dr. Benjamin Winegard	Sociology	University of Missouri—St. Louis	2015
Dr. Eric Gladstone	Sociology	Cornell University	2014
Dr. Melissa Guzman	Sociology	University of California— Santa Barbara	2014
Dr. Whitney Laster (Pirtle)	Sociology	Vanderbilt University	2014
Dr. Erik Anderson	Cell & Molecular Biology	University of Michigan	2013
Dr. Jessica Cruz	French/Public Administration	Columbia University	2013
Dr. Joseph Haughey	English	Western Michigan University	2013
Dr. Stephanie McNeil (Payne)	Cell & Molecular Biology	Johns Hopkins University	2013
Dr. Christina Mello	Anthropology	University of New Mexico	2013
Dr. Jennifer Nyland	Psychology/Biomedical Science	Penn State University	2013
Dr. Catherine Willis	Cell & Molecular Biology	Northwestern University	2013
Dr. Christa Abdul-Karim (Herrygers)	Anthropology	Washington State University	2012
Dr. Shannon Burton	History	Michigan State University	2012
Dr. Jillian Canode	Philosophy	Purdue University	2011
Dr. Erika Edwards	History	Florida International University	2011
Dr. Denice Durkee	History	Ohio State University	2010
Dr. Sadie R Pendez	Sociology	University of Minnesota—Crookston	2010
Dr. Littisha A Bates	Sociology	Arizona State University	2009
Dr. Edwina Reece	Psychology	Sam Houston State University	2009
Dr. Nicole Dafoe	Biology	University of Victoria, British Columbia	2008
Dr. Jaqueline Deuling (Mitchelson)	Psychology	Wayne State University	2007
Dr. Ramon Hinojosa	Sociology	University of Illinois—Chicago	2007
Dr. Lisa C Mondie	Chemistry	Ferris State University	2007
Dr. Jason Rapelje	Sociology/Film Video	Western Michigan University	2007
Dr. Todd Davis	Chemistry	Texas Tech University	2004
Dr. Audelia Munguia	Health Science	Wayne State University	2003
Dr. Angela Walker	Psychology	University of Connecticut	2003
Dr. Mary Seburn	Psychology	University of Massachusetts	2001





## About the TRiO Programs

To fight the war on poverty, our nation made a commitment to provide education for all Americans, regardless of background or economic circumstances. In support of this commitment, Congress established several programs in 1965 to help those from low-income backgrounds and families with no previous college graduates (first generation). The first three programs established were Talent Search, Upward Bound, and Student Support Services. Thus, they are known as the TRiO Programs.

Since then, other programs have been added, including Upward Bound Math and Science, Educational Opportunity Center, The Training Authority, and in 1989, The Ronald E. McNair Post-Baccalaureate Achievement Program. The goal of all of the programs is to provide educational opportunity for all.

The Ronald E. McNair Post-Baccalaureate Achievement Program is designed to prepare highly talented undergraduates to pursue doctoral degrees. In addition, the goal of the program is to increase the number of faculty in colleges and universities that come from a low-income/first generation college background and/or are from an ethnic/racial group that is under-represented in PhD programs.

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