The Penn State McNair Journal

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About the Penn State McNair Journal

TRIO Programs at the National Level

TRIO is a set of federally-funded college opportunity programs that motivate and support students from disadvantaged backgrounds in their pursuit of a college degree. More than 800,000 low-income, first-generation students and students with disabilities — from sixth grade through college graduation — are served by over 3,100 programs nationally. TRIO programs are a vital pipeline to opportunity, serving traditional students, displaced workers, and veterans. TRIO programs were the first national college access and retention programs to address the serious social and cultural barriers to education in America. TRIO began as part of President Lyndon B. Johnson's *War on Poverty*. The Educational Opportunity Act of 1964 established an experimental program known as Upward Bound. Then, in 1965, the Higher Education Act created Talent Search. Finally, another program, Student Support Services, was launched in 1968. The Higher Education Amendments of 1972 added a fourth program by authorizing the Educational Opportunity Centers. Amendments in 1986 added the sixth program, the Ronald E. McNair Post-Baccalaureate Achievement Program, and in 1990, the Upward Bound Math/Science program was created.

The Pennsylvania State University Ronald E. McNair Post Baccalaureate Achievement Program

The Pennsylvania State University Ronald E. McNair Post Baccalaureate Achievement Program (Penn State McNair) provides disadvantaged college students with effective preparation for doctoral study with services and resources that include: opportunities for research or other scholarly activities, summer internships; seminars and other educational activities, tutoring, academic counseling, assisting students in securing admission to and financial assistance for enrollment in graduate programs, mentoring, and exposure to cultural events and academic programs not usually available to disadvantaged students.

Penn State McNair is housed in the Penn State Graduate School. Its administrative home is the Office Graduate Educational Equity Programs.

Since 1991, Penn State McNair has assisted more than 300 students with earning their baccalaureate degrees and preparing them for graduate education. Currently over 50 McNair alums have earned their doctoral degrees and are employed in many areas of the public and private sector including: academia, research, administration, public policy, and the health sciences.

Scholars have been accepted to, are currently enrolled at, or have graduated from graduate programs across the nation that include: Harvard University, University of Pennsylvania, Columbia University, Yale University, Boston University, Johns Hopkins University, University of Maryland-College Park, University of Illinois-Urbana Champaign, University of California at Los Angeles, Purdue University, The Pennsylvania State University, University of New Mexico, University of Texas at Austin, and University of Chicago.

About Dr. Ronald E. McNair

"Whether or not you reach your goals in life depends entirely on how well you prepare for them and how badly you want them." – Dr. Ronald E. McNair

Ronald Erwin McNair was born on October 21, 1950, in Lake City, South Carolina. McNair displayed an early aptitude for technical matters, earning the nickname "Gizmo." His interest in space was piqued by the launch of the Russian satellite Sputnik in 1957, and boosted by the appearance of *Star Trek* on TV years later, its multi-ethnic cast pushing the boundaries of what was possible for a small-town African-American boy.

An outstanding student at Carver High School, McNair starred in baseball, basketball and football and played saxophone for the school band. He graduated as valedictorian of the class of 1967, earning a scholarship to attend North Carolina Agricultural and Technical State University (NC A&T). After initially considering majoring in music at NC A&T, McNair eventually came back around to his love for science, graduating magna cum laude in 1971 with a B.S. in physics.

From there, it was on to the Massachusetts Institute of Technology as a Ford Foundation fellow. Adjusting to the new environment proved a challenge for McNair. He later faced a potentially career-altering obstacle when two years of specialized laser physics research for his doctorate was stolen, but he managed to produce a second set of data in a year, and earned his Ph.D in physics in 1976. Dr. McNair was a member of several organizations during his professional career, including the American Association for the Advancement of Science, the American Physical Society and the North Carolina School of Science and Mathematics Board of Trustees. He was named a Distinguished National Scientist by the National Society of Black Professional Engineers in 1979 and received the Friend of Freedom Award 1981.

During his NASA career, McNair was assigned to the STS-51L mission in January 1985. The primary goal of the mission was to launch the second Tracking and Data Relay Satellite (TDRS-B). It also carried the Spartan Halley spacecraft, a small satellite that McNair, along with mission specialist Judith Resnik, was to release and pick up two days later using *Challenger*'s robotic arm after Spartan observed Halley's Comet during its closest approach to the Sun. Tragically, *Challenger* launched from Cape Canaveral on January 28, 1986, but the orbiter *disappeared in an explosion just 73 seconds after liftoff*. McNair and the six other astronauts in the crew did not survive. Shortly after his death, the Ronald E. McNair Post-Baccalaureate Achievement Program was created through an act of Congress.

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Marital Instability and Spousal Empathy Mediate Childhood Parental Affection Predicting Adulthood Depression

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Conflict of interest
The authors do not have any conflicts of interest or financial disclosures.

Ethical standards
This study was conducted in compliance with the American Psychological Association (APA) ethical standards in the treatment of human participants and approved by the institutional review board (IRB). Informed consent was obtained from participants as per IRB requirements at Harvard University, Georgetown University, University of California at Los Angeles, and University of Wisconsin. Since this study used a publicly available dataset, it was exempt from IRB approval.

Abstract

Attachment theories propose that lack of childhood parental affection confers increased vulnerability to heightened depression in adulthood. However, there remains a dearth of prospective studies on this topic, and no studies have attempted to explain the sequential parental affection–depression connection. This study thus explored whether marital risk and spousal empathy functioned as mediators for childhood parental affection predicting depressive symptoms across 18 years of adulthood. Participants (n = 2,825) averaged 45.55 years (SD =11.39) and 54.16% were females. Parental affection (Parental Support Scale) was measured at Time 1 (T1). Depressive symptoms (Composite International Diagnostic Interview-Short Form) were measured at T1, Time 2 (T2) and Time 3 (T3). Marital risk (Marital Instability Index) and spousal empathy (Marital Empathy Scale) were measured at T1 and T2. Structural equation modeling analyses were conducted to test whether parental childhood affection would negatively predict T3 depressive symptoms, and if marital risk and spousal empathy mediated those relations. All analyses adjusted for prior levels of mediator and outcome variables. Significant direct effects were found such that childhood maternal and paternal affection negatively predicted T3 depressive symptoms. Further, marital risk and spousal empathy mediated those associations. Lower childhood maternal and paternal affection predicted greater marital risk and less spousal empathy. Higher risk and less spousal empathy in turn predicted more T3 depressive symptoms. Findings highlight the importance of parental affection in childhood as well as learning socio-emotional skills to nurture strong marital bond to reduce the odds of developing major depressive disorder in middle-to-late adulthood.

Keywords: attachment theory, major depressive disorder, marital satisfaction, prospective
Marital Instability and Spousal Empathy Mediate Childhood Parental Affection Predicting

Adulthood Depression

Major depressive disorder (MDD) is one of the most common mental disorders globally (Whiteford et al., 2013). In the United States, the lifetime prevalence for MDD is estimated to be 16.2%, and of these, 60% of sufferers of MDD experience severe functional impairment (Kessler et al., 2003). Functional deficits include lack of participation in rewarding social or leisure activities by limiting interactions with family, friends, and significant others (Blanco & Barnett, 2014). Relatedly, MDD has been associated with poorer job performance, work productivity, and increased absenteeism (Lerner & Henke, 2008). Further, research has shown that MDD might put people at risk for chronic cardiovascular, autoimmune, and metabolic health conditions such as angina, arthritis, asthma, and diabetes (Moussavi et al., 2007). Thus, MDD is currently the second major cause of disability globally (Ferrari et al., 2013), and is predicted to be the first major cause of disability by 2030 (Mathers & Loncar, 2006). Given the adverse individual and societal impacts of MDD and its high prevalence, identifying risk factors to inform evidence-based programs that might prevent the development this common mental illness is important.

A plethora of variables serve as risk factors for MDD. These include cognitive biases toward negative material, abnormalities in brain regions linked to emotion regulation and reward processing, parental depression, marital dissatisfaction, and problematic pattern of interactions with primary caregivers during childhood (Gotlib, Joormann, & Foland-Ross, 2014). Specifically, in the last 50 years, *attachment theories* have proposed that deficits in parental affection in childhood contribute to the etiology of MDD (Bowlby, 1977; Bowlby, 1982).

Attachment is defined as an internal working model humans develop that reflects the enduring psychological connections with caregiver figures, particularly the biological parents most people grew up with. Primary caregivers are thought of as those who primarily offer basic care, protection, and pleasure in most situations, as well as a sense of comfort in times of distress. The mental representations of primary caregivers guide one's social skills, as well as how one thinks about others' motivations, actions, and feelings. Secure attachment patterns characterized by high levels of parental affection, availability, and support are theorized to protect against MDD. People with secure attachment styles tend to be more optimistic, open to new experiences, and goal-driven (Bowlby, 1969). Conversely, insecure attachment styles typified by unpredictable, avoidant, or conflictual ways of parenting have been proposed to confer increased risk of MDD. Taken together, high levels of childhood parental affection functions as a proxy for secure attachment, whereas low childhood parental affection reflects insecure attachment styles.

Supporting attachment theories, data pooled across 4,386 participants reliably showed that persons with insecure (vs. secure) attachment patterns marked by dismissive, cold, distant, or harsh caregiver-child interactions were at heightened risk for future depressive disorders (Dagan, Facompré, & Bernard, 2018). However, a primary limitation of research on the relations between attachment and depression is that most of them have been cross-sectional in nature, thereby precluding causal inferences. Nonetheless, these single-time point studies concur with prospective data that insecure attachment styles places people at risk for the onset of clinical depression later in life (Bifulco, Moran, Ball, & Bernazzani, 2002). Collectively, data suggests that lack of childhood parental affection would predict future heightened depression.

What factors might then explain the aforesaid relations between attachment and depression symptoms? Attachment theory also postulates that insecure attachment patterns could adversely impact relationships all through life (Bowlby, 1977; Hazan & Shaver, 1987; Shaver & Mikulincer, 2002). As the internal working model shaped by attachment are the concepts we have of ourselves, others, and the world, attachment offers a practical lens to comprehend human thoughts and feelings. Attachment thus impacts marriage at its core: the growth of an intimate and trusting relationship. Whereas securely attached persons feel close with their intimate partners and reciprocate interactions, insecurely attached persons tend to display suspicion or indifference, or fear abandonment. Supporting this theory, insecure attachment patterns indexed by dearth of parental affection at childhood have been linked to poorer marital quality and risk of separation in at least two studies (Curran, Hazen, Jacobvitz, & Feldman, 2005; Young & Ehrenberg, 2007); however, these single time-point studies need to be corroborated with longitudinal study designs. On the whole, low levels of childhood parental affection can set the stage for marital instability later in life, thereby increasing the risk for future MDD.

Yet attachment models also posit that deficits in childhood parental affection and support likely diminishes individuals' capacity to empathize with others (Mikulincer et al., 2001). Empathy, defined as the emotional response of care brought about by observing another being in need (Cuff, Brown, Taylor, & Howat, 2016), might be lacking in insecurely attached persons. In addition, the theory suggests that feeling chronically underappreciated by primary caregivers might hinder growth in the ability to accurately infer others' thoughts and feelings. Indeed, insecurely attached persons with parents who did not offer ample attention or space to confide in

difficult topics tend to be uncomfortable in intimate partnerships or with managing their feelings (Slade, 1999). Also, they display empathy deficits by hiding their feelings and are inclined to detach themselves from others to avoid discomfort arising from failures in seeking help (Shaver & Mikulincer, 2002). Moreover, data showing that insecurely attached persons endorsed low levels of interpersonal empathy (Burnette, Davis, Green, Worthington, & Bradfield, 2009) further supports the theory. Taken together, it is plausible that the childhood parental affection–adulthood depression connection would be mediated by deficits in spousal empathy.

To date, numerous studies have repeatedly shown that spousal empathy deficits, marital instability, and related concepts predict heightened depression. Data collated across 26 empirical studies comprising more than 5400 participants showed that marital instability and dissatisfaction explained 14% and 18% of husbands' and wives' depressive symptoms respectively (Whisman, 2001). Moreover, even after adjusting for marital instability, depressed (vs. non-depressed) couples displayed more problematic communication patterns (Du Rocher Schudlich, Papp, & Cummings, 2004). For instance, distressed couples with at least one clinically depressed partner habitually communicated about their identity, physical health, psychological well-being, and future in ways that worsen the situation (Hautzinger, Linden, & Hoffman, 1982). This pattern of observations holds up across cultures. For instance, divorced and separated Korean couples were vulnerable to experiencing prolonged low mood states, fatigue, and other depressive symptoms later in life than their married counterparts (Jang et al., 2009). These single time point studies concur with longitudinal ones that showed higher marital strife forecasted more depressive symptoms 15 years later (Choi & Marks, 2008). Therefore, low spousal empathy and high marital instability would likely lead to future increased depression.

Building on attachment theory, the empirical evidence, and logic outlined, we examined the prospective associations among parental affection in childhood and MDD in adulthood. Further, we explore how marital risk and lack of spousal empathy functioned as mediators of the inverse parental affection–adulthood MDD severity connections. This study makes an important contribution because it adds to the limited longitudinal evidence base on deficits in parental affection as risk factors for MDD over 18 years at various stages of adulthood. Thus, we hypothesized that childhood maternal and paternal affection would significantly negatively predict future depressive symptoms (Hypotheses 1 and 2). Additionally, we hypothesized that the childhood maternal and paternal affection–adulthood depressive symptoms relation would be mediated by marital instability (Hypotheses 3 and 4) and spousal empathy (Hypotheses 5 and 6).

Methods

Participants

The present study used the publicly available Midlife Development in the United States (MIDUS) dataset. Data was collected across three waves of assessment to gather information on behavioral and psychosocial factors for physical and mental health (Ryff et al., 2017a; Ryff & Lachman, 2018; Ryff & Lachman, 2017; Ryff et al., 2017b): 1995–1996 (Time 1 [T1]); 2004–2005 (Time 2 [T2]); 2012–2013 (Time 3 [T3]). In this study, participants ($N = 2825$) averaged 45.55 years ($SD = 11.39$, range = 20–74), and 54.16% were females.

Data was gathered in the forms of clinical interviews, mailed questionnaires via telephone and self-administered questionnaires. Whereas data on depressive symptoms were collected via interviews across three waves, childhood parental affection was assessed at T1, and both marital risk and spousal empathy were measured at T1 and T2.

Measures

Parental affection. Parental affection was measured using a seven-item Parental Support Scale (Rossi, 2001) at T2 and T3. Maternal and paternal affection were assessed separately, each on a 7-item scale (e.g., "How much time and attention did your mother/father give you when you needed it?"). Participants rated on a 4-point Likert scale ranging from 1 (*not at all*) to 4 (*a lot*). High internal consistencies have been found for the scale (Cronbach's αs = .91 and .93 for maternal affection and paternal affection respectively) (Rossi, 2001).

Marital risk. Marital risk was measured using the two-item Marital Instability Index (Booth, Johnson, & Edwards, 1983). The two items consisted of, "During the past year, how often have you thought your relationship might be in trouble?" and "What do you think the chances are that you and your partner will eventually separate?" Participants endorsed on a 4-point Likert scale ranging from 1 (*not likely at all*) to 4 (*very likely*). This measure has shown good internal consistency at T1 (α = .69) and T2 (α = .70).

Spousal Empathy. was measured using the Marital Empathy Scale (Grzywacz & Marks, 1999; Schuster, Kessler, & Aseltine Jr., 1990; Walen & Lachman, 2000) administered at T1 and T2. The clinical interview asked questions such as, "How much does your spouse or partner really care about you?" Respondents rated on a 4-point Likert-scale ranging from 1 (*not at all*) to 4 (*a lot*). This scale has good internal consistency at T1 (α = .86) and T2 (α = .90).

Major depressive disorder symptom severity. MDD symptom severity was measured by using the World Health Organization's Composite International Diagnostic Interview-Short Form (WHO CIDI-SF; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998), based on the Diagnostic and Statistical Manual of Mental Disorders – Revised Third Version (DSM-III-R; American Psychiatric Association, 1980). Participants first answered the stem question, "In your lifetime, have you ever had two weeks or more when nearly every day you felt sad, blue, depressed? Have there ever been two weeks or longer when you lost interest in most things like work or hobbies or things you usually like to do for fun?" Subsequently, those who endorsed 'yes' on either of the two stem questions reported whether they had experienced any of the following seven depressive symptoms over the last 12 months: low mood, loss of interest, fatigue, appetite, sleep disturbances, poor concentration, suicidal ideation. Participants responded on a dichotomous scale (either 0 (*no*) or 1 (*yes*)).

Procedures

At T1, the survey was given to a wide variety of participants using a random digit dialing (RDD) strategy, which oversampled five metropolitan areas in the US, siblings of the those from the RDD, and a national RDD of twin pairs (N = 7,108). All of these participants were English speaking adults living in the US. Most of the participants were interviewed via phone calls, whereas others were given self-administered questionnaires, which were mailed to the participants.

The follow-up assessment at T2 was carried out in a similar fashion on 4,963 participants recruited from T1. At T3, assessments from the previous waves were repeatedly administered on 3,294 participants (Radler & Ryff, 2010). The final sample comprised 2,825 married participants who were able to speak to our research questions.

Data Analytic Strategy

We conducted longitudinal structural equation modeling analyses using the *lavaan* package in R (Rosseel, 2012). MDD symptom severity at T3 served as the outcome variable in all of the models. For a stringent test of our analyses, we adjusted for baseline mediators (marital risk, spousal empathy) as well as T1 MDD and T2 MDD (Cole & Maxwell, 2003). All the indicators of the latent constructs were non-normally distributed ordinal data. Thus, we conducted all analyses using the diagonally weighted least squares estimator with means and variance adjusted (WLSMV) χ^2-statistic with theta parametrization which inputs the polychoric correlation matrix (Rhemtulla, Brosseau-Liard, & Savalei, 2012; Wang & Cunningham, 2005). Pearson product-moment correlations underestimate the strength of associations among variables which may lead to attenuated factor loading estimates (Jöreskog & Sörbom, 2006). Further, the WLSMV estimator does not assume multivariate normality but instead computes optimal weights and offers robust standard errors. Simulation studies showed that the WLSMV (vs. standard WLS estimator) worked well across diverse sample sizes and an array of manifest indicators (2-8 items; Flora & Curran, 2004; Nussbeck, Eid, & Lischetzke, 2006).

Mediation analyses were conducted by carrying out a *product-of-coefficients* approach of the indirect effects ($a \times b$) for the regression coefficients of the predictor (childhood maternal *or* paternal affection) forecasting the mediator (marital risk *or* spousal empathy) (*a* path), and the mediator predicting T3 MDD symptom severity (*b* path). We presented the unstandardized regression coefficients and used bootstrapping with 10,000 resampling draws (Cheung & Lau, 2008). The mediation effect size (P_M) is the ratio of the indirect effect (a*b) to the total effect, c = a*b + c' (Preacher & Kelley, 2011; Wen & Fan, 2015). In total, the 1.9% missing data points were handled with listwise deletion. Tests of model's assumptions were conducted before analysis of each hypothesis.

We assessed each model's *empirical identification status* by comparing the model's fully standardized solutions against conventionally acceptable loadings (Graham, 2005). The pattern of standardized factor loadings suggested that all measurement models were empirically identified. For large samples, χ^2 tends to be statistically significant (Brown, 2006), despite the candidate model differing from the true saturated model by trivial amounts. To assess each model's goodness-of-fit, we used practical goodness-of-fit indices and heuristic cut-offs (Kline, 2016a, 2016b): Tucker-Lewis Index (TLI; also named non-normed fit index (NNFI); Bentler & Bonett, 1980; Tucker & Lewis, 1973; TLI ≥ .95), confirmatory fit index (CFI; Bentler, 1990; McDonald & Marsh, 1990; CFI ≥ .95), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993; Steiger, 1990; RMSEA and its 90% confidence interval [CI] ≤ .50), and standardized root mean square residual (SRMR; Hu & Bentler, 1999; SRMR with 90% CI ≤ .080).

Results

Direct Effects of Parental Affection on Future MDD

The structural models for the first two hypotheses showed excellent fit when the predictors were childhood maternal affection ($\chi^2(df = 344) = 347.14$, $p = .442$, CFI = 1.00, RMSEA = .002, SRMR = .027) and childhood paternal affection ($\chi^2(df = 344) = 334.66$, $p = .631$, CFI = 1.000, RMSEA = .000, SRMR = .027). Supporting Hypothesis 1, childhood maternal affection significantly uniquely negatively predicted T3 MDD ($\beta = -0.012$, $SE = 0.004$, $z = -3.092$, $p = .002$). Similarly, supporting Hypothesis 2 childhood paternal affection significantly independently negatively predicted T3 MDD ($\beta = -0.007$, $SE = 0.003$, $z = -2.454$, $p = .014$).

Indirect Effects of Parental Affection on Future MDD

When marital risk was tested as the mediator, the structural models displayed acceptable model fit for Hypothesis 3 ($\chi^2(df = 653) = 3304.14$, $p < .001$, CFI = .90, RMSEA = .049, SRMR = .060) and Hypothesis 4 ($\chi^2(df = 653) = 3334.61$, $p < .001$, CFI = .91, RMSEA = .050, SRMR = .061). Analyses showed that childhood maternal affection significantly negatively predicted T2 marital risk ($\beta = -0.166$, $SE = 0.027$, $z = -6.024$, $p < .001$), and T2 marital risk in turn substantially predicted T3 MDD severity ($\beta = 0.020$, $SE = 0.007$, $z = 2.680$, $p = .007$). The indirect effect for Hypothesis 3 (childhood maternal affection → T2 marital risk → T3 MDD severity) was also significant ($\beta = -0.003$, $SE = 0.001$, $z = -2.482$, $p = .013$) and explained 26.39% of the variance of the relation between childhood maternal affection and T3 MDD severity. Accordingly, Hypothesis 3 was supported.

For Hypothesis 4, analyses revealed that childhood paternal affection substantially negatively predicted T2 marital risk ($\beta = -0.127$, $SE = 0.021$ $z = -6.047$, $p < .001$) and T2 marital risk then considerably positively predicted T3 MDD severity ($\beta = 0.023$, $SE = 0.007$, $z = 3.129$, $p = .002$). The indirect effect for Hypothesis 4 (childhood paternal affection → T2 marital risk → T3 MDD severity) was also statistically significant ($\beta = -0.003$, $SE = 0.001$, $z = -2.754$, $p = .006$) and accounted for 40.38% of the variance of the relation between childhood paternal affection and T3 MDD severity. All in all, Hypothesis 4 was supported.

Upon examining spousal empathy as the mediator, the structural models for Hypothesis 5 ($\chi^2(df = 767) = 4041.30$, $p < .001$, CFI = .90, RMSEA = .050, SRMR = .074) and Hypothesis 6 ($\chi^2(df = 767) = 4267.04$, $p < .001$, CFI = .90, RMSEA = .053, SRMR = .078) displayed satisfactory model fit. Results showed that childhood maternal affection significantly negatively predicted T2 spousal empathy ($\beta = -0.124$, $SE = 0.016$, $z = -7.557$, $p < .001$) and T2 spousal empathy thereby substantially negatively predicted T3 MDD severity ($\beta = -0.043$, $SE = 0.016$, $z = 2.662$, $p = .008$). The indirect effect for Hypothesis 5 (childhood maternal affection → T2 spousal empathy → T3 MDD severity) was also significant ($\beta = -0.005$, $SE = 0.002$, $z = -2.560$, $p = .010$) and explained 40.20% of the variance of the relation between childhood maternal affection and T3 MDD severity. Therefore, Hypothesis 5 was fully supported.

For Hypothesis 6, analyses showed that childhood paternal affection significantly negatively predicted T2 spousal empathy ($\beta = -0.085$, $SE = 0.012$, $z = -6.923$, $p < .001$), and T2 spousal empathy subsequently negatively predicted T3 MDD severity ($\beta = 0.047$, $SE = 0.015$, $z = 3.168$, $p = .002$). The indirect effect for Hypothesis 6 (childhood paternal affection → T2 spousal

empathy $\rightarrow$ T3 MDD severity) was also significant ($\beta = 0.004$, $SE = 0.001$, $z = 2.967$, $p = .003$) and explained 51.92% of the variance of the relation between childhood paternal affection and T3 MDD severity. Hypothesis 6 was fully supported.

Discussion

Due to the limited amount of studies on how marital risk along with parental affection impacts depression, this was the first analysis proposing the potential of marital risk being a mediator between parental affection predicting depression. Importantly we found that the association between low levels of parental affection predicting depressive symptoms occurred via two mediators: marital risk and spousal empathy. Findings of this study align with the previous cited literature such that distant and cold caregivers lead to heightened risk of depressive disorders later in life (Dagan et al., 2018). Results are also consistent with Bowlby's attachment theory (Bowlby, 1977; Bowlby, 1982) which proposed that parental affection plays a salient role in the etiology of MDD. The importance of parental affection in childhood impacts the potential of someone experiencing depressive symptoms later in adulthood. The degree to which individuals experiences warmth and affection during childhood will impact how they express or experience affection, thus either mitigating or aggravating the risk for future MDD.

Why did the negative childhood parental affection-future MDD association occur via marital risk? Plausibly, experiencing dissatisfying relationships with one's maternal figure might render individuals' vulnerable to interacting with significant others in maladaptive ways. Perhaps recurrent poor quality of parental interactions in childhood might hinder the development of open communicative styles important for satisfying relationships. Low parental affection might also predispose individuals to adopt attitudes that reflect high level of distrust towards their spouse. Further, the lack of adaptive communication skills that accompany deficits in maternal affection might create confrontational relationship dynamics in marriages. Data showing that people who reported less childhood parental affection tend to be more upset in social situations and were less able to relate to the others perspectives (Narvaez, Wang & Chen, 2016) supports these viewpoints. Without this perceptive taking, confrontations are bound to happen. Future prospective work could attempt to confirm these speculations.

More specifically, Bowlby proposed the idea of an internal working model (Bowlby, 1969). This internal working model proposed that children suffering from lack of parental affection would have emotional difficulties later in life along with difficulty in understanding the world and their relationships with others (Bretherton & Munholland, 1999). Further, individuals are often misguided when it comes to later partners and relationships if their internal working model is disrupted. This may contribute to trust issues in the relationship, ineffective communication, as well as a poor connection between two people. These persons are missing an essential part of their development. Having a secure-base via high levels of parental affection, not only positively impacts how a person interacts in later relationships, but also how a person later interprets interactions with their spouses. Lack of parental affection likely increases misinterpretation of intentions and causes quarrelsome and lackluster interactions often seen in distressed couples. Without trust in a relationship, many problems arise quickly.

Why did spousal empathy mediate the relationship between childhood parental affection and adulthood MDD symptoms? Perhaps that lack of parental affection reduces the ability to care for and resolve conflict with others, more specially spouses, in constructive and mature ways. Also, less parental affection in childhood leads to people not being able to understand other's perceptions. Lacking the skills of perspective taking can be detrimental to relationships when it comes to understanding others emotions and motives. Possibly the type of attachment style that someone forms based on parental affection, impacts future relationships, which might then manifest in depressive symptoms. Relatedly, as partner support has been found to be predictive of future well-being (Walen & Lachman, 2001), it is likely to be protective against MDD. Research has also consistently shown positive connections between insecure attachment styles and marital quality (Hollist & Miller, 2005). Also, romantic love has been shown to be related to attachment styles (Hazan & Shaver, 1987). People who have poor experiences of parental affection childhood, may in turn, have bad love experiences with their future intimate partners.

Limitations of the study deserve mention. The present sample comprised mostly well-educated, White Americans in the middle-to-higher income bracket. Thus, future studies could test if findings herein generalize to culturally and socio-economically diverse contexts. Doing so is important as participants who retained in the study were more likely to be Caucasians (vs. ethnic minority), highly educated, financially and physically healthier, as well as married (vs. single, divorced, or widowed) (Radler & Ryff, 2010). Also, the study used the DSM-III criteria to measure depressive symptoms rather than the current DSM-5. Relatedly, as the parental affection measure was retrospective in nature, it was susceptible to recall bias, and their opinions of their parents' affection could have changed through the years. Nonetheless, study strengths include the long 18-year period, where data was collected across three phases. Further, this study used psychometrically valid and reliable measures. Therefore, due to its longitudinal design, this study offered unique views on the predictive roles of parental attachment, marital instability, and spousal empathy on adulthood depression.

Findings demonstrate that parenting practices, in terms of level of warmth and affection conveyed by parental figures during children's formative years are instrumental in either mitigating or increasing future risk of major depressive episodes in adulthood. Accordingly, a major clinical implication of this study is the need to increase dissemination of evidence-based, preventative parenting programs, such as those delivered online (Cardamone-Breen et al., 2018). The results suggest that parents who model adaptive behaviors (e.g., willingness to have conversations on important matters) to their children are likely to help them become well-adjusted adults later in life. Such efforts are crucial from a public health perspective due to the rising numbers of people suffering from major depressive episodes and suicidal ideation (Bridge, Horowitz, Fontanella, Grupp-Phelan, & Campo, 2014). Moreover, subsequent work should examine how therapies that improve married couples' socio-emotional skills, such as empathic accuracy and effective communication (Schmidt & Gelhert, 2017), might also effectively prevent the onset of MDD.

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Empathy Engagement with Native Americans in the Context of Social Disparities and Historical Trauma

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Abstract

Although empathy is a beneficial process to our daily interactions, research indicates that people show a robust preference to avoid empathy because it can be cognitively taxing. This tendency to avoid empathizing with others may be more pronounced when targets are outgroup members depicted as suffering due to social disparities (Cho et al., 2019). This can be especially problematic for minorities trying to navigate society, such as Native Americans who have suffered immense social injustice in the past (historical trauma) and continue to be impacted by large-scale social inequalities. The present study uses the Empathy Selection Task (Cameron et al., 2019) to examine whether White individuals demonstrate empathy avoidance when asked to either empathize with or describe pictures of Native Americans portrayed as suffering under three different conditions (social disparity, historical trauma, or no context). Our goal is to understand the factors that lead to avoidance or engagement without group empathy.

Introduction

In a 2017 Ted Talk, Tara Houska explained the dehumanizing effects of inaccurate depictions of Native Americans in school textbooks and the accepted mainstream usage of racial slurs referring to Native Americans in sports (e.g., the Washington DC Football "Redskins"). According to Shear et al., 87% of American textbooks portray indigenous populations as existing only prior to 1900 and exclude any mention of modern genocides, social issues, and the struggles Native Americans continue to face today. Hoskie went on to connect how not being viewed as real people in these instances has made it a lot easier to "run over" Native Americans' rights. As one example of this, consider the Dakota Access pipeline which was built across Native American homelands despite strong opposition by the Native American community. At the end of her Talk, Houska pleads with her listeners and the people of the United States to "stand with us [Native Americans], *empathize*, learn, grow, change the conversation." (Houska, 2017) The following study is a direct answer to Houska's call by examining the willingness of White Americans to engage in empathy when faced with Native Americans presented in different contexts of suffering.

Empathy Defined

Empathy has many definitions and there are various models of empathy discussed across several psychological subfields (Zaki, 2014) encompassing different moral, cognitive, and behavioral dimensions. They tend to converge on empathy as a process that allows a person to understand another person's situation, perspective, feelings and, even pain (Benbassat et al., 2004). According to Benbassat, empathy can be viewed as a multi-faceted virtue. Of the many models of empathy in existence today, most describe the components of empathy as being automatic, evolutionarily preserved survival mechanisms that allow social animals to communicate (Preston & de Waal's 2002; Bartal, Decety, & Mason, 2011). Some of these intrinsic components of empathy include emotion recognition, perspective-taking, and social mimicry (C. M. Cheng & Chartrand, 2003; Goff, Eberhardt, Williams, & Jackson, 2008). Neurologists attribute many of these innate and automatic responses to the existence of "mirror neurons," which are neurons that allow people to simulate feelings (including pain) through mental simulation (Gallese, 2005). All in all, these characteristics of empathy make it a major key to driving positive prosocial interactions, generosity, and compassion (Fowler & Christakis, 2010).

Although the facets of empathizing are automatic and important to prosocial interactions, multiple researchers have demonstrated how the contextual factors and situation can change how much people are willing to empathize with a person. Empathic motivation is based on both the evolutionary (Scott-Phillips, Dickins, & West, 2011) and social customs an individual is exposed to growing up. Zaki's (2014) Motivated Model examines the relationship between these approach and avoidance motives in people's tendencies to feel emotions and empathize with other individuals. These affective motives go beyond people's tendency to avoid pain and seek pleasure (Higgins, 2011), and further incorporate an individual's goals, relationships, and self-efficacy in choosing to empathize with other people or not. Zaki identifies ingroup identification, offspring care, and expertise as being the main motives that drive people to choose to empathize (or not) with others. The goal of the current study is to examine whether contexts that highlight social inequality or hardship might also impact empathic engagement with Native Americans as outgroup targets.

Empathy Avoidance

Cameron et al. (2019) evaluated the cognitive perspective-taking facets of empathy and found that empathy takes cognitive work, can be avoided, and tends to be avoided. Using the Empathy Selection Task (EST), Cameron showed participants a series of photographs of people's faces and the participants were given the choice to objectively describe the target (*describe*) or to empathize with the target and attempt to feel the target's emotions (*feel*) and share in their experiences. The task is designed to assess an individual's use of situation selection to regulate their emotional experience (Gross & Thompson, 2007) by allowing participants to choose whether or not to share in the target's emotional experience. Cameron found that individuals consistently opted to describe the targets over empathizing with them. He called this tendency *empathy avoidance* and suggested that individuals may set individual limits on how much they empathize with people based on how hard they want to work which makes them less likely to empathize with strangers (outside of their immediate family and friends) and outgroup members.

Similarly, other studies describe empathy as a motivated phenomenon (Zaki, 2014) and indicate that people tend to choose to avoid certain situations where they may have to be empathic with non-strangers or outgroup members. According to Mathur, Harada, Lipke, and Chiao (2010), an ingroup is a heterogeneous set of individuals who interact and work together towards common goals. Working together with an ingroup fulfills the fundamental psychological need of belonging (Baumeister & Leary, 1995), which promotes progressive behaviors such as cooperation and trust. Unfortunately, Zaki indicates that this ingroup preference also can be accompanied by the exclusion of individuals outside of your perceived ingroup. This phenomenon is known as outgroup exclusion, which is also an evolutionarily preserved mechanism meant to protect one's immediate ingroup by delineating boundaries against groups who do not share ingroup characteristics. Outgroup exclusion can also contribute to antisocial behaviors such as perceiving outgroups as homogenous (S. T. Fiske, 2000) and inferior (Tajfel, 1982). This social categorization of outgroups (Tarrant et al., 2009) is yet another factor that can affect people's decision to avoid empathy.

The tendency to avoid empathy, in general, and particularly with strangers, can be especially detrimental in multicultural interactions in diverse countries such as the United States. In diverse environments, individuals may be more likely to use observable characteristics such as the race, gender, or ethnicity of a person to socially categorize people (Sherif & Sherif, 1961). Therefore, interactions with underrepresented minorities of a different race are often driven by preconceptions and biases against that group (Wheeler, 2015). These biases may be at the root of acts of both implicit and explicit acts of prejudice (Devine, Forscher, Austin & Cox, 2012) such as being less willing to work with minorities and or care about issues important to their communities. These factors together might make empathizing with outgroups, including Native Americans, less likely.

People also tend to avoid empathizing more with multiple individuals suffering as opposed to a single identifiable victim of tragedy as demonstrated by Cameron and Payne (2011). They tested this hypothesis by conducting a survey in which they observed which charities people donated more money to, comparing how often people gave to charities that help single individuals vs. charities that help groups of people. They found that people donated more to charities that focused on helping single, identifiable victims versus those that helped large groups of people. They argue that people behaved this way, not because they were insensitive to mass suffering, but more likely because people have a functional limit as to how much emotion they can feel for others. We believe a similar process will unfold if we ask individuals to empathize or describe Native American targets that are portrayed in contexts that that highlight social disparities because disparities also implicate large-scale suffering.

Native American Disparities Contexts
Social Disparity

With 573 federally recognized tribes in the United States encompassing many different cultures and identifies, it is hard to generalize across the Native American population in the United States. However, according to the US Department of Health and Human Services (https://minorityhealth.hhs.gov). Native Americans still consistently report having the highest rates of alcoholism, lowest rates of education and lower-income levels than any other ethnic group in the United States.

Previous studies that incorporate the empathy selection task indicate that people tend to demonstrate greater empathy avoidance when given the choice to describe or empathize with target individuals presented in a disparity context. For example, a study by Cho et al., (2019) demonstrated that White and Asian participants were less likely to choose to empathize with African American targets relative to describing them objectively when the target was presented in a social disparities' context. Cho's within-subject design used a modified version of the Empathy Selection Task (EST) that included pictures of African American targets accompanied by disparities faced by the African American community as well as pictures of African American targets without any disparity information. Considering that White and Asian participants chose to empathize less with targets in a disparities context in Cho's study, we believe a similar process will unfold if we ask individuals to empathize or describe Native American targets that are portrayed in contexts that that highlight social disparities because disparities also implicate large-scale suffering.

Historical Trauma

In comparison with all other racial and ethnic groups in America, Native Americans were the last group to gain citizenship in 1924 and consistently demonstrate more suffering in social areas such as suicide, alcoholism, and pre-mature deaths (Centers for Disease Control and Prevention [CDC], 2007). What many people often fail to recognize is that many of these social disparities Native Americans face today may have their roots in the "legacy of chronic trauma and unresolved grief across generations" which researchers suggest was enacted upon them by the dominant European culture (Brave Heart & DeBruyn, 1998) known as *Historical Trauma*. According to Sotero, (2006) this historical trauma refers to the transfer of trauma to following generations through biological, environmental and social means resulting in cross-generational cycles of trauma. Researchers have also connected behaviors such as heavy alcohol consumption (Chartier & Caetano, 2010) to historical losses of land, people, and culture (Whitbeck et al., 2004). Consequently, we also present a similar context in which we examine the response to pictures of Native Americans presented along with accounts of historical traumas experienced by Native Americans. Despite being America's original inhabitants, Native Americans continue to be considered outgroups both socially, through limited integration in mainstream society, and systematically, through dehumanizing slurs in official policies and documents (e.g. the United States Constitution still refers to Native Americans as "merciless Indian savages"; Harjo, 1992).

Many of the historical injustices and misrepresentations referenced above are deep-rooted in America's society which makes changing the dehumanizing ways Native Americans are perceived an uphill battle in most cases. In fact, a 2018 survey indicated that 40% of Americans selected from a random sample do not believe Native Americans still exist (Shear, Knowles, Soden, & Castro, 2017). Aside from invisibility, Native Americans also face prejudice and discrimination from Americans who are unfamiliar with their existence. The isolation that many Native American populations face also contributes to negative stereotypes such as "the drunken Indian," a myth disproven in 1994 by Phillip Ortiz which suggests that Native Americans have a biological predisposition to alcohol. Other popular beliefs held by the American public assume that all Native Americans receive benefits from casinos and wrongfully receive full funding for college even though Native Americans are more likely to have to take out a student loan than their white counterparts (Adelman, Taylor, & Nelson, 2013).

All in all, the combination of obstacles such as general empathy avoidance, empathy collapse, and the general unfamiliarity of non-Native Americans could create a large disconnect which could push most individuals to avoid empathizing with Native American targets in a historical trauma context. At the same time, the tragic nature of the historical traumas may also allow individuals to better understand Native American targets as humans and individuals and less as dehumanized outgroups which might facilitate engagement of empathy in this context (Costello & Hodson, 2010). Therefore, we do not make a specific prediction as to whether a historical trauma context with lead to more or less empathy avoidance.

The Present Study

In our experiment, we manipulate the context of Native American suffering in order to further understand the factors that lead to empathy avoidance versus which factors may lead to greater empathy engagement. Specifically, we examine whether the tendency to avoid or engage in empathy with depictions of Native Americans who are suffering (control condition) is affected by the additional presence of information that implicates large-scale causes of that suffering (social disparity or historical trauma), or without any disparity contexts. We use a modified version of the empathy selection task designed by Cameron et al., (2019) and Cho et al., (2019) to identify whether contextual factors can increase or decrease empathy avoidance in response to depictions of Native Americans.

Our first hypothesis was that participants would avoid empathy more in the social disparity conditions than the control condition. We expect that this may occur because of the greater inefficacy we predict the social disparities context may create. Our second research question evaluates the participant's response to our historical trauma context relative to the control and social disparities context. The historical trauma context could either elicit more empathy engagement based on the grim nature of the historical statistics which could humanize Native Americans and create a desire to empathize with them, or this context could lead to more empathy avoidance because people may feel more inefficacious when confronted with another large scale suffering contexts (similar to the social disparities context), contributing to a greater disconnect from Native Americans.

Methods
Participants

A total of 259 Qualtrics Panelists served as the participants for this study, participants also had to give effortful responses (e.g. no random typing, exclaiming "I don't know," or expressing disdain for the survey) for their survey to be reported. Our control condition consisted of 91 participants with an average age of 51, our historical trauma condition consisted of 87 participants with an average age of 52.2, and our social disparities condition consisted of 81 participants with an average age of 37.7. The eligibility criteria for our study included being White or Caucasian, over 18, and being born in the United States. In order to ensure that Native Americans would be considered outgroup members to the participants, we instructed Qualtrics to recruit only White participants which could possibly be a group tied to the oppression of Native Americans. Those meeting the criteria were then invited to complete the experimental survey then paid $5.00 upon completion.

Measures

Empathy Selection Task Modified (EST). Our survey was modeled after the original empathy selection task developed by Dr. Daryl Cameron and Colleagues in 2017. The task aimed to evaluate empathy avoidance by asking participants to choose a card from two decks of cards label as "empathy" or "describe". Participants were then shown a photo of a person and had to follow the instructions on the back of their chosen card. If participants chose the empathy deck, they were asked to share in the target photo's feelings and to write a sentence about what they might be feeling. On the contrary, if participants chose the describe deck, they were asked to objectively focus on the external features of the person and write a sentence describing their age and gender.

For the purposes of the present study, the stimuli and trial structure of the EST was modified as follows. We used Native American stimuli because they are considered outgroup members to most United States citizens, making up 1% of the population (according to the US Census Bureau, 2017). The target pictures depicted were always of a Native American individual in distress with the words "the person in the photograph is struggling" presented immediately below the picture. In the control condition, no additional information was provided. In our disparities conditions, a sentence or two were added prior to the statement provided in the control condition. In the historical trauma condition, a traumatic event was described (e.g., the US Government forced 8,500 Navajos to walk 300 miles to a concentration camp in 1864) and in the social disparity condition a statistic depicting an inequality was provided (e.g., 20% of Native Americans/American Indians have not completed high school, compared with 8% of Whites). Next, participants were asked to choose whether to empathize with the target in the photograph or describe the target objectively. In each condition, participants saw 20 images.

Post-Task Question and NASA Task Load Index. After completing the EST, participants first were asked an open-ended question asking them to report what it was like to complete the survey. Participants then completed the NASA Task Load Index (NASA TLX) which measures the subjective mental workload associated with completing the EST trials. The NASA TLX ask about participants perception of the task across the following six dimensions: Mental Demand, Physical Demand, Temporal or Time Demand, Effort, Performance, and Frustration level. Answers are provided on a scale from 1-7. This scale was included to determine which dimensions are most important in completing the task.

Previous contact with Native Americans. The present study also incorporated a questionnaire designed to determine how familiar participants may or may not be with Native Americans. The scale contains 4 components that ask participants to rate on a scale of 1-3 (not at all to a great deal) on the extent to which they have interacted with Native Americas, are familiar with the statistics provided in the historical trauma or disparity conditions, and whether they feel like they would be competent in engaging with a Native American person in the future or not. The control condition excluded the question about how familiar the participant might be with the historical trauma and disparity information presented in the EST because this condition did not provide any information other than "the person in the photograph is struggling".

Additional Measures. Our task also incorporated additional measures that are not used in the current study. These measures included The Interpersonal Reactivity Index (IRI) [empathetic concern (EC) and [personal distress (PD) subscales only] and the Identification with All Humanity Scale (IWAH).

Procedures

The study was completed online and was conducted wherever the participants chose to take it. Participants were then randomly assigned to one of our three conditions (the control condition, historical trauma condition, or social disparities condition). Participants first read and agreed to the consent form by indicating they were above the age of 18 and wished to participate in the study. Participants who indicated that they were not over the age of 18 and or did not wish to participate in the study after reading the consent form were then redirected out of the survey. Once consent was indicated, the survey began and consisted of two parts: first, participants completed the modified Empathy Selection Task and then they completed a demographic section along with additional measures. A debriefing was provided after the survey explaining the purpose of the study.

Figure 1. Sample Modified EST Stimuli
Sample picture used in the modified EST task along with the control condition description and example social disparities and historical trauma descriptions. Participants are presented with the option to Describe or Feel immediately after each photo and description.

The person in the photograph is struggling. **[Control Condition]**

Native American/American Indians die at a 189% higher rate than other Americans from diabetes. The person in the photograph is struggling. **[Social Disparities Condition]**

In 1863, a Sioux Indian Scalp was worth $25 US Dollars. The person in the photograph is struggling. **[Historical Trauma Condition]**

Describe: Objectively focus on the external features of this person. Write one sentence describing this person's age and gender.
Or
Feel: Share in the sufferings of this person. Write one sentence describing their feelings

Data Analytic Approach

Our primary comparisons of interest were between the two disparities contexts (historical trauma and social disparities) and the control group (no additional context provided). Our primary outcome of interest was *empathy choice score,* or the number of trials participants chose to empathize over describing the targets objectively. We tested whether the mean empathy choice score for each condition was significantly different from .50 to see if there was evidence of empathy avoidance in each condition, regardless of the differences between conditions. We then tested our empathy choice scores to the score from Cho et al., (2019). Testing against the .50 chance and the Cho et al., (2019) study meant using a one-sample *t*-test and to test the differences between the conditions we used a series of independent samples *t*-test.

Results

Preliminary Results

The primary outcome of interest in our study was the percentage of trials that the participants chose to empathize over describe (empathy choice). Overall, the results indicated that people tended to choose to empathize with the targets less than they chose to describe the targets objectively slightly, 48% vs 52%, respectively. A one-sample t-test revealed that this was not significantly different from the 50% expected by chance, $t(260) = -1.29$, $p = .2$ indicating that there was no empathy avoidance in our sample when collapsing across conditions. Our results also indicated that the mean empathy choice for our control condition (.49) did not differ from the 50% chance level, $t(92) = -.33$, $p = .75$. Our remaining conditions, though lower in empathy choice than the control condition, also failed to differ significantly from chance, showing no empathy avoidance: historical trauma (.47), $t(86) = -.78$, $p = .44$, and social disparities (.46), $t(80) = -1.14$, $p = .26$.

Empathy Choice in a Social Disparity Context

Our first hypothesis was that participants would show greater empathy avoidance in the social disparity condition relative to the control condition, consistent with the findings from Cho et al. (2019), which featured a similar design only with African American targets instead of Native American targets. An independent samples t-test revealed that the mean empathy choice in the social disparity condition (.46) was *not* significantly different than the control condition (.49), $t(172) = .61$, $p = .54$. However, the means of these two conditions were in the same direction as reported by Cho et al., (2019), with individuals in the social disparity condition showing relatively more avoidance. Interestingly, our results indicated a marginally higher tendency to empathize with Native Americans (.46) in a social disparities context than participants did with the African American targets in Cho's study (.41), $t(80) = 1.68$, $p = .10$.

Empathy Choice in a Historical Trauma Context

Our other research question involved examination of how the historical trauma condition would impact empathy avoidance, though we did not specify a hypothesis given that an argument could be made for historical trauma to *both* increase or decrease empathy avoidance. An independent samples t-test revealed that the mean empathy choice in the historical trauma (.47) condition was also not significantly different than the control condition (.49), $t(170.5) = .39$, $p = .7$, nor did it differ significantly from the social disparity condition (.46), $t(165.2) = .19$, $p = .85$. Despite not being significant, the results suggest that

participant's responses in historical trauma condition were closer to the pattern observed in the social disparities context than the control condition.

Exposure to and Contact with Native Americans
In addition to the percentage of trials people chose to empathize over describe, we were also interested in how familiar our participants were with Native Americans considering that Native Americans are often considered outgroups to most Americans (Shear, Knowles, Soden, & Castro, 2017). Descriptive statistics revealed that 44% of participants indicated had never interacted with Native Americans before and 44% were not previously aware of any of the social disparity statistics presented in the study. Anecdotally, many of the responses to our post-survey question asking what completing the study was like indicated that participants found the disparity statistics surprising and upsetting or difficult to learn about. In addition, the majority of the participants who encountered our social disparities (91%) and historical trauma (94%) contexts indicated that they would be at least moderately likely to want to learn more about Native Americans in the future. This is important because around half of our participants (44%-49%) in all three conditions claimed they had never interacted with a Native American.

Discussion
The purpose of the current study was to evaluate the effects of suffering contexts on empathy avoidance towards outgroups (more specifically Native Americans). Our two contexts portrayed Native American suffering as the result of two kinds of disparities: historical accounts of Native American maltreatment and traumas, and contemporary statistics describing the social disparities that Native American communities continue to face today. Our results indicated that people slightly preferred to empathize less in our disparity contexts compared to our control condition, although these patterns failed to reach statistical significance. Findings from the historical trauma condition closely mirrored those of our social disparity context. Although none of the results from our three conditions yielded statistically significant outcomes relative to each other, they demonstrated consistent patterns with previous studies that we modeled our study after (Cameron et al.,2017; Cho, 2019).

Social Disparities Context
The participants in our study showed a slight tendency to avoid empathy in the social disparities contexts than in our control condition, though this difference was not significant. This may be because people may feel somewhat inefficacious or unable to accurately empathize (Chismar, 1988) with the Native American targets when presented with these modern disparities experienced by outgroups that they already have little contact with. However, it is possible that the lack of pronounced differences between the disparity conditions and the control condition might have been explained by the grim nature of the statistics which may have contributed to greater sympathy which may have, in turn, led to less empathy avoidance. Interestingly, our findings also demonstrated that the people in our study chose to empathize with the Native American targets more so than the African American targets presented in a social disparities context within Cho et al., (2019). This could be due to the differences in demographics between our study and Cho's study. Our sample also contained an older group, on average (37.7 years), compared to the college-aged students (roughly 18-25 years old) in the Cho et al. study. According to a study by O'Brien, Konrath, Grühn, and Hagen (2012), general self-reported empathy (both emotional empathic concern and cognitive perspective-taking) peaks in

mid-adulthood which might explain why our older average participants might have been more empathetic towards Native Americans considering that both studies featured minorities presented in disparities contexts. Although we did record participant's Empathic Concern score as well as their age, both factors were not a focus in our study but could be useful for future studies.

Historical Trauma Context
We also wanted to test how presenting participants with the possible root of many modern Native American issues might affect White American's empathy avoidance. We learned that there were no statistical differences between our historical trauma condition relative to our social disparities condition. This could be due to the similarities of both contexts including using the same photographs for each condition, how both studies dealt with mass Native American suffering, which Cameron and Payne (2011) suggested could be due to people's tendency to people's functional limit for how much emotion they can feel in response to suffering. Overall, people chose to empathize less, though not significantly so when there was a historical trauma statistic present relative to our control condition which was similar to the results of our social disparities condition and may also suggest that the presence of any suffering context may make people slightly less likely to empathize with the people suffering. In this study, we suspect that the general unfamiliarity with Native Americans as well as the disconnection and inefficacy created by encountering such dreadful statistics may have made some participants more likely to empathize with the targets than other participants based on variables such as age, gender, political or religious beliefs as well as life experiences.

<u>Limitations and Future Directions</u>
Our study had several limitations that are important to acknowledge. First, at times it was hard to tell how much effort participants put into the survey, and we had to exclude some respondents that were obviously not taking the experiment seriously. However, others may have been less obvious in their lack of attention and interest, thereby remaining in the sample and possibly skewing our results. Next, our study used a between-subject approach to compare whether participants demonstrated more empathy avoidance in different contexts pertaining to Native American targets (social disparities, historical trauma, control). A within-subject approach might have provided greater statistical power, however, we wanted to avoid any overload of time and information which might have resulted in participant fatigue in this case, given that each condition would require a minimum of 20 trials.

Other confounding variables may have been in play with our trials as well, including the vast differences in the age and gender (e.g. we did not include any child targets under the age of 18) of the Native American targets we presented in our study. In addition, some of the targets were visibly in more distress than others. Although we have not analyzed differences in response to the different targets (in terms of differences in empathy choice), future studies may benefit from examining which targets may elicit more empathy engagement. Future work might also benefit from evaluating the effect that age has on empathy avoidance as well as establishing specific criteria for which responses should be considered effortful.

Conclusion

The goal of our study was to provide some insight into how White Americans may perceive such suffering contexts as well as their willingness to engage in social issues faced by Native Americans. The motivation behind our investigation is the recognition that empathy avoidance by White Americans with Native American targets might be indicative of a greater level of disengagement with the Native American community. If Non-Native American individuals are less likely to interact with and, or more likely to avoid Native American individuals, then Non-Native Americans may also be less likely to acknowledge their roles in the history and systems of oppression that continue to affect Native American communities today. This is important because 22% of Native Americans still live on government established reservations according to the US Department of Health and Human Services (https://minorityhealth.hhs.gov), where they continue to endure cycles of poverty, substance abuse, and limited access to healthcare due to geographic isolation. Also, if people are not willing to engage in prosocial interactions with outgroups, they may be more likely to hold negative stereotypes and ideas that could hurt future interactions with that particular group.

Considering that our results were not statistically different from chance, the roots of empathy avoidance may lie in the evaluation of individual differences in participant's life experiences (in this case their exposure to Native Americans), age, political affiliation, and even gender. Understanding the various factors that play a role in empathy avoidance are important considering that similar contexts exist in today's society by means of news reports, historical textbooks, and social media which may be the only sources the majority of Americans might have to learn about Native Americans and the issues they continue to face. Ultimately, we hope this research will contribute to the humanization and acknowledgment of Native Americans who continue to struggle in modern society despite being America's original inhabitants.

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Diary of a Dirty Computer

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Abstract

This paper explores how contemporary Black women artists use audiovisual resources and experimental forms of musical storytelling to construct a 21st century critical Black feminist mode of expression. Specifically, I examine Janelle Monáe and her visual album *Dirty Computer*. Using textual analysis and semiotic analysis, I approach Dirty Computer as a case study that demonstrates how Janelle Monáe, a Queer Black woman, uses commercial media as a platform for self-definition. Furthermore, my project is an autoethnography that considers my own experiences of the tensions that emerge in an attempt to make sense of the self as a Queer Christian Black woman.

Introduction

Artists like Michael Jackson and Prince were well-known for integrating audiovisual elements into their work as music artists. *Thriller* (1982) and *Purple Rain* (1984) were more than musical triumphs, they were multimedia projects that thrust Jackson and Prince into superstardom. In fact, *Purple Rain* garnered an Oscar and two Grammy awards for its artistry and *Thriller* was a groundbreaking masterpiece that helped to integrate the MTV network, especially its 14-minute music video for the song that shared the album's title. By experimenting with artistic storytelling across different platforms, Prince and Jackson set the tone for an important genre in black expressive culture—the music video—that would eventually become dominated by hip-hop artists. By the 1990s, music industry gatekeepers repackaged hip-hop as a heavily masculine, hypersexual, and aggressive genre steeped in stereotypes of black criminality and caricatures of the black poor. Within this narrow frame, 21st century music videos by commercial hip-hop and R&B artists developed a reputation for being gross exhibitions of violence, conspicuous consumption, and the sexual objectification of Black women. The video vixen emerged as a staple of this visual form of hip-hop culture and a reminder that Black women still had to contend with the male gaze as they attempted to express their sexuality in public culture.

Against this backdrop, contemporary Black women have breathed new life into the audiovisual form and reclaimed this medium as a critical artistic space. Beyoncé's self-titled visual album released to critical acclaim in 2013 and her follow-up project, *Lemonade* (2016), marked the artist as a more politically-oriented cultural producer. The success of these projects demonstrated the profitability of visual albums as an updated iteration of the music video and proved that there was an audience hungry for musical products that crossed boundaries in form and theme.

My study examines how a contemporary Black woman, artist Janelle Monáe, uses audiovisual resources and experimental forms of musical storytelling to construct a 21ˢᵗ century critical black feminist mode of expression. Monáe's 2018 release, *Dirty Computer,* was published by Bad Boy Records and features 14 tracks total. My study focuses on five of the ten tracks that Monáe dramatized for her audiovisual project, an artistic form that she refers to as an "emotion picture."

In an interview published on YouTube, Monáe described her term for the audiovisual project as a play on words (motion picture) that captures the style of the album and process of creating it. *Dirty Computer* is a narrative told in a similar fashion to that of a movie, featuring characters, a plotline and dialogue. Additionally, Monáe described the album as a culmination of emotions: "It was really just paying attention and being upset, being inspired, but being more angry," she said. "And love. I went from that angry place to realizing that love was the right decision for me to choose" (Monáe 4:43-4:58). In this paper I analyze the lyrics, symbolism, visual metaphors and aesthetic affordances of the album.

Literature Review

I used three major theoretical frameworks to contextualize *Dirty Computer*, Black Feminist Thought, Queer Theology, and Afrofuturism. I then narrowed my focus according to the themes that emerged in my analysis. This literature review process is in line with an inductive reasoning/constructivist approach to inquiry.

Black Feminist Thought

Foremothers Maria W. Stewart, Ida B Wells, Anna J. Cooper, and far too many others to mention, forged the intellectual path for Black Feminist Thought beginning in the nineteenth century. However, the release of the Combahee River Collective Statement in 1977 marked a crucial point in the history of more recent struggles for Black women's liberation. The Collective consisted of politically radical black women who, dissatisfied with their exclusion from the social justice movements of the day, came together in Boston in 1974 to form their own organization. They focused their efforts on four key areas of concerns affecting black women: racism, sexism, heterosexism, and economic oppression. Importantly, these women articulated the struggle for liberation as a multifaceted effort that required Black women to confront an interlocking set of repressive forces.

> The major source of difficulty in our political work is that we are not just trying to fight oppression on one front or even two, but instead to address a whole range of oppressions. We do not have racial, sexual, heterosexual, or class privilege to rely on, nor do we have even the minimal access to resources and power that groups who possess any one of these types of privilege have. (Combahee River Collective)

Through books, speeches, and other political action, women like those involved in the Combahee River Collective constructed and cultivated a Black female consciousness based upon the tenet of intersectional oppression. Furthermore, they understood that in fighting for their own liberation they would be confronting entire systems and structural forces that had been built upon their bondage. Their vision of liberation looked like access to better paying jobs, eradication of racism, and admittance into higher education. In a time where Black women were denied opportunities for self-improvement, these desires were bold.

Despite their rich intellectual projects and political organizing, Black women were still struggling to gain access to platforms to share their theories and uplift their voices in the latter decades of the 20th century. In 1984, bell hooks, a Black feminist theorist and author, wrote: "We [black women] have not had access to the machinery of power that would allow us to share our analyses or theories about gender with the American public" (hooks 140). Thus, another key concern for Black feminists at the time was visibility and access to institutions that would allow them to publicize their counterarguments to those dominant philosophies which sought to rationalize and justify their oppression. Although Black women's presence in public spaces of deliberation has grown since the time of hooks' writing, their theories continued to be marginalized or discounted in favor of those who have been traditionally been recognized as knowers and experts.

Dirty Computer serves as contemporary response to the Black feminist struggle three decades prior. Janelle Monáe, a Queer Black woman, is using music videos as the mode of storytelling. In the process she embraced all of her identities publicly and made many statements about the oppression Queer Black women face. Traditionally, music videos aren't thought of as critical intellectual products, however Monáe engages in Black feminist dialogue through lyrics, narratives, and visual metaphors. As a Black woman with access to the machinery of power of commercial media, Monáe is a bold figure in contemporary Black Feminist Thought. Not only is she resisting racial oppression, but experiences sexual and gender oppression too, as her foremothers of the Combahee River Collective did.

Afrofuturism

Black science fiction novelist Octavia E. Butler wrote the novel Kindred, which was a vanguard for Afrofuturism in narrative form. Parliament Funkadelic, an Afrocentric Black American funk band headed by George Clinton, embodied the spirit of Afrofuturism in music. Both of these artists/groups are Black visionaries who create art that reflects their Afrofuturistic vision of the future. Writer Mark Dery coined the term Afrofuturism to "describe the self-conscious appropriation of technological themes in Black popular culture, particularly that of rap and other hip-hop representations" (Gipson 92). Afrofuturism is an appropriate theoretical framework for this research project because it accommodates the ways in which Black creatives generate and exist in futuristic, imaginative worlds. The emotion picture world of *Dirty Computer* is one such domain where Monáe lives vicariously through Jane 57821 as a Queer Black woman. Visual and technological themes of culture manifest in the emotion picture through wardrobe selections, lyrical content, and the metaphor of "dirty computers" as a representation of dehumanized and disposable subjects. This is a very large step for the world of science fiction because cisgendered heterosexual white men dominate the field. However, it can be argued that there is a relationship between Afrofuturism, feminism, science fiction, and technology because they "were initially dominated by white patriarchal standards: however, are now vehicles that are being used as liberating voices to express public consciousness" (Gipson 93). Monáe is part of a movement to reclaim white dominated spaces such as science fiction, to redefine philosophical ways of being.

Beyond an aesthetic practice, Afrofuturism also holds distinct political value in the sphere of Black expressive culture. Specifically, it "allows artists, such as Janelle Monáe to present new and innovative perspectives and pose questions that are not typically addressed in canonical works" (Gipson 92). Although musicians have and continue to use music videos to tell stories, Monáe offers a fresh perspective of what it means to be Black by addressing

pansexuality, Queer Theology, female erotic desire, police brutality, and other emerging topics of concern. Through the emotion picture she positions herself in a fictional world where the government tries to brainwash or cleanse her, because her rejection of societal norms has made her dirty or unacceptable. Working within the Afrofuturist paradigm Monáe not only accomplishes a creative feat with her project, but also redefines womanhood, queerness, and blackness. Monáe is creating new cannons for Black expression to depart from. Afrofuturism serves as an autonomous space where she can explore, imagine, and discover herself.

Queer Theology

To fully understand the framework of Queer Theology, one must familiarize themselves with the definition of Queer. Theologian Patrick S. Cheng proposes four definitions in his book *Radical Love*: Queer as an umbrella term for the LGBTQIA community; Queer as transgressive action, or Queer[ing] as "a methodological approach that challenges and disrupts the status quo" (Cheng 6); and Queer as an erasure of boundaries. By this definition *Dirty Computer* is a Queer body of work that disrupts the status quo and challenges the boundary of clean and dirty; masculinity and femininity; and fiction and reality. The world of *Dirty Computer* departs from reality, while simultaneously making social commentary about America.

Cheng's definition is rooted in Queer Theory which views sexuality as something that is "continually undergoing negotiation and dissemination, rather than as a mere natural (let alone medical) fact" (Cheng 6). Cheng goes on to further explain the binary between homosexuality and heterosexuality denies the existence of the spectrum of sexuality. Jane 57821's sexuality in the emotion picture erases the boundary between heterosexual and homosexual as she engages in a romantic erotic relationship with a man and a woman. Thus, reflecting the pansexual identity, she claims in reality. Her choice to include this personal detail in her fictional character actively engages in the dialogue of Queer Theory as she brings the spectrum of sexuality to life on the screen.

Queer Theology's three definitions coincide with the three definitions of Queer. "First, Queer Theology is LGBT people 'talking about God'. Second, queer theology is 'talking about God' in a self-consciously transgressive manner, especially in terms of challenging societal norms about sexuality and gender. Third Queer Theology is 'talk about God' that challenges and deconstructs the natural binary categories of sexual and gender identity" (Cheng 9). Simply put, Queer Theology is Queer people talking about God. *Dirty Computer* is a Queer Theological text because Janelle Monáe, a Queer Black woman, is its creator and includes conversations about God within the album's (visual) rhetoric. These visual metaphors challenge traditional ways of thinking and talking about God by juxtaposing a Black woman in the place of Jesus. Monáe also challenges traditional ways of performing gender and sexuality as her character Jane 57821 raps about pussy in a suit. In conclusion, *Dirty Computer* serves a Queer Theological text that talks about God in a transgressive manner and erases widely accepted boundaries of sexuality and gender performance.

Methods

  I approached this project through the methodological framework of textual analysis and autoethnography. Textual analysis is appropriate for this study because it enables me to draw conclusions from non-traditional texts, such as an audiovisual album. This approach relies on the belief that there are multiple ways of interpreting reality and that we can only understand culture by also examining how we make sense of the world (McKee). Textual analysis is a methodology based in the constructivist philosophy which posits that reality is a construct of the human mind. Essentially, textual analysis allows me to approach texts with the mindset that they are constructions of another individual's reality, and the truths found in the texts are not universal due to this fact.

  Additionally, I drew upon semiotic analysis, a method which interprets the meaning "behind signs and symbols, typically involving metaphors, analogies, and symbolism" (Film Analysis). I took screenshots from the emotion picture and analyzed the symbols to find the meaning and messages Monáe was conveying. Based on these frameworks, I interpreted data from an immersed standpoint. I used the tools of observation and analysis to draw conclusions.

  I also approached this research project from the methodological framework of autoethnography. Autoethnography seeks to describe and analyze personal experience in order to understand cultural experience. "A researcher uses tenets of *autobiography* and *ethnography* to *do* and *write* autoethnography" (Ellis et al.). I chose to employ the research method of autoethnography because it allows my personal experience, emotion, and identity to play an integral role in the research process and product. My personal experience was a suitable addition to my project because as a Queer Black woman in America I resonate with the messages Monáe put in the emotion picture. Including myself in the research project as both subject and researcher acknowledges my insider's standpoint. I am both analyst and enthusiastic audience member, critic and fan. In this way, I recognize and embrace my "subjectivity, emotionality, and…influence on [the] research, rather than hiding from these matters or assuming they don't exist (Ellis et al.). Ultimately, this project is not only about understanding Monáe or her project, it is also about understanding my own identity.

  As a part of my study I recorded rigorous field notes every week for an hour a day. These notes include introspection, reflection, poetry, and journal entries. They effectively document the progress I made toward coming to the decision to employ autoethnography as a research method. It is my intention to "produce aesthetic and evocative thick descriptions of personal and interpersonal experience" (Ellis et al.). Therefore, I used my field notes as a tool to critically engage my interpretation of reality, self, and *Dirty Computer* as it relates to my experience. By employing textual analysis and autoethnography, I immersed myself into the fictional world of *Dirty Computer,* while focusing on myself as a research subject. I analyzed images, lyrics, and meanings in it from my unique standpoint as a Black Queer Christian Woman.

  My standpoint as a researcher-subject is significant because I exist at the intersection of quarrelsome identities. Black people, Queer people, and women continue to be marginalized by the oppressive forces of white male supremacy. Christianity has been weaponized against Black people, Queer people, and Women for centuries, and I feel the effects of this power struggle in my body as I labor to harmonize my faith-filled self, with my Black self, my Queer self, and my Woman self. This project is made all the more complex by the fact that Christianity has been the cornerstone upon which my life is built; therefore, complicating my relationship with my sexuality. Thus, Janelle Monáe's very existence in the commercial entertainment industry as a Pansexual, Black woman, with a Baptist rearing is significant to me.

Her music speaks to a demographic of people whose rights have been stripped away. *Dirty Computer* specifically is an album that serves as a voice for the silenced. Textual analysis allows me the tools to absorb and interpret *Dirty Computer* from the inside of the dystopian universe, and autoethnography allows me to write from the unique standpoint of self.

An Introduction to Dirty Computer

What exactly is a dirty computer? As described by Janelle Monáe, the term captures her theory about humans as beings with the capacity to be programmed like computers. It is her belief that we all come from dirt, and go back to dirt when we die.[1] Monáe also believes that our brains are similar to computers, as we are constantly downloading and uploading information from the world around us. However, computers come with bugs and viruses, which are the things that make us unique and special (Darden 9:05-10:00). For example, Monáe is a dirty computer because she is pansexual, a sexual identity that is unique to a community and falls outside the bounds of respectability. Her sexuality is considered a bug or virus to her computer, or brain.

Monáe came out as pansexual in April 2018, the day before she released *Dirty Computer*. The album responds to a question she raised in an interview, "What is it like to live in a society that is constantly trying to cleanse you?" (Darden 10:00-10:03). Within the project narrative, Monáe plays the protagonist Jane 57821 who lives in a world where the government is abducting dirty computers, erasing their memories, and cleansing them of their bugs and viruses with a gas called "the Nevermind." At the beginning of the emotion picture government officials seize Jane 57821 at the House of New Dawn and scroll through her memories like thumbnails and delete them. Each memory is a music video from songs on the album *Dirty Computer* and represents the bugs that are sullying Monáe's brain. The protagonist resists their attempts to rob her of her identity as the narrative unfolds in three parts: the Reckoning, the Celebration, and the Reclamation. Part one explores Jane's recognition of the ways that she deviates from acceptable norms. The songs in the Celebration focus on the various parts of the self that constitute Jane's identity and seek to uplift the communities who share those identities. The Reclamation section of *Dirty Computer* considers activism, protest, voice, and irony with a focus on reclaiming culture.

All three sections of the album are important in that they represent self-actualization, self-love, self-realization and the evolution of Janelle Monáe. Previous to the release of *Dirty Computer* Monáe released *The ArchAndroid* where she created a musical persona named Cindi Mayweather, a part-human-part-android, Afro-futuristic, revolutionary activist. Songs like "Mushrooms and Roses" and "Sir Greendown" hinted at her pansexual identity, but when confronted with questions about her queerness in 2010 she responded "I only date androids. Nothing like an android, they don't cheat on you" (Hoard). *Dirty Computer* serves as a confirmation and celebration of Monáe's public declaration of her identity. This album is urgent because it speaks out against injustice in a moment in history where people are facing oppression and opposition every day; especially women, people in the LGBTQ community, and people of color. The project speaks directly to the current U.S. presidential administration and leadership of this country who maintain the physical, legal, economic, and social injustices impacting vulnerable communities. For example, legislators have cut funding for essential women's health organizations like Planned Parenthood and passed laws making it illegal for women to abort pregnancies, even in cases of rape and incest. Black women are paid 61 cents in comparison to white men's dollar and black transwomen are murdered at an alarming rate.

According to the HRC, 27 transwomen were murdered in 2018, a majority of them were women of color.[2] The clear injustice that people in these communities face is undebatable.

Queer Theology in Dirty Computer: *Crazy Classic Life*, *Don't Judge Me*, **and** *So Afraid*

The following image is a screenshot is from the second song on *Dirty Computer*, "Crazy, Classic, Life," Jane 57821 and other dirty computers in the community are pictured having a celebration at a large mansion. The mood is lighthearted and playful as the camera pans to capture shots of people laughing, dancing and posing. This particular moment is a change of pace from the moments that precede it because the dirty computers are sitting instead of dancing. This image is a contemporary replication of Leonardo da Vinci's depiction of the Last Supper.

Obviously, there are similarities and differences between both images. For example, in the Last Supper the disciples are in conversation with one another about Jesus. The painting depicts the moment when Jesus revealed that one of his disciples would betray him[1] and the disciples are trying to identify the traitor. In the emotion picture the dirty computers are not in

conversation with one another, rather they are looking straight at the camera in a way that destroys the barrier between the emotion picture and the audience, or breaking the fourth wall, while discussing police brutality and racial discrimination.

Handcuffed in a bando
White boy in his sandals
Police like a Rambo
Blow it out, blow it out like a candle, Sambo
Me and you was friends, but to them, we the opposite
The same mistake, I'm in jail, you on top of shit
You living life while I'm walking around moppin' shit
Tech kid, backpack, now you a college kid

On the other hand, both of these moments depict a time where the head of the table is making an important statement. Jane 57821, a black woman, is at the center of the table, the same position of Jesus at the Last Supper. Through this positioning, Monáe likens herself to Jesus as a voice for the socially disinherited. Lyrically she is speaking on behalf of marginalized identities and is seen as a champion in her community. Jesus was arrested and put to death because of who he is, however, he resurrected.[2] Jane 57821 was abducted by the government who attempted to cleanse her, but in the end, she was able to resist and break free. Jesus and Jane 57821 are similar in that they pose a threat to societal norms. Their activism and resistance disrupt the status quo.

Much like in Queer Theology Jesus transgresses the boundary between God and human. He is God and the Son of God at the same time[3]. His mere existence is a miracle and a witness to the love and power of God. Jesus troubled the status quo to the point of his death and resurrection. Similarly, Jane 57821 disrupts the boundary between android and human, as she is a cross between android and human, and the government tries to take her humanness away from her. Both Jesus and Jane 57821 disrupt what is common, and bridge the gap between binaries.

While Crazy Classic Life carries its punch through visual elements, the subversive power of Don't Judge Me lies in the song's lyrics, which constitute a dialogue between Jane 57821, her lover, her church family, and God. The record is rich with references to the Christian faith tradition and features the protagonist poetically serenading her lover, another woman. Although she does not outright state that she is in fact in conversation with another woman, context clues in the song and emotion picture reveal the gender of her partner.

Come, let me kiss you right there
Wake you up like sunrise
On the backs of your thighs

I'm gonna pray you this prayer
That I keep in my mind
As a lovely reminder

In the first triplet Jane is speaking to a romantic partner. Tones of affection, intimacy, and sensuality ring out as she paints a picture of waking her lover with kisses at sunrise. In the second triplet Jane is in dialogue with another entity or God, *I'm gonna pray you this prayer.* In the Christian faith, prayer is simply speaking to God. It could be a request or an expression of thanks, but it ultimately boils down to communication with God (Jeremiah 3:33, Philippians 4:6).

In this situation, Jane is praying as a means of conjuring a pleasant memory and expressing thanks to God for her lover.

Even though you tell me you love me
I'm afraid that you just love my disguise
Taste my fears and light your candle to my raging fire
Of broken desire

But don't judge me
I know I got issues
But they drown when I kiss you

This stanza illuminates a relational and internal conflict. Jane is struggling to accept love because she is hiding part of herself. Much like the previous section, Jane is in conversation with two different people, and it switches midway. Jane is talking to her family in the first five lines, and to a lover in the second three. She oscillates between her Queer self, and the self that she has presented to her loved ones as a means of survival. She wants to live in her truth and be authentic in her relationships, however, she holds back due to fear of judgement. Hers is a common plight of a closeted Queer person who has not yet come out to their family. From the standpoint of a queer black woman within a closet, I *love you*'s sound muffled. *Is it me? Or do you love my disguise?* In addition to securing acceptance from family and community, the protagonist also longs for approval from God.

Don't judge me
Baptize me with ocean
Recognize my devotion

The water's perfectly good
Let's reintroduce ourselves
From a free point of view

The first line could be interpreted as Jane asking her loved ones not to judge her. However, the following five lines in this stanza suggest that she is in conversation with God. She references baptism, a deeply Christian tradition, and continues to use it as a point of reference. Biblically, water baptism is an act in which an individual who has dedicated their life to Jesus Christ is immersed into water by a clergy member. This tradition symbolizes the death of the old or sinful self and the emergence or liberation of a renewed self that is sanctified through Christ. The apostle Peter wrote that "water is a picture of baptism, which now saves you, not by removing dirt from your body, but as a response to God from a clean conscience. It is effective because of the resurrection of Jesus Christ." (1 Peter 3:21). According to the Bible, baptism is an act where an individual is sanctioned through Christ and made holy in God's sight. If Jane is indeed in conversation with God in this stanza she is pleading to the Lord for a closer relationship, and recognition of her devotion.

Jane also seeks liberation. *The water's perfectly good* references the ocean in which she pleaded the Lord to baptize her. However, this time she is immersed in the water and invites her lover to join her. It can be inferred that the Lord granted her request, because water baptism represents freedom from guilt. Here Jane is enticing her lover to free herself and remain in intimate relationship with her on a new level. It is an invitation to her lover to be

baptized. Baptism represents a clean consciousness. Themes of dirtiness and cleanliness are prominent in the emotion picture, as dirty computers are being abducted by the government to be cleaned. This invitation is urgent then because Jane wants to be free with her lover on her own terms.

Underneath this track is a softer track of the sound of the ocean and the emotion picture presents footage of Jane 57821, Zen, and Ché frolicking on the beach in love. While this is a depiction of queerness and polyamory, she is well aware that these identities are condemned in most churches.

If I'm gon' sin, it's with you.

This line speaks to the larger issue of homophobia in the church. Janelle Monáe was raised in a Baptist church and trained in the belief that homosexuality is a sin. This doctrine had a lasting effect on Monáe that internalized homophobia and created a binary requiring her to choose between their faith and who she wants to love. Lyrically, Jane addresses this binary by making a choice to love, which ironically, is the pure form of God. This choice circumvents the binary that the church imposed on her because unapologetically choosing to love is choosing to be in God.[3] This line resists the doctrine she, and many other queer people of color, was exposed to, and offers an alternative understanding of God's love unlimited by traditional norms of gender and sexuality.

Despite New Testament scriptures which show Jesus to be "virtually indifferent about matters of sexuality" (Douglas 90), some Christians argue that homophobia is biblically unsound. Monáe's work is therefore groundbreaking in that it includes queer people in sacred spaces, rejecting the notion that homophobia is a core element of Christianity. In her book *Sexuality and the Black Church*, Kelly Brown Douglas theorizes the 'canopy' of homophobia and heterosexism in the Black church community. She states,

> Black people often argue that the Bible makes clear that homosexuality is a sin. By invoking biblical authority, they place a sacred canopy, a divine sanction, over their views toward gay and lesbian persons. This canopy renders homophobia practically intractable. The Bible becomes, then, a tool for censoring a group of people, in this case, gay men and lesbians (90).

Monáe's work taps into the angst that many Black Queers face when they come out to their church family and carves out space for them to question and critique the doctrines that condemn them.[4]

What does it mean to be afraid of loving yourself? Monáe poses this question to listeners in "So Afraid," which is found in the Reclamation portion of *Dirty Computer*. Moving beyond the struggle between imposed expectations and interior longings discussed in "Don't Judge Me," the Reclamation discusses the importance of owning one's identity and resisting oppressive forces, especially fear. This track delves deep into her fears and champions vulnerability as a model for others who share her anxieties. Unlike "Don't Judge Me," the song features the protagonist in conversation with herself and reads as a tear stained dairy entry.

And I'm afraid
Ah, I'm so afraid
Ah, what if I lose?
Is what I think to myself
I'm fine in my shell
I'm afraid of it all, afraid of loving you

In a podcast interview where she explains the meaning of this song, Monáe revealed that she is afraid of loving herself, loving other women, and loving her country (Hirway 2:45-2:55). She acknowledges that she would be safer if she stayed in her comfort zone, in the closet, where she does not have to be reveal her norm-bending beliefs and experiences to the world. However, by releasing this song on the album she is doing the exact opposite; being vulnerable and presenting her feelings under the harsh light of public scrutiny. Monáe believes that there is power in vulnerability, and she admires people who share their stories and practice this act of intentional exposure.

Despite the public nature of the song, Monáe also reveals that she is comfortable in her shell, the private place where she loves her Queer self in silence. Repeatedly Monáe has expressed that her church believes that anyone who identifies as queer is a sinner who is going to hell. Monáe heard these messages all of her childhood and internalized them; it was only within her shell, shielded from the outside world, that she felt safe to live authentically. Through therapy Monáe worked through what her sexuality meant to her and came to peace with the fact that her loved ones may never understand it (Sewell). In an interview in *them* magazine Monáe stated, "I leaned into the idea that if my own church won't accept me, I'm gonna create my own church" (Sewell). Thus, she battles with the tension between desiring to own her sexual identity and fearing it at the same time. This tension builds up to a sonic climax or explosion on the chorus of the second half of the song. Metaphorically speaking, the musical explosion is Monáe's emergence from her shell and into the public, much like the album release.

Black Feminism in Dirty Computer: "Django Jane" and "Pynk"

Django Jane, and Pynk are the sixth, and seventh songs on the album *Dirty Computer*. Each of these songs celebrate different aspects of Monáe's identity, especially her role as an activist guided by Black feminist politics. Patricia Hill Collins defines Black feminism as "a process of self-conscious struggle that empowers men and women to actualize a humanist vision of community" (Collins 39). I believe that a humanist vision of society is a place where people exist in harmony. It is a dream where individuals are valued, respected, and taken care of regardless of their race, sexuality, or gender. *Dirty Computer* is dedicated to self-actualization and struggle against oppressive forces to imagine such a community. Through song, Monáe is an advocate for a humanist society where all people have an equal chance to opportunities and access to resources.

Django Jane is a song inspired by anger, frustration, and empowerment. The lyrics evoke power through their demands for change in the form of an aggressive rap delivery.

> *We gon' start a motherfuckin' pussy riot*
> *Or we gon' have to put 'em on a pussy diet*
> *Look at that, I guarantee I got 'em quiet*
> *Look at that, I guarantee they all inspired*

In an interview Monáe expressed that she put this line in the song because she is a big fan of the Russian punk protest band Pussy Riot. They are a feminist band who advocates for the LGBTQ community and women. This line pays homage to the work that they do for women and other marginalized people across the globe. The second half of the stanza expresses the power that women have in society. In the context of a heterosexual relationship, there is power in a woman withholding sexual favors and pleasure from her male partner. This sentiment resonates with a famous Greek comedy by Aristophanes called Lysistrata. In the

comedy, Lysistrata and other women in the area withhold sex from their male partners in order to persuade the them to end the Peloponnesian War (LYSISTRATA). The play speaks to the power men and women have in society. Men have the power to start wars, and women hold the power to end them. *Look at that, I guarantee I got 'em quiet*. This line emphasizes the power women have over men sexually, while suggesting that men do not have control over their sexual appetites. This power places women in a position that is empowering, yet women across the globe do not have equal access to resources for self-actualization. Despite the inequality women face in the world, they are powerful force to be reckoned with, and lyrically, Monáe acknowledges that strength in the song.

> *A-town, made it out there*
> *Straight out of Kansas City, yeah we made it out there*
> *Celebrated, graduated, made it pass/fail*
> *Sassy, classy, Kool-Aid with the kale*
> *Momma was a G, she was cleanin' hotels*
> *Poppa was a driver, I was workin' retail*
> *Kept us in the back of the store*
> *We ain't hidden no more, moonlit nigga, lit nigga*

Here Monáe is paying homage to the city and parents that raised her. She is proud of her Kansas City roots and her working-class parents who she saw go to work every single day to provide for her. To this day she wears black and white attire while performing to honor her working-class roots and to signal that she is no more dignified in the spotlight than those who labor on the margins of society. While Monáe has climbed the ladder of success in her career and starred in two Oscar-winning and Oscar-nominated films, *Hidden Figures* and *Moonlight*, the use of "we" indicates that the support and love of her community are crucial to her success. In keeping with this homage to vernacular culture, references to Kool-Aid and kale have cultural significance and represent more than nourishment. Kool-Aid serves as a cheap alternative to store-bought juice and is a widely accepted beverage in the Black community for various gatherings from cookouts to the dinner table. It is made of artificial fruit flavored powder, sugar, and water. It is a relatively cheap drink, (99 cents per pack at Walmart), and is available to purchase in bulk. In the context of the song, Kool-aid represents Blackness. Kale is a leafy vegetable in the same family as cabbage. In the past decade it became very popular. In fact, according to the Department of Agriculture kale production increased nearly 60% between 2007 and 2012 (Turrow). Kale is a pricier purchase at Walmart at around three dollars per pound. In the context of the song kale represents refined taste and classiness. Monáe is communicating that she is Black and classy at the same time, and has no trouble embodying both traits.

> *Runnin' outta space in my damn bandwagon*
> *Remember when they used to say I look too mannish*
> *Black girl magic, y'all can't stand it*

After all of her success as a singer, artist, and actress Monáe's fanbase has grown exponentially. However, she will not forget when critics would call her too masculine because of the way she dressed and performed gender. Despite all of the negativity, her Black girl magic reigns on. Black girl magic has been described as a way to "celebrate the beauty, power, and resilience of Black women" (Wilson). Despite what the critics have to say about Monáe's appearance, she continues to stay true to herself as a Black woman.

Her resilience and authenticity in the public eye is a prime example of Black girl magic. At the same time, Monáe's power is based in the fact that, as a Black feminist, she does not adhere to conventional standards of femininity and respectability. She is known for wearing black and white suits to red carpet events and wearing her hair in unique styles that highlight the kinky volume. Through presentation and expression Monáe resists hegemonic standards of beauty and adopts a counter-normative expression of Black femininity.

Made a fandroid outta yo girlfriend
Let's get caught downtown in the whirlwind
And paint the city pink, paint the city pink
And tuck the pearls in, just in case the world end

In addition to resisting proscriptions for pop female music artists in attire, Monáe also makes a feminist maneuver by retaining her erotic agency. Specifically, she expresses her prowess as a talented artist and a sexual woman who is able to steal girlfriends. Sexual prowess and ability to "steal yo girl" is a common male theme in rap music. Monáe is flipping the script by adopting a masculine attitude as a Black woman. The last two lines in this stanza are in reference to her hit single Pynk, which she released before *Dirty Computer*. All in all, this line is expresses that Monáe is not going to run from modern racism in America. She states that she is here to stay and is going to speak her truth and empower those who also live in theirs. She makes herself known as a Black woman who stands up in the face of injustice against her people. Painting the city pink can be understood as making her mark on the world as a Black feminist. "Pynk" is a feminist icon in song form. Monáe celebrates femininity, sexuality, and queerness in a catchy tune that embodies pride. The video celebrates black womanhood and vaginas.

"Pynk" is the seventh song on *Dirty Computer*, but Monáe released the video to this song prior to the release of the album. It went viral immediately with a grand total of 13 million views on *YouTube*; "Pynk" broke the internet. The pussy pants, as seen in the previous image, have become so popular that Monáe has hinted at making them available for purchase. It is important to note that not all women in this image are wearing pussy pants. This is an intentional decision on Monáe's part. She is sending the message that not all women have vagina's, thus including transwomen in the celebration of femininity. However, the lack of actual transwomen in the music video could be deemed as controversial, despite the effort Monáe has made to include the transgender community.

The "Pynk" music video is full of vagina centric imagery, some are playful, and others, as depicted in the following image, are more political.

These panties are a direct response to the current President's infamous comment, "grab her in the pussy" (Makela). He made this comment in 2005 in a conversation about taking advantage of women because of his position of power and fame. The video clip went viral in 2016, months before he was elected into office. There was a national uproar in regards to these comments. "I grab back" became a rallying cry of outraged women nationally. Monáe's inclusion of this statement is political and timely. This image breaks the fourth wall of the dystopian universe and directly speaks to current issues in the United States.

Pink like the inside of your, baby
Pink behind all of the doors, crazy
Pink like the tongue that goes down, maybe
Pink like the paradise found

Pink when you're blushing inside, baby
Pink is the truth you can't hide, maybe
Pink like the folds of your brain, crazy
Pink as we all go insane

Pink like the lips around your, maybe
Pink like the skin that's under, baby
Pink where it's deepest inside, crazy
Pink beyond forest and thighs

Pink like the secrets you hide, maybe
Pink like the lid of your eye, baby
Pink is where all of it starts, crazy
Pink like the halls of your heart

Traditionally, the color pink is associated with the female gender from birth, but Monáe argues that we all have a little pink on the insides of us. For example, tongues, hearts, and eyelids are universal human traits that share the color pink. However, in the context of this song the color pink means a lot of things. *Pink is the truth you can't hide,*

maybe. Here Monáe is equating pinkness to her queerness, which is something she is not willing to hide anymore. The video much like the song is full of double entendres such as *Pink beyond forest and thighs* where she is talking about the color of vaginas "beyond forest" or pubic hair "and thighs." This song is a staple in the Black feminist community because Monáe is expressing and loving her blackness and femaleness out loud. It seems that she has no trouble embracing her masculine and feminine energy as she makes the sonic shift from "Django Jane" to "Pynk." Both of these songs illuminate her identity as a complex Black woman who has a lot to say about blackness, queerness, and femininity. All humans are born from women, who harness feminine or "pink" energy. We all come from pinkness, and it is to be celebrated.

Conclusion

In lieu of a more traditional conclusion, I offer the following as a final statement of how I was able to apply Monáe's theories of identity, liberation, and structural oppression to my own journey of confronting the multiple selves occupying my body. These selves include my Queer self, Black self, Woman self, and Christian self. Although my existence is a combination of all four of these identities, I wanted to give each part of myself an opportunity to speak. "Dear Janelle" is a letter from my Queer self (QS) to my Christian self (CS).

Dear Janelle
It's been a while since you looked me in the eyes
You know why

The first line is an introduction from my QS to my CS. It's important to note that in the song I am addressing myself by my first name. I did this to show that my CS and QS occupy the same body and are seen as the same person in the world. People perceive me as Janelle, however, there is underlying tension between my inner selves that the song communicates.
When it comes to operating in the world, my CS has maintained superiority to my QS for a greater portion of my life. One of the many factors that shapes this power dynamic is my Christian upbringing. I devoted my life to Jesus Christ at a very young age, and my parents brought my siblings and I to church almost every Sunday. Before I was aware of my sexual identity, I was familiar with Christianity. For years I did not fully acknowledge my budding Queerness, and this stanza speaks to that neglect. To this day, there are instances where I doubt my judgment and revert back to repressing my queerness for the sake of comfort.
It's Janelle
I'm the part that you always try to hide
Why'd you lie?
So I took a little time
To decide if I wanna stay alive

Similar to the previous stanza, this section speaks to the neglect of my QS experiences. It also represents the introspection that I underwent in attempts to negotiate with my QS. There were times when I doubted that these parts of me were authentic. This doubt had a lasting effect on the most vulnerable part of myself, leading her to contemplate suicide.

And I decided
That I feel how I feel

And I love who I love
And I like what I like
And I can't take it off
No I won't take it off
And I won't turn and run

The words you try to hurt me with
Sound better with your tongue
When they're sung
When they're sung
When they're sung

The first seven lines represent the truth that my QS lives in. I love who I love and I feel how I feel. Despite the doubt and invalidation, I endure. I perform this part of the song in a soft falsetto voice to represent flying over negativity and existing at the highest level of truth. *The words you try to hurt me with sound better with your tongue* is a direct response to the harmful things that my CS has said to my QS to keep her silent. This line is about turning pain into beauty.

Dear Janelle
It's been a while since I've seen the sun shine
Without the clouds

I was diagnosed with anxiety and depression in early July. These mental illnesses can affect productivity and result in isolation. I have had days where I don't leave my room and I feel like a dark cloud is in the way of the sun. My QS is dealing with the symptoms of depression in this line. It doesn't make it easier that her validation is under constant reevaluation by my CS.

Hey Janelle
I'm the part of you you can't figure out
Without the music

Writing songs, playing my bass, and singing are therapeutic outlets that benefit my mental health. Music is a tool that I use to understand the hurting parts of myself.

So I took a little time
I figured out that I wanna stay alive

And I decided
That I feel how I feel
And I love who I love
And I like what I like
And I can't make it stop
No I won't make it stop
And I won't turn and run

The words you try to hurt me with
Sound better with your tongue
When they're sung

44

When they're sung
When they're sung

Dear Janelle
It's Janelle
Love Janelle
Ohhh ooo

  The last four lines of the song imitate the format of a letter. *Dear Janelle, It's Janelle, Love Janelle*. This song is literally a letter to myself written with love and honesty; I wanted the end of the song to reflect that truth.

  "Dear Janelle" is similar to "So Afraid" in tone and message. Repeatedly, "So Afraid" reads as a tear stained diary entry and "Dear Janelle" evokes a similar tone as it is derived from my field notes. "So Afraid" speaks to fears and anxieties, and "Dear Janelle" faces a level of anxiety. Both songs express vulnerability, fear, and love.

  Analyzing *Dirty Computer* forced me to face some hard truths about myself. I see myself in Jane 57821's pain, bravery, and frustration. I am a dirty computer. I have bugs and viruses, but those are the things that make me special. I am more than my pain. I am a survivor of it. I am a witness. I occupy a unique standpoint of self. My experience is unique and shared.
Janelle Monáe inspired me to understand the importance of telling my story on my own terms. This project is a reflection of that decision. I am different and I am not alone. I am a dirty computer.

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The Impact of Neighborhood Quality on the Relationship Between Parental Involvement and Academic Outcomes of Diverse Adolescents

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Abstract

This research is important because it examines factors that is not often considered by many researchers in this field. Demographic disparities in children's achievements exist at all levels in education and the neighborhood in which the children reside can also have its own influence on the children's academic outcomes. It is important to look at these factors that may or may not make it possible for these children to continue and complete their educational career. Secondary data analysis of the Families, Adolescents, and Neighborhoods in Context (FAN-C) study, ($N = 140$ African American and Hispanic parent-adolescent dyads) was used to test the following questions: (1) what is the association between home-based and school-based involvement and adolescents' self-reported grades?, (2) is the magnitude of the association with grades greater for home-based or school-based involvement?, and (3) does the association between parental involvement and grades vary by neighborhood quality? We hypothesized: (1) home and school-based involvement would be positively associated with grades, (2) this association would be stronger for school-based involvement, and (3) the association between parental involvement and grades would be stronger in poorer quality neighborhoods. Results showed that parental involvement did not have an impact on academic performance, but an aspect of neighborhood quality, informal social control, moderated the association of home-based involvement and grades.

Keywords: Parental involvement, academic outcomes, neighborhood quality

Education is one of the greatest opportunities offered by the United States. People see education as a way to access many different opportunities, while some may see it as a way to become equipped with the knowledge necessary to help others. There are, however, disparities in education when comparing minority children to their White counterparts. In 2013, African American students scored an average of 31 points below White students in eight grade math and 26 points below in eighth grade reading (Morris & Perry, 2016). Also, Hispanic students are about 15% more likely than White students to not have finished high school (Cameron & Heckman, 2001). Another study showed that in 2015, the rates of White young adults receiving a high school diploma or equivalent was higher than the rate of both African American and Hispanic young adults.

Also, in 2017 it was reported that the rate of college enrollment for White young adults were higher than that of African American and Hispanic young adults (Musu-Gillette, De Brey, McFarland, Hussar, Sonnenberg, & Wilkinson-Flicker, 2017). Some of these disparities are due to the fact that a lot of children from minority households do not have the same resources as their White counterparts, necessary to complete their schooling. Another reason for these disparities is that some of these minority children come from households where their parents face barriers such as nonflexible work schedules, transportation problems, and stress from living in a disadvantaged neighborhood, which prevents them from supplying the necessary involvement to their child's education (Hill & Taylor, 2004). This study examined the association between parental involvement in education and adolescents' grades among African American and Hispanic families. In addition, the current study examined whether the quality of the neighborhoods the participants reside in can impact the relationship between parental involvement and grades.

Theoretical & Conceptual Frameworks

The current study was guided by several theories and conceptual frameworks related to the specific contexts in which families (e.g., neighborhood) are embedded as well as a specific parenting practice (i.e., parental involvement). For the neighborhood context, social disorganization theory (Shaw & McKay,1942) proposes that structural disadvantage within neighborhoods can impact the outcomes of adolescents, ultimately leading to higher youth problems (Kingston et al, 2009). When there is a combination of low social cohesion (shared values and goals) and social control with disadvantage, there are fewer opportunities for the youth to engage in positive social activities, which may lead to increased delinquency (Bowen, 2002) and potentially lower academic performance (Madyun, 2011). Related to social disorganization theory is the collective socialization framework (Wilson, 1987), which proposes that neighbors influence youth through peer interactions, adult role modeling, and parental monitoring (Macartney,2012). Together, these theories suggest that neighborhood structural disadvantage reduces the likelihood of collective socialization, a positive neighborhood asset, thereby potentially contributing to less desirable youth outcomes.

Guided by these theories, the current study measured neighborhood quality using both positive and negative neighborhood features to understand the interactive effect of neighborhoods and parenting on youth's academic outcomes. A neighborhood that possess high levels of cohesion and control and low levels of problems is considered having good quality, and a neighborhood that possesses low levels of cohesion and control and high levels of problems is classified as poor quality. It is important to consider these constructs because they indicate any disadvantage within the neighborhood and the interactions between the people that reside in that neighborhood. Any type of influence from the neighborhood could also have an impact on how effective parental involvement in education can be on the adolescent's academic outcomes. Neighborhood factors, whether good or bad, are experienced by both the parents and the adolescents and can therefore impact how parents and adolescents interact with each other after experiencing those neighborhood factors. When bad qualities of neighborhoods rise, parents are expected to intervene so that adolescents can remain on a positive path.

Parental involvement is a construct that explains parents' use of different strategies to help better their child's educational outcomes. The most commonly examined and recognized parental involvement strategies are home-based involvement and school-based involvement. Home-based parental involvement includes ways that parents communicate with their child about school, engage with school work, and provide a learning environment at home (Hill &

Tyson, 2009). Activities such as helping with homework, providing a productive space for work to get done, and making sure the child has everything they need to complete their work, are some examples of home-based involvement. School-based parental involvement refers to the parents' participation in school events, governance, and their communication between teachers (Hill & Tyson, 2009). Examples of school-based involvement include attending PTA meetings and communicating with the child's teacher(s) about how the child can better improve. Previous research has shown that home-based involvement was a significant predictor for GPA (Chung, Phillips, Jensen, & Lanier, 2019), and that different types of home-based involvement was positively associated with higher academic achievement (Wilder, 2014). It was also seen that African American and Hispanic parents engaged in less home-based involvement in comparison to White parents (Puccioni, 2018). In regard to school-based parental involvement, average weighted correlation between school-based involvement and academic achievement was stronger than the correlation between home-based involvement and academic achievement (Hill & Tyson, 2009).For African American adolescents, school-based involvement was positively correlated with GPA (Day & Dotterer, 2018). Below, we review relevant literature that explores parent involvement in education, neighborhood quality and African American and Hispanic adolescent's academic performance.

Parental Involvement in Education

For many children, parents are the primary source of advice and help. Parental involvement plays a significant role in children's academic achievement regardless of their grade level (Wilder, 2014) and can yield very positive results. Specifically, for racial-ethnic minority youth, parental involvement is associated with higher achievement (Jeynes, 2005). It is due to these findings that it is believed that family-school relationships and parental involvement have been identified as a way to close the achievement gap between different ethnic groups and maximize the potential of students (Hill & Tyson, 2009).

When children start to get older, it might be harder for parents to express involvement, as the children start becoming self-actualized and are less likely to ask their parents for help (Wilder, 2014). Adolescents would prefer their parents to trust them with the responsibilities of school and would discourage their parents from coming to school (Collins & Laursen, 2004). Although this is true, it is important for parents to try to remain involved in their children's schooling because adolescents whose parents are more involved with their education tend to be more likely to graduate from high school and attend college (Day & Dotterer, 2018). Oftentimes, Hispanic parents find themselves lacking when it comes to parental involvement because they feel they do not have much knowledge to contribute, or there is a language barrier between the parent and the school which prevents them from being willing to involve themselves. African American parents may lack in involvement because bias they may face leads them to mistrust the school and its teachers (Hill & Tyson, 2009). Due to these certain circumstances that may prevent school involvement, it becomes important for parents to be engaged in other ways such as having quality home-based involvement. Some works shows that for African American students, home-based involvement was positively correlated with higher grades (Day & Dotterer, 2018). Another way that home-based parental involvement can serve as key for students is that when parents help with homework, it fosters positive attitudes towards schooling (Balli, Wedman & Demo, 2010). It is important for parents to express interest in their children's studies because parental interest and involvement has proven to be related to higher academic achievement (Bronstein, Ginsburg, & Herrera, 2005).

Researchers and theorists tend to debate whether home-based or school-based involvement has the greatest impact on the academic outcomes of children. Hill & Tyson's (2009) meta-analysis of parental involvement in middle school shows that school-based involvement may have a greater impact than home-based involvement on youth's achievement. Undeniably, parents' school-based involvement is a way to model that school activities are worth the time, which leads to adolescents being more likely to see education as a priority (Day & Dotterer, 2018). Other researchers have found that for children between 15-17 years old, home-based involvement is positively associated with academic achievement, while school-based involvement had no association with academic achievement (Wang and Sheikh-Khalil, 2014). Results tend to depend on the researcher's definition of each type of involvement, and how their questions lead them to analyze the results. For example, Fishel and Ramirez (2005), defined parental involvement in education using Epstein's (1987) typology, which includes communicating with the child's teachers, assisting with the child's learning at home, volunteering or attending events at school, and making decisions regarding the child's academic progression, and this study yielded that these types of involvement were not associated with achievement. Although there are individual benefits of home-based and school-based involvement on adolescents' grades, there is more empirical evidence in support of the claim that school-based involvement has a significant impact on the grades of adolescents.

Neighborhood Quality

While home-based and school-based involvement are related to academic outcomes among adolescents, neighborhood quality may also have implications for the academic success of these youth. Specifically, the context of the neighborhood and resources within those neighborhoods can influence the adolescents in ways that either favor or oppose positive educational outcomes. More affluent neighborhoods are associated with higher achievement in comparison with middle income neighborhoods (Sanbonmatsu, Kling, Duncan, & Brooks-Gunn, 2006), and crime and violence have been found to negatively affect student functioning, performance, and behavior at school (Daly, Shin, Thakral, Selders, & Vera, 2009). With this in mind, it is important to explore neighborhood problems because parents' and adolescents' perceptions of these problems likely matters for youth's academic achievement.

In addition to neighborhood problems, the current study considers informal social control as an aspect of neighborhood quality. By examining informal social control, the influence of members within the neighborhoods can be analyzed as a possible influence on academic outcomes. Hispanic mothers living in neighborhoods with high informal social control engaged in more home-based involvement and resource seeking than mothers living in neighborhoods with less informal social control (Bhargava, Bamaca-Colbert, Witherspoon, Pomerantz, & Robins, 2017). This study shows that how parents perceive their neighborhood environment can impact their involvement in their child's education. If parents perceive the neighborhood as positive, the parents are more capable of adjusting, and in turn are more able to provide a more cognitively stimulating home environment (Mahatmya & Smith, 2017). Informal social control also plays a critical part for adolescents because residents have an easier time supervising youth within the neighborhood, socializing them towards conventional values and preventing them from becoming involved with delinquent peers (Haynie, Silver, & Teasdale, 2006). With the involvement of residents within the neighborhood, adolescents are more directed to staying out of trouble, and with that, hopes of them focusing on completing their education.

There are very limited studies on the influence of neighborhoods on academic achievement. The studies that did examine neighborhood influence showed that neighborhood context and affluence was related to academic achievement. Specifically, immigrant concentration, concentrated affluence, and social capital helped to account for gaps within scores of Hispanic children (Macartney, 2012). Results also showed that trust in neighbors was positively associated with achievement for Hispanic children in native born families (Macartney, 2012). Another study found that for those that had low achievement, they lived in less affluent neighborhoods compared to those that overachieved (Mahatmya & Smith, 2017). There is also limited literature on the effects of neighborhood problems and informal social control on academic achievement.

Current Study

The current study investigates the impact of neighborhood quality on the relationship between parental involvement and African American and Hispanic adolescents' self-reported grades. This research is important because it can help parents to understand how to better help their children in school, while understanding any possible neighborhood influences that can also impact their children. This type of information is especially relevant for racial-ethnic minority families who may perceive barriers to involvement in their youth's education and may also live in lower quality neighborhoods than their White counterparts. The goal of the current study is to answer three questions. (1) what is the association between home-based and school-based involvement on African American and Hispanic adolescent's self-reported grades? (2) is the magnitude of the association between parental involvement and academic outcomes greater for home-based or school-based involvement?, and (3) does the association between home-based and school-based involvement and grades vary by their neighborhood quality? It was hypothesized that there would be a positive association between both home-based and school-based involvement and adolescents' grades. The second hypothesis was that the magnitude of the association between school-based involvement and self-reported grades will be stronger than the association between home-based involvement and grades. The third hypothesis was that the association between home-based and school-based involvement and grades will be stronger within neighborhoods that have high neighborhood problems or low levels of informal social control.

Method

Overview

The current study utilizes data from the Families, Adolescents, and Neighborhoods in Context (FAN-C) study, conducted between 2010 and 2014. This cross-sectional study was conducted in two phases, with the purpose of understanding how neighborhood context is associated with adolescent well-being and family functioning. The study was conducted in Harrisburg, PA, due to its vast racial/ethnic diversity and high proportion of African American and Hispanic families. According to the 2010 census, the racial/ethnic makeup of Harrisburg, was 52.4% Black or African American and 30.7% White. Approximately 18% of the population was Hispanic or of Hispanic ancestry (U.S. Census Bureau, 2010). Participants were recruited from three neighborhoods within the city of Harrisburg. These neighborhoods were selected based on informal interviews with parents and children, community advisory board members and other community stakeholders. Participants were also recruited from two neighborhoods in the surrounding Harrisburg area, which were categorized by a slightly higher median income ($558-$4,550 more) and had a different racial/ethnic makeup from the first three neighborhoods. These

neighborhoods were characterized by a lower proportion of African American (38.1%) and Hispanic (14.6%) residents.

Participants

  The sample for the current study was taken by combining the samples from both phases of FAN-C (N_{parent} = 177 and $N_{adolescents}$ = 205) and using only N =140 parent-adolescent dyads that identified as African American (N = 67, 47.9%) or Hispanic (N =73, 52.1%). The median family income was within the $20,001-30,000 range, and most parents were natural mothers (67.9%). On average, adolescents were 13 years old (SD = 1.9); 42.9% of the youth were males. Of the parent population, 77% had at least a high school diploma. Demographic characteristics of the participants are listed in Table 1.

Procedure

  After receiving IRB approval, flyers were posted on community boards located in populous areas within the community to recruit participants for phase I. Agencies and churches in support of the project also informed individuals about the project. Community members who were interested in participating contacted the project hotline where they were screened for eligibility. If the person was eligible to participate, the project coordinator notified them of focus group session dates and times, so the participant could schedule when they could attend. For phase II, Hispanic communities were contacted to help recruit Hispanic individuals. Also, five individuals who were fluent in Spanish were hired to make connections with and recruit the families. Similar to phase I, in phase II, flyers were displayed in hot spots, and they were also posted at events that were organized by Hispanic communities. Interested participants would contact the study hotline, which screened each participant for eligibility. If they were found to be eligible to participate, they were given a date to come in and participate in the study.

  Both phases of the study had inclusion and exclusion criteria. Across both phases inclusion criteria were that parents had to be at least 18 years old and the adolescent had to be between the ages of 11 and 17 years old. Additional inclusion criteria for phase I was the participants had to live within one of the five communities that were selected for the study. Exclusion criteria for this phase was that participants had to be able to speak, read, and understand English. For phase II of the study, which focused on Hispanic families, an additional inclusion criterion was that parents had to be able to communicate in Spanish, and adolescents were required to speak in English.

  Before study participation, consent and permission had to be given. In phase II, parents were given consent and permission forms in either Spanish or English. For both phases of the study, parents provided permission for their adolescent to participate. The adolescents were read the assent form and signed if they agreed to participate. After consent was given, parents and adolescents were separated into two groups, each having a maximum of 12 members. Questionnaires were completed separately, and the remaining hour was spent discussing topics in those same separate groups. As compensation for their time, parents were given a $25 gift card, and adolescents were given a $15 gift card.

Measures

  All variables included in this study were used in both phases of FAN-C. Reliability by race/ethnicity is reported in Table 4.

Demographic information. Demographic information was reported by parents and adolescents and is reported. This information includes child age, child gender, parent education, annual family income.

Adolescents reported child gender (coded 1= girls, 2= boy) and their age. Parent education level was coded so that less than high school = 1; high school = 2; some postsecondary education but less than a four-year degree = 3' college graduate (BA/BS) = 4; graduate or professional school = 5. Annual family income was coded on an 11-point scale ranging from 1= less than $10,000 to 11= greater than $100,000. Type of residence was coded so that 1= apartment and 2=house. Child grade was not coded and was just inputted as the parents reported it.

Neighborhood quality. *Neighborhood problems*. Neighborhood problems was assessed with an adapted version of the neighborhood problems index (Perkins & Taylor, 1996), which examined perceptions of neighborhood problems by both the youth and the parents. Parents responded to 16 items, and adolescents responded to 10 items (e.g., "how much of a problem is/are burglaries and thefts?") on a three-point Likert scale: 1 = not a problem; 2 = somewhat of a problem; 3 = a big problem. Both scales demonstrated strong reliability ($\alpha_{parents}$ = 0.95, a_{youth} = 0.89).

Informal social control. Informal social control was measured using the collective efficacy scale (Sampson et al., 1997). This scale examined perceptions of informal social control in their neighborhood. Both parents and youth responded to 5 questions (e.g., "how likely is it that your neighbors would do something, or could be counted on to do something if they saw neighborhood kids skipping school and hanging out on the street corner?") on a four-point Likert scale: 1 = Not at all likely; 2 = Not very likely; 3 = Somewhat likely; 4 = Very likely. Both scales showed strong reliability ($a_{parents}$ = .92, a_{youth} =.92).

Parental involvement. The measures used to assess home-based and school-based involvement are slightly different for adolescents and parents, as detailed below. These measures were previously developed from focus groups within diverse families. The strategies the caregivers and adolescents used were coded and then items were created for each developmental stage.

Home-based involvement. Parents and adolescents responded to a measure which examined the extent to which parents provided their youth with structure at home. Parents responded to 15 questions (e.g., "my child follows a schedule for completing his or her homework") on a five-point Likert scale: 1 = never; 2 = occasionally; 3 = sometimes; 4=most of the time; 5 = always. The parent-reported scale showed good reliability (a =.87). Adolescents responded to 16 similar questions (e.g. "I have a schedule at home for doing my homework") using the same five-point scale. This adolescent-reported scale also showed good reliability (a =.90).

School-based involvement. The parent- reported measure examined the extent to which parents engaged in proactive and preventative communication with their child's teachers. The scale was created by Hill, Witherspoon, & Teo (2010), and had 10 questions (e.g. "the teachers make suggestions for how my child can improve" and "I ask teachers questions about my child's homework assignments") on a five-point Likert scale: 1 = never; 2 = occasionally, 3 = sometimes; 4 = most of the time; 5 = always. The scale had good internal consistency **(**a =.93). The adolescent-reported measure of school-based involvement was created by Hughes & Way (2004). It measured youth's perception of their parents' involvement at school. This measure had a total of 11 questions (e.g. "since the start of the school year how often has your parent(s) talked with one of your teachers in person?") on a four-point Likert scale: 0 = never; 1= sometimes; 2= many times; 3 = always), and showed good reliability (a=.89).

Grades. Adolescents responded to questions about their grades in math, science, language arts, and social studies, as reported on their last report card, on an 8-point scale. The items were coded so that 1=55, 2=65-69, 3=70-74, 4=75-79, 5=80-84, 6=85-89, 7=90-94, and 8=95-100, and grades in all four subjects were averaged. The scale showed good reliability ($a=.76$).

Data Analysis Plan

After the variables were selected, exploratory factor analysis (EFA) and reliability was used to construct the scales and examine internal consistency. Descriptive statistics were separated by parents and adolescents, and t-tests were used to test for mean differences by race/ethnicity. Bivariate correlations were run to examine associations between the variables. Regression analyses were conducted using SPSS to test study hypotheses. All models were separated by parent-reported and adolescent-reported predictor variables, and all models include covariates of child gender, child age, parents' education, and family income. Parental involvement and neighborhood variables were entered in the first step of the regression to examine the main effects. Interactions were then added to the models. Due to a high level of collinearity among the parent-reported interaction terms, the interactions were entered in two separate models. Specifically, one model examined the interactions between neighborhood problems and parental involvement variables, and the other model examined the interactions between informal social control and parental involvement variables. For interactions that were statistically significant, simple slope analyses were conducted using the PROCESS macro in SPSS.

<div align="center">

Results

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Preliminary Results

Descriptive statistics are shown in Tables 2, 3, and 4. Mean levels of study variables were compared for Hispanic and African American participants using *t*-tests (and results are displayed in Tables 2 and 3). Parent-reported models showed significant differences for reports of informal social control ($t(138) = 1.73$, $p < .10$). Hispanic parents reported higher levels of informal social control ($M =2.61$, SD $=.98$) than African American parents ($M =2.31$, SD $=1.04$). For adolescent-reported models, reports of school-based involvement were significantly different ($t(134)=2.32$, p$<.05$). African Americans reported higher levels (M $=1.27$, SD $=.82$) of school-based involvement Hispanic adolescents ($M = .98$, SD $=.63$). Correlations are displayed in Table 5.

Substantive Analyses

The regression analyses are show in in Table 6. Parent reported variables were inconsistent with hypothesis, as the regression showed that home-based and school-based involvement were not significantly associated with grades. The interaction of neighborhood problems and informal social control were entered in separate models. Parent-reported neighborhood problems did not moderate the effect of home-based or school-based involvement on grades. Similarly, informal social control, did not moderate the effect of school-based or home-based involvement on grades.

For the adolescent-reported models, results showed that there was no association between either home-based or school-based involvement and academic outcomes, also contrary to hypotheses. To examine the moderation by neighborhood variables, interactions were entered into the models, starting with neighborhood problems. As with results for parents, neighborhood problems did not moderate the association between school-based involvement and grades for

adolescent report. However, adolescent-reported neighborhood problems did moderate the association between home-based involvement and grades (B=-.96, SE=.24, $p < .10$). This marginally significant interaction was explored by graphing the simple slopes (displayed in Figure 2). Although the interaction was not significant, the figure showed that for neighborhoods with low levels of problems, parents' home-based involvement was positively associated with grades. Next, interactions between informal social control and parental involvement variables were entered in a separate model. Informal social control moderated the association between home-based involvement and grades (B =.24 ,SE =.03, $p < .05$). Simple slope analysis was then used to further explore this interaction, displayed in Figure 2. Analyses showed that for neighborhoods with high informal social control, as home-based involvement increased, grades increased as well (B =.48, SE =.26, $p < .10$). For neighborhoods with average and low informal social control, adolescent reported of parents' home-based involvement were not associated with grades.

Discussion

The current study examined the association between parental involvement in education and adolescents' academic performance, as well as the impact of neighborhood quality on the relationship between parental involvement and the grades of adolescents. First, it was hypothesized that there would be a positive association between home-based and school-based involvement with academic performance. Results showed that the effect of home-based and school-based involvement, as reported by parents, were not associated with grades. Similarly, for adolescent report, regression analysis showed that the effect of home-based and school-based involvement had no significant effect on grades. Therefore, hypothesis 1 was not supported. It was also hypothesized that the association between parental involvement and academic performance would be greater for school-based involvement. Since the data did not support the first hypothesis, a conclusion could not be drawn about whether home-based or school-based involvement had a stronger association with grades. These findings reflected the uncertainty shown in the literature presented previously. Participants, measures, and frameworks may be similar across the many different studies, but there are underlying factors that play a role in how these characteristics interact with each other that impact the significance of the expected results. Although it is not unlikely that there would be unsupported data, it is still surprising, nonetheless.

Finally, it was hypothesized that for poor quality neighborhoods (i.e. neighborhoods with low informal social control and high neighborhood problems), the association between parental involvement and academic outcomes would be stronger than the association within affluent neighborhoods. For adolescent report, results showed that informal social control moderated the effect of parents' home-based involvement and grades, but this moderation was inconsistent with hypotheses. Specifically, in neighborhoods that had *high* informal social control, home-based involvement was positively associated with grades. It can then be perceived that neighbors have some impact on either how adolescents think and approach education, and/or how involved the adolescents perceive their parents to be in their education. This is consistent with the collective socialization framework (Wilson, 1987) because it is showing that these neighborhoods, specifically its residents, can influence the youth, and when these influences are positive, can yield positive results. Additionally, the interaction between adolescent report of neighborhood problems and home-based involvement was marginally significant. Within neighborhoods that had high levels of problems, grades would decrease as home-based involvement increased, and for neighborhoods with low levels of problems, grades would increase as home-based

involvement decreased. These findings support social disorganization theory (Shaw & McKay,1942), in that these neighborhoods with high levels of problems may be impacting the adolescents in a way where parental involvement cannot counter the impact and therefore the adolescents education take a toll. For parent-reported variables, neighborhood variables did not moderate the associations between parent involvement and grades. This was expected because parents are less likely to be influenced by their environment when it comes to parenting their child. It is expected that parents are already aware of the neighborhood environment since they are the ones who choose where their family will live, so it is not unusual that neighborhood problems shows to not have any significance for parents. Also, some parents rely on their instincts when raising their child, so working with their neighbors for the benefit of their child may not be an idea that they consider, which could explain why informal social control also showed no significance.

Limitations and Future Directions

One limitation of the current stud was the use of cross-sectional data, which does not account for changes in contextual factors (i.e. change in neighborhood environment overtime). The data showed that the moderation of neighborhood problems on the relationship between parental involvement and academic outcomes had no significant effect. This could be because having lived in a neighborhood for a certain amount of time, the residents become accustomed to the environment, and it will no longer have any significant impact on them. For future examination, increasing the sample size can improve the chances of getting significant results.

Conclusion

Although there were some limitations, this study gave insight into how neighborhood qualities can impact the relationship between the involvement of parents in their child's education, and the academic outcomes of those children. Parents can use this information to better understand not only how their involvement can impact their child, but also encourage them to use their fellow neighborhood residents as additional help for their child. The adjustment of youths depends on both parenting process and the structural characteristics of neighborhoods (Beyers et al.,2009), which this study highlighted. Families working together with neighbors can not only prove to have a worthy impact on academic outcomes but can also further develop cohesion within the community, ultimately creating even more advantages for its members.

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Table 1 Demographic Variables

	Entire Sample N=140	African American Sample N=67	Hispanic Sample N=73
Parent Education			
No formal education	1.4%		2.7%
Grade School	8.6%	1.5%	15.1%
Junior High School	6.4%	3%	9.6%
High School	40%	41.8%	38.4%
Vocational School	10%	11.9%	8.2%
1-3 years of college/no degree	10%	14.9%	5.5%
Associates Degree	6.4%	9%	4.1%
College Graduate (BA/BS)	7.1 %	6%	8.2%
Graduate or Professional School (MA, MS, MBA)	2.1%	3%	1.4%

Graduate or Professional School (PhD, JD, MD, DO, DDS, etc.)	6.4%	7.5%	5.5%
Missing	5.9%	5.9%	3.6%
Family Income			
Less than 10,000	30%	28.4%	31.5%
$10,001-20,000	17.9%	11.9%	23.3%
$20,001-30,000	10%	13.4%	6.8%
$30,001-40,000	8.6%	16.4%	1.4%
$40,001-50,000	4.3%	7.5%	1.4%
$50,001-60,000	0.7%		1.4%
$60,001-70,000	2.9%	4.5%	1.4%
$70,001-80,000	1.4%	3.0%	--
$80,001-90,000	0.7%	--	1.4%
$90,001-100,000	0.7%	--	1.4%
Greater than $100,000	0.7%	1.5%	1.4%

Family Residence			
Apartment	35.7%	31.3%	39.7%
House	62.1%	64.2%	60.3%
Child Grade			
4th grade	0.7%	--	1.4%
5th grade	9.3%	5.9%	12.7%
6th grade	14.3%	19.1%	9.9%
7th grade	19.3%	13.2%	23.9%
8th grade	12.1%	14.7%	9.9%
9th grade	10.7%	13.2%	8.5%
10th grade	7.9%	10.3%	5.6%
11th grade	6.4%	7.4%	5.6%
12th grade	7.9%	10.3%	5.6%
Child Gender			
Girl	54.3%	55.9%	52.1%
Boy	42.9%	39.7%	46.5%
Missing	2.9%	4.4%	1.4%
Marital Status			
Not Married or Cohabiting	42.9%	58.2%	28.2%
Married/Cohabiting	32.1%	23.9%	39.4%

Widowed	1.4%	1.5%	1.4%
Separated	10.7%	3%	18.3%
Divorces	11.4%	10.8%	12.7%

Table 2 Descriptive Statistics for Adolescent Reported Variables by Race/Ethnicity

	Adolescent Ethnicity	Mean (SD)	t (df)
Home-Based Involvement	African American	3.06 (.99)	1.26 (127)
	Hispanic	2.84 (.97)	
School-Based Involvement	African American	1.27 (.82)	2.32 (134)[*]
	Hispanic	.98 (.63)	
Neighborhood Problems	African American	1.92 (.57)	.71 (133)
	Hispanic	1.85 (.58)	
Informal Social Control	African American	2.32 (1.10)	1.44 (132)
	Hispanic	2.05 (1.03)	
Grades	African American	5.82 (1.28)	-.83 (133)
	Hispanic	6.02 (1.49)	

[*]$p<.05$

Table 3 Descriptive Statistics for Parent Reported Variables by Race/Ethnicity

	Parent Ethnicity	Mean (SD)	t (df)
Home-Based Involvement	African American	3.81 (.72)	-.73 (132)
	Hispanic	3.91 (.81)	
School-Based Involvement	African American	3.36 (1.06)	-1.18 (133)
	Hispanic	3.59 (1.12)	
Neighborhood Problems	African American	1.86 (.55)	-1.03 (138)
	Hispanic	1.97 (.64)	
Informal Social Control	African American	2.31 (1.04)	-1.73 (138)[t]
	Hispanic	2.61 (.98)	

[t]p<.10

Table 4 Cronbach alphas by race/ethnicity, mean, and standard deviations

Variables	Adolescent	African American Adolescents	Hispanic Adolescents	Parent	African American Parents	Hispanic Parents
	M (SD)	α	α	M (SD)	α	α
Home-Based Involvement	2.94 (9.8)	.89	.90	3.86 (.76)	.84	.90
School-Based Involvement	1.12 (.74)	.92	.91	3.48 (1.10)	.92	.94
Informal Social Control	1.88 (.58)	.94	.89	2.47 (1.02)	.91	.92
Neighborhood Problems	2.19 (1.08)	.88	.90	1.92 (.60)	.94	.95
Grades	5.93 (1.39)	.74	.78			

Table 5 Correlations for Parents and Adolescents

	Child Age	Child Gender	Parent Education	Family Income	Home-Based Involvement	School-Based Involvement	Informal Social Control	Neighborhood Problems	Grades
Child Age	1	-.13	.18*	.16	-.30**	-.28**	-.03	-.30**	-.21*
Child Gender	-.13	1	-.11	-.21*	-.06	.03	.002	.03	-.08
Parent Education	.18*	-.11	1	.36**	.03	.01	.01	-.13	-.06
Family Income	.16	-.21*	.36**	1	-.01	.02	.08	-.20	-.06
Home-Based Involvement	-.28**	.07	-.09	-.11	1	.61**	.03	.18*	.21*
School-Based Involvement	.03	-.04	-.09	-.05	.36**	1	.02	.22	.25
Informal Social Control	.03	-.02	-.05	-.05	-.001	.08	1	.01	.09
Neighborhood Problems	-.07	.04	-.06	-.30**	.11	-.06	.17*	1	.13
Grades	-.21*	-.08	-.06	-.06	.08	-.04	.11	.02	1

*p<.05, **p<.001
Note: Parents are reported below the diagonal and adolescents are reported above the diagonal

Table 6 Regression Analyses

	Parent N=140	Adolescent N=140
Main Effect Model	β (SE)	β (SE)
Child Age	-.20 (.08)	-.13 (.08)
Child Gender	-.12 (.29)	-.12 (.29)
Family Income	-.01 (.16)	-.05 (.07)
Parent Education	-.05 (.08)	-.02 (.15)
Home-Based Involvement	.05 (.21)	.04 (.18)
School-Based Involvement	-.06 (.14)	.19 (.24)
Neighborhood Problems	-.03 (.25)	.03 (.26)
Informal Social Control	.12 (.14)	.08 (.13)
Neighborhood Problem Interactions[a]		
Home-Based x Neighborhood Problems	-.49 (.31)	-.96 (.24)[t]
School- Based x Neighborhood Problems	-.33 (.23)	.37 (.31)
Informal Social Control Interactions[a]		
Home-Based x Informal Social Control	.05 (.18)	.24 (.03)**
School-Based x Informal Social Control	.54 (.14)	-.38 (.20)

[a] All main effects and interactions were also entered in the covariate models
[t]p<.10, **p<.05

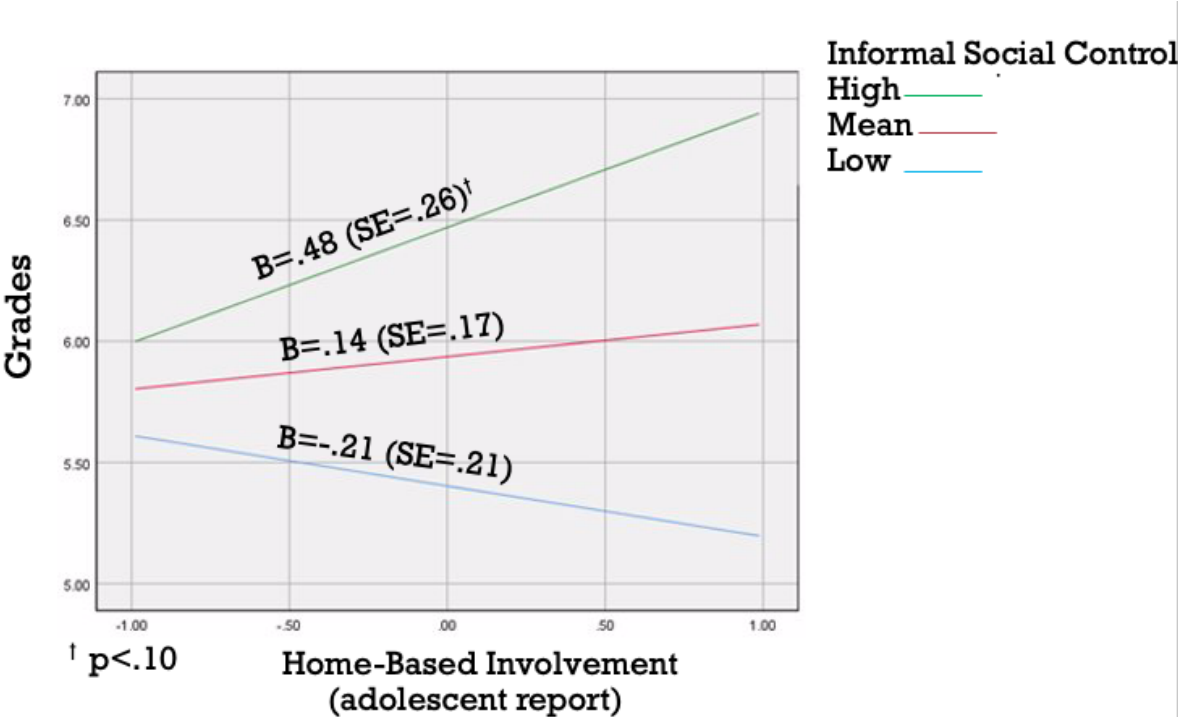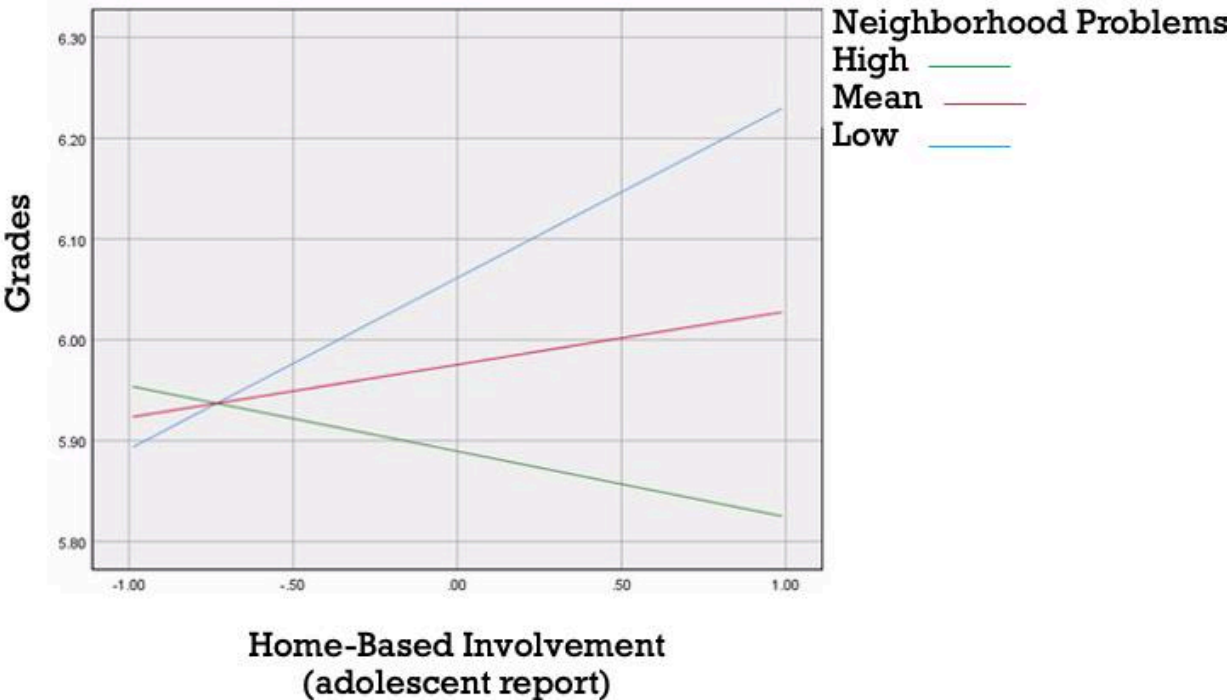Figure 1. Simple Slope Plot for Home-Based Involvement x Informal Social Control

Figure 2. Simple Slope Plot for Home-Based Involvement x Neighborhood Problems

Assessing the Effects of Deformed Wing Virus Infections on Biomarkers of Honeybee (Apis mellifera) Immune Function and Stress

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Abstract

US beekeepers lose 40% of their colonies annually, and viral infections are significant contributors to these losses. One of the most well-characterized and problematic honey bee viruses is Deformed Wing Virus (DWV). DWV infections result in reduced activity and shortened lifespans in honey bee workers. DWV is transmitted by the parasitic *Varroa destructor* mite. Mite infestations and DWV are both positively correlated with colony mortality. DWV exhibits high genetic diversity with multiple "master variant" strains (mainly DWV-A and DWV-B) which have different infection dynamics and health implications. Here, we examine how honey bees respond to high and low DWV-A and DWV-B infection levels. Quantitative real-time PCR was used to monitor DWV levels and expression of two genes that are potential markers of an immune response (*Dicer-like*) and bee health (*Vitellogenin*). This study will help determine if different expression levels of these genes can serve as robust indicators of viral infections and bee health.

Introduction

Maintaining large and healthy honey bee population levels is crucial for food production as honey bees are the world's most important food crop insect pollinator for a vast majority of domestic and foreign produce. Approximately three quarters of the major global crops are dependent on honey bees for pollination.[1] However, in recent years there has been an alarming decline in honey bee colonies. Between 2018 and 2019, U.S. beekeepers lost 40.7% of their colonies, which is a slightly higher mortality rate than the previous year.[17] These losses can be attributed to stressors such as pathogens, parasites, pesticides, and poor nutrition. It is critical to develop sustainable approaches that mitigate the impacts of stressors to support food security and improve beekeepers' economic outcomes.

Recent studies have begun to identify the severe contribution of viruses to these colony losses.[4] Thus, maintaining and expanding honey bee populations requires improving our understanding of virus and host interactions in this system.

One of the foremost studied viruses of honey bees is Deformed Wing Virus (DWV), which has well-characterized infection dynamics and a significant negative impact on developing pupae.[9] Honey bee pupae inoculated with DWV develop more slowly, produce nonfunctional wings, and die soon after emergence as adults. DWV is a positive single-stranded RNA virus in the Iflaviridae family. DWV exists as multiple "master variants", with most focus on master variants DWV-A and DWV-B (also known as Varroa Destructor Virus-1 or VDV-1). DWV-A and DWV-B are similar, sharing 84% of the same nucleotide sequence and 95% of amino acids.[11] Despite these relatively small sequence differences, DWV-B has different infection dynamics and has been shown to have a higher virulence compared to DWV-A in adults.[13]

Both DWV variants can be transmitted by the ectoparasitic *Varroa destructor* mite, another worldwide stressor of bees associated with colony declines, DWV-B was isolated and sequenced from *Varroa*.[9] The *Varroa* mite was introduced into the U.S. in 1987, and has rapidly spread to become a ubiquitous parasite of colonies independent of beekeeper management or operation.[18] While feeding on developing bee hemolymph (insect equivalent of blood), the *Varroa* mite vectors, or transmits, multiple honey bee viruses including DWV. This virus and vector association is the primary cause of colony decline and mortality.[4] By providing a new transmission route for viruses like DWV, the *Varroa* mite serves as an influential factor on viral genotypes, by selecting for genotypes that transmit better through a vector transmission route compared to other routes such as fecal-oral or vertical transmission. Vector transmission of DWV by the *Varroa* mite increases the DWV's pathogenicity by inducing higher viral titers and selecting for reduced viral genotype diversity compared to oral transmission [4,13]. These effects may be due in part to *Varroa's* ability to suppress the honey bee immune system.[15]

The primary immune responses in honey bees include the Imd, JNK, JAK/STAT, Toll and RNA interference (RNAi) pathways. The RNAi pathway, in particular, is the main antiviral defense mechanism for insects.[19] RNAi is a post-translational, sequence-specific, gene regulation mechanism.[5] In honey bees, the RNAi pathway component *Dicer-like* is the predicted endoribonuclease which cleaves the viral dsRNA into shorter segments which allows for viral transcript degradation by the RNAi pathway and, therefore, suppressed virus replication.[5] Expression of *Dicer-like* increases with higher Israeli Acute Paralysis Virus titers in honey bees.[6] Expression of *Dicer-like* may therefore be a possible marker for an active immune response against viral stressors. Another critical immune gene is *Vitellogenin*, a yolk precursor gene in insects which also serves a special function by regulating the onset of foraging behavior and priming bees for specialized foraging tasks.[7] Hence, a decreased expression of *Vitellogenin* is a signal of accelerated maturation from nursing to foraging behavior. Becoming a forager is stressful, its when mature bees are vulnerable factors outside of the hive. The differential expression of these genes during viral infection can provide insight into how the honey bees' stress and health levels differ according to viral titer and genotype. This study aims to evaluate the different effects of the DWV variants DWV-A and DWV-B in developing honey bee pupae by measuring the transcription levels of *Dicer-like* and *Vitellogenin* after infection by high and low concentration of DWV-A and DWV-B.

Methods

Virus Propagation

DWV-A and DWV-B was first propagated to generate sufficient quantity of viral inoculum for the experimental injections. We obtained pure isolates of DWV-A and DWV-B from Dr. Robert Paxton (Martin Luther University, Halle, Germany), under USDA APHIS Permit P526P-18-03011. Pupae were injected with 2μL of either DWV-A or DWV-B viral inoculum. The pupae were left to develop for four days and then were collected and stored at -80ºC for later use. The pupae were homogenized in phosphate buffer saline (PBS) in a FastPrep homogenizer for 45 seconds at 6.5 m/s, centrifuged for 3 minutes at maximum speed, and the supernatant was passed through a 0.2μM filter to separate virus particles (smaller than 0.2μM) from animal cells (larger than 0.2μM). This crude virus purification became the "High" DWV-A and DWV-B inoculums. "Low" DWV-A and DWV-B were created by making a 1:10 dilution of the "High" inoculum (see Table 1).

Field Preparation

To obtain age-matched bees for viral infections, healthy and productive queens were caged on an empty honeycomb frame within their colony for 24 hours to lay eggs. After 24 hours, the queen was removed and the cage remained around the comb to prevent the queen from laying additional eggs. After fourteen days (white-eyed pupae stage) the pupae were collected for inoculation. Healthy and productive queens and colonies were assessed through weekly colony inspections. The colonies health was confirmed (for example, large amounts of food and multiple ages of brood) to ensure a favorable status of the colony and queen. This experiment utilized three different colonies for each different Trial. Two colonies were head by a queen (on average 75% related sister bees due to honey bee haplodiploid genetics) (Trials 1 and 2) and one colony was headed by a naturally-mated queen (Trial 3).

Collection and Infection

White-eyed pupae (14 days old) were collected by removing the frame from the colony and uncapping the cells. The frame was then inverted, and pupae could be removed from the comb through gravity, requiring little manipulation and injury. Properly aged pupae were sorted into experimental treatment groups (n=5 per group). Bees were injected with virus or PBS buffer to mimic viral transmission by the *Varroa* mite. To perform the injections, capillary needles containing the virus or buffer were inserted into the pupae abdomen between its integuments. To avoid contamination, the micropipette injector capillary tube was changed between virus groups.

Pupae were injected with 2μL of inoculum, buffer (PBS), or left as a no treatment control. Virus concentration per μL for all treatments in Trial 3 can be found in Table 1, where the virus quantities were normalized between the DWV-A and DWV-B inocula. Trials 1 and 2 were injected with inoculum without normalizing the differing concentrations of DWV-A and DWV-B (ranging from 1.5E8/μl- 2.5E8/μl) within the inoculums. Thus, the description of the results will focus on the Trial 3 data.

After infections, the pupae developed in an incubator at 34ºC and 50% relative humidity within sterile Petri dishes. Five days post-infection, the five pupae from each viral group were collected and stored at -80ºC until screened for immune gene expression and DWV-A and DWV-B quantification.

Inoculum	Quantity/µL
DWV-A Low	1.5×10^7
DWV-A High	1.5×10^8
DWV-B Low	1.5×10^7
DWV-B High	1.5×10^8
PBS	$1 \times$PBS
Control	n/a

Table 1: DWV-A and DWV-B were propagated in pupae and then extracted. The viral titers of the high and low concentration groups were normalized to each other. There is a 1 to 10 dilution factor between the high and low quantities.

RNA Purification and Extraction

Abdomens from five-day-post-infected pupae underwent an RNA extraction protocol using a Qiagen RNeasy Plus Mini Kit (Hilden, Germany) following the manufacturer's protocol, including a DNase 1 incubation. RNA was eluted in 50ul of molecular grade water and the concentration was assessed via NanoDrop (Thermo-Fisher Scientific, Waltham, MA, USA).

cDNA Synthesis

A High Captivity cDNA Reverse Transcription Kit (Applied Biosystems, Foster City, CA, USA) was used to produce complementary DNA (cDNA) from the extracted RNA following the manufacturer's protocol, including RNase inhibitor, starting with 200 ng of RNA.

Real-Time Polymerase Chain Reaction (RT-qPCR)

After cDNA synthesis, qPCR (Sybr Green PCR master mix, Applied Biosystems) for *Dicer-like, Vitellogenin, eIF-S8,* DWV-A and DWV-B (for primer sequences, see Table 2) was conducted. For viral quantification, a dilution series of oligonucleotides for DWV-A and DWV-B PCR target sequences, ranging from 10^2- 10^6 copy numbers, were included. To quantify the immune gene expression, a dilution series ranging from 10^{-1}- 10^{-5} was made from a control sample to assess plate and primer efficiency. Each sample was analyzed in triplicate, and the results were averaged to generate an accurate quantification.

Target Gene	Primer	Reference
eIF-S8	F: 5'- TGA GTG TCT GCT ATG GAT TGC AA-3' R: 5'- TCG CGG CTC GTG GTA AA- 3'	Galbraith, Yang, Niño, Yi, & Grozinger, 2015
Vitellogenin	F: 5'- TTG ACC AAG ACA AGC GGA ACT -3' R: 5'- AAG GTT CGA ATT AAC GAT GAA -3'	Kocher et al. 2008
Dicer	F: 5'- CCA ACA GGA GCT GGA AAA AC -3' R: 5'- TCT CCA CTA AGT GCT GCA CAA -3'	Galbraith, Yang, Niño, Yi, & Grozinger, 2015
Deformed Wing Virus -A (DWV-A NS)	F: 5'- TTC ATT AAA GCC ACC TGG AAC A -3' R: 5'- CAA GTT CGG GAC GCA TTC CAC G -3'	Ryabov et al., 2014
Deformed Wing Virus -B (Varroa destructor Virus (VWV-1 NS))	F: 5'- TTC ATT AAA ACC GCC AGG CTC T -3' R: 5'- CAA GTT CAG GTC TCA TCC CTC T -3'	Ryabov et al., 2014

Table 2: RT-qPCR Specific Forward and Reverse Primer Sets

Data Analysis and Statistics

Each primer expression value was calculated based on the standard curve. Within triplicates, outliers with a >0.5 threshold cycle (CT) from the average were removed. *Dicer-like* and *Vitellogenin* absolute quantities were normalized to *eIF-S8* (control gene). The fold difference was then calculated by normalizing the values to the control sample. Analysis of Variance (ANOVA) test was utilized to assess target gene expression differences ($p \leq 0.05$) between treatment and control groups. Statistics were conducted using the aov() function in R.[21] Figures were generated in Excel.

Results

Since the concentrations of DWV-A and -B used to inoculate bees in Trials 1 and 2 were not equivalent, we focused our analysis on Trial 3 . PBS- and non-injected samples were virus-free. DWV-B High and Low groups showed higher DWV levels than both DWV-A High and Low groups despite the inoculums starting at the same concentration. Samples injected with low concentration inocula had similar final viral levels as samples injected with high concentrations. DWV-A Low and High group had significantly higher DWV-A levels compared to DWV-B High (One way ANOVA, p=1.0E-3, 0.025) and Low (One way ANOVA, p=1.0E-3, 0.025) groups (Figure 1). Similarly, the DWV-B Low and High group had higher DWV-B levels compared to DWV-A High (One way ANOVA, p=7.8E-3, 2.8E-5) and Low (One way ANOVA, p=7.8E-3, 2.8E-5) groups (Figure 2). Thus, the incocula seemed to contain only DWV-A and DWV-B, with no evidence for cross-contamination.
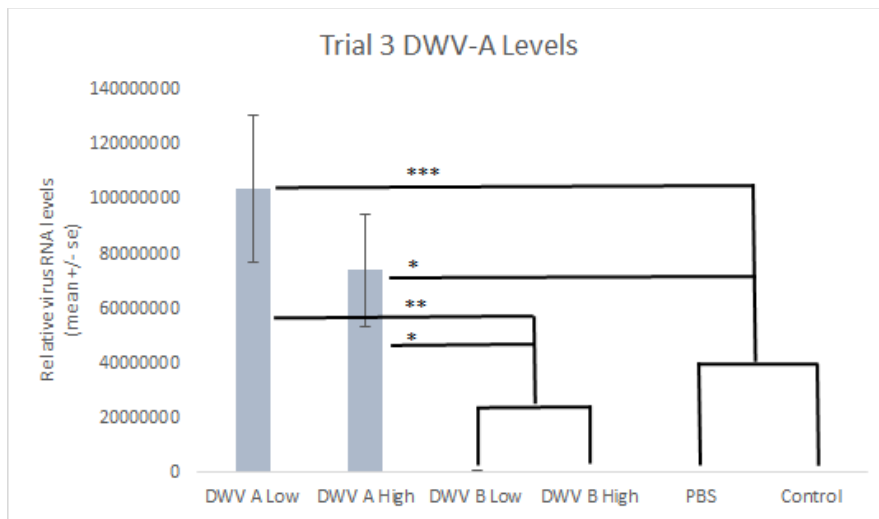
Figure 1: Trial #3 DWV-A levels in experimental groups
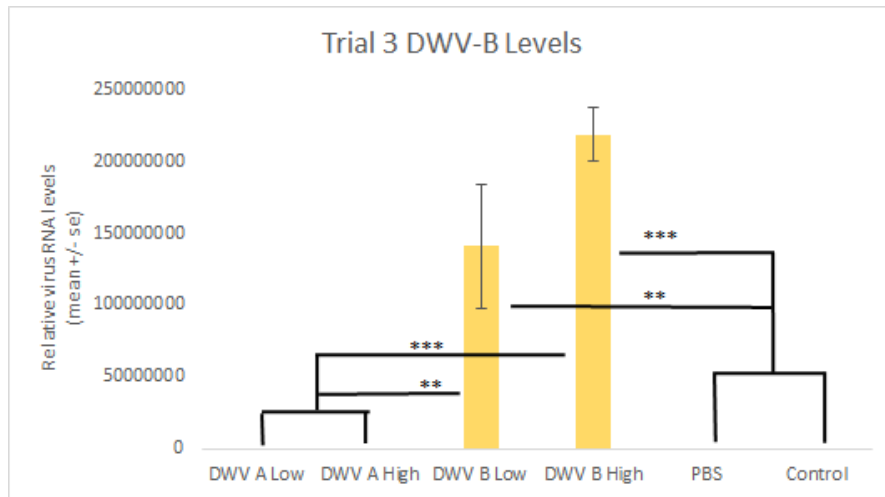
Figure 2: Trial #3 DWV-B levels in experimental groups

In Trial 3, the DWV-A High infected group exhibited significantly higher elevated levels of *Dicer-like* expression compared to the DWV-B Low and High groups (One way ANOVA, p=0.04), see Figure 3. All other groups were not statistically different from the control group (One way ANOVA, p>0.05). The RNA levels of *Vitellogenin* were not significantly different between the inoculated and control groups in Trial 3 (data not shown).
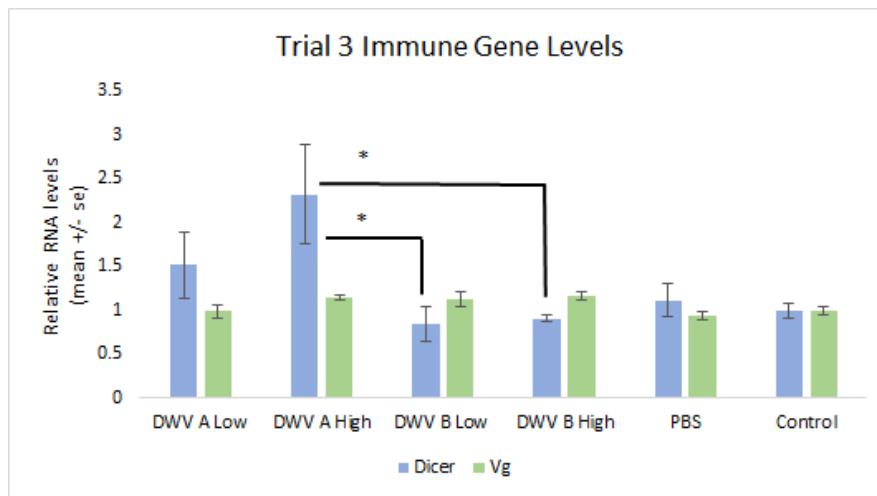
Figure 3: Trial #3 *Dicer- like* and *Vitellogenin* levels in experimental groups

In Trials 1 and 2, the amount of DWV-B injected was lower than the amount of DWV-A injected, and thus the overall levels of DWV-B in the sample was lower (data not shown). However, interestingly, when data from all three trials are combined, levels of *Dicer-like* expression were significantly higher in the DWV-A High group compared to the Control and PBS groups, and levels were significantly higher in the DWV-A Low group compared to the DWV-B High and Low groups (Two way ANOVA, p<0.05, data not shown). When the data from all three trials are combined, there was still no notable difference in expression levels of *Vitellogenin* across the inoculated and control groups.

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Discussion

This study aimed to determine if *Dicer-like* and *Vitellogenin* are suitable bio-markers for stress and health in DWV infected pupae. The expression results of *Dicer-like* and *Vitellogenin* from the DWV infections suggest they are not valuable bio-markers for health and stress. *Vitellogenin* RNA levels did not fluctuate between the inoculated and control groups. *Dicer-like* RNA levels were significantly higher in the DWV-A infected groups but not DWV-B groups, and thus *Dicer-like* does not serve as a consistent marker of viral infection. Intriguing, the *Dicer-like* expression data suggests that the pupal immune system responds differently to the two DWV variants.

The different *Dicer-like* levels resulting from DWV-A and DWV-B infection indicates that the pupae had different immune responses to the variants in Trial 3. Only the High DWV-A inoculum was able to induce a significant increase in expression of *Dicer-like*. The low DWV-A concentration inoculum did not display any significant changes in *Dicer-like* transcription compared to other treatments. Also, the *Dicer-like* levels in the PBS group did not significantly vary from the control group. These results also indicate that DWV-A stimulated an alteration to the immune gene levels, which was not dependent on *Varroa* mite feeding, which was mimicked by the PBS injection. Neither the injection nor DWV infection appeared to affect *Vitellogenin* transcription levels compared to the control groups.

The lack of observed differences in expression of *Vitellogenin* among the DWV infected and control groups is perhaps due to age-dependent expression differences. Changes in *Vitellogenin* expression have previously been described in adults, where levels are associated with behavioral maturation and the transition from nursing to foraging behavior.[7] In the current study, honey bee pupae were examined. In this developmental stage, it appears that viral infection has no effect on *Vitellogenin* RNA levels.

Viral infections have previously been shown to lead to increased activity in the RNAi pathway and increased expression of *Dicer-like*,[6] which is what was observed for the DWV-A injected group. However, DWV-B infection had no effect on *Dicer-like* RNA levels. It is possible that the DWV-B evades the RNAi pathway or slightly suppresses it. Viruses can develop mechanisms to suppress the RNAi immune pathway. For example, the Flock house virus produces the B2 protein that binds to dsRNA and prevents Dicer dsRNA cleavage and siRNA loading into the RNA-induced silencing complex (RISC).[5] Since it lacks these characterized viral suppressors of RNAi target protein machinery, DWV-B may be using a previously unobserved method of RNAi suppression through modulating gene expression.

Future studies are needed to determine if DWV-B is suppressing gene expression of other components of the RNAi pathway, such as Argonaute (AGO2). Additionally, to determine if the DWV-B genotype is modulating only the RNAi pathway, expression of genes in other immune pathways could be measured. For example, the expression of *dorsal-1A* in the Imd (immune deficiency) pathway can be analyzed. In the response to a DWV infection, *dorsal-1A* is expected to be down regulated and have no expression differences due to *Varroa mite* transmission route.[12] This can also determine if DWV-B is causing an overall down regulation in immune pathway expressions.

To further validate these results, this experiment should be repeated utilizing a wider range of viral inoculum concentrations, as well as co-infections of DWV-A and -B. Injecting virus concentrations of 10^3, 10^5 and 10^7 can provide a more comprehensive evaluation of how viral titers can influence *Dicer-like* expression. Based on the current study's results, one would expect a stronger positive correlation between the DWV-A titers and *Dicer* transcription levels and a consistent or potentially decreased *Dicer* expression with increasing DWV-B titers. A co-infection with both variants of DWV could determine if DWV-B can suppress the RNAi response even in the presence of DWV-A.

Immune responses in honey bees vary across tissues and life stages.[16] This variation could lead to differences in *Dicer-like* expression levels. In this study, white eyed pupae were evaluated. The pupal development stage was chosen because *Varroa mites* feed, reproduce and transmit the viruses while the honey bee is pupating in a closed cell. However, mites continue to feed throughout pupation and there is evidence they may feed on adults. Newly emerged adults instead of pupae can be analyzed for *Dicer-like* levels after viral inoculation during pupation.

Conclusion

This study demonstrated that expression levels of *Dicer- like* and *Vitellogenin* are not effective biomarkers for health and stress in DWV infected honey bees. In fact, two genotypes of the one virus resulted in significantly different expression of *Dicer- like*. Interestingly, infection with DWV-A triggered an increase in *Dicer- like*, indicative of an active RNAi anti-viral response, while infection with DWV-B did not result in an increase in *Dicer- like* expression, despite equivalent levels of viruses in Trial 3. Thus, the DWV-B may be able to evade or suppress the host's RNAi response. Meanwhile, *Vitellogenin* had no expression changes due to the viral infection. More genes need to be assessed as potential biomarkers. This study's results also suggest that no single target gene can be effectively used assess bee health. Analyzing the honey bee's immune function and stress requires holistic monitoring and maintenance from the cellular level to the environment to support honey bee populations.

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Weight Concerns in African American Youth: The Role of Gender and Sociocultural Factors

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Abstract

Weight concerns are common among adolescents, especially girls, and have been linked to a plethora of negative psychological and physical health outcomes. However, much of the research on weight concerns focuses on European American youth. Theory and prior research suggest that ethnic identity, racial socialization, and racial school composition can act as protective factors against the development of weight concerns in African American youth. Thus, the current study aimed to illuminate sociocultural factors that may have implications for the weight concerns of African American youth and examine the role of gender in these linkages. The participants were youth from 162 African American two parent, primarily working to middle class families. The sample was 47% female, and youth averaged 14.09 years of age (SD = 2.09) at Time 1. Youth and their parents were interviewed in their homes on two occasions spaced two years apart. Results revealed that youth and the sample had few weight concerns, although girls reported more concerns than boys, and levels of ethnic identity and racial socialization were moderate to high. Linear regressions showed that the sociocultural factors, ethnic identity, racial socialization, and school racial composition were not significant predictors of weight concerns.

Introduction

Weight concerns refer to individuals' fears of gaining weight, concerns about body weight and shape, emphasis on the importance of weight, as well as dieting behaviors (Killen et al., 1994). These concerns and related behaviors such as dieting, are most prevalent among adolescent girls. For example, in one sample of adolescent girls aged 12-18, 25% to 40% reported that they felt fat and were dieting; even among older adolescent girls, up to 60% perceived themselves as overweight even when they were of normal weight (Kaltiala-Heino, Kautiainen, Virtanen, Rimpela & Rimpela, 2003). Research shows that as women age (30+), they place less of an emphasis on their body's appearance, which results in greater acceptance of age-related body changes and is protective of their self-esteem (Tiggemann, 2004). Although girls are more likely to be affected by weight concerns, boys are also affected: One study of adolescents at 15 years old found that 34% of girls and 21% of boys reported concerns (Micali, Ploubidis, De Stavola, Simonoff, & Treasure, 2014). Beyond studying their prevalence, it is imperative to address youths' weight concerns due to their detrimental effects: Weight concerns are an important factor in the development of disordered eating and are linked to depressive symptoms, lower self-esteem, and risky behavior (Killen et al., 1996; McHale, Corneal, Crouter, & Birch, 2001; Hochgraf, McHale, & Fosco, 2018). Further, body dissatisfaction, a closely related construct that is defined as a negative subjective evaluation of the weight and shape of one's own body, is linked to bulimic symptomatology (Joseph & Shiffrar, 2011; Stice, Nemeroff, & Shaw, 1996).

In order to address youth weight concerns, a key step is to examine the role of socialization influences. Prior research highlights the roles of parents, peers and the media as contributors to the development of body dissatisfaction (Smolak, 2004). The Tripartite Influence model suggests that "environmental influences, such as family, peers and media, affect eating and weight-related behaviors" (Van Den Berg, Thompson, Obremski-Brandon, & Coovert, 2002, p. 1017). Parents, for example, may explicitly socialize their daughters about body size, shape, weight and health overall. One study that followed European American youth across a 7-year period found, for example that, in years when mothers reported less acceptance of and fathers reported more conflict with their adolescents than usual, adolescents reported more weight concerns than usual, and fathers' weight concerns were linked to the adolescent's weight concerns overall (Lam & McHale, 2012). Such findings highlight that both mothers and fathers may play a role in their youths' weight concerns. Importantly, Ogle and colleagues showed through interview data that the strategies White mothers used to socialize their daughters about weight were influenced by their perceptions of (potentially damaging) sociocultural messages and by their own ideas about health (Ogle, Reddy-Best, & Park, 2017). In another study of predominantly White adolescents, girls' perceptions of their peers' desire for thinness as well as their consumption of social media that emphasized appearance predicted higher levels of body dissatisfaction and their own desire for thinness (Dohnt & Tiggemann, 2006).

These findings are consistent with an ecological framework, which highlights the role of person characteristics, social processes, and the larger context in human development (Rosa & Tudge, 2013). Grounded in this framework, the current study builds on prior research on weight concerns in adolescence, which has focused primarily on European American youth, to examine weight concerns among African American youth. In general, research on youth development and adjustment does not take into account the distinctive strengths and competencies in children of color and the protective factors in their environments that may shape their experiences and outcomes (Coll et al., 1996). An ethnic homogenous design is imperative to examine variability

among African American youth and the sociocultural experiences that may explain differences within this group. Thus, this study examined sociocultural factors that may have implications for the weight concerns of African American youth. Specifically, this study addressed two questions: (1) What are the links between ethnic identity, racial socialization and school racial composition and African American youth's weight concerns? and (2) Does gender moderate these linkages? I expected to find that stronger ethnic identity, more racial socialization and attending a school with a higher proportion of Black students would be linked to fewer weight concerns. Further, I predicted that gender would moderate these associations, such that the effects of these sociocultural factors would be stronger –or more protective—for girls given that they are at higher risk of weight concerns than boys.

The Role of Ethnic Identity

Ethnic identity refers to "the part of an individual's self-concept which derives from his [sic] knowledge of his [sic] membership of a social group (or groups) together with the value and emotional significance attached to that membership," (Phinney & Ong, 2007, p. 271). A small body of research suggests that African American young women who had stronger ethnic identities scored higher on measures of psychological well-being, including in the domains of state anxiety, depression and psychological distress (Rakhkovskaya & Warren, 2014; Williams, Chapman, Wong, & Turkheimer, 2012). Relevant to the current investigation, a cross sectional study of African American youth revealed that those with stronger ethnic identities were less likely to internalize U.S. societal ideals regarding attractiveness and beauty—including the ideal of thinness (Wood & Petrie, 2010). One cross-sectional study of African American college-aged women also showed that ethnic identity was a significant predictor of eating and weight concerns, serving as a protective factor against negative eating habits and weight concerns (Rakhkovskaya & Warren, 2014).

The Role of Racial Socialization

Research on racial socialization aims "to understand how African American parents maintain children's high self-esteem and prepare them to understand racial barriers given systems of racial stratification in the US," (Hughes et al., 2006, p. 748). Racial socialization is multi-dimensional and includes practices pertaining to cultural socialization, preparation for bias, promotion of mistrust, and egalitarianism and silence about race (Hughes et al., 2006). In the current study, I focused on the role of cultural socialization, which refers to parents' promoting and teaching their child practices and cultural customs and pride in their cultural heritage and history (Hughes et al., 2006). Cultural socialization may be important for African American youth's weight concerns because parents' efforts to socialize their children to embrace their culture and promote their pride in being Black may lessen the effects of larger societal messages about the value of thinness. In order to foster a strong connection to culture in their children, parents may teach children about their cultural history and heritage including through stories about Black history, taking their children to Black cultural events, celebrating Black history, and providing role models as well as by financial support for clothing and hairstyling that are stereotypically Black (Hughes & Chen, 1997). In addition, prior work shows that Afrocentric cultural orientations, which refer to the "extent to which one embraces mainstream culture and his or her ethnic culture's worldview," are protective and can promote positive social, behavioral and psychological well-being, including high self-esteem in African American youth (Grills et al., 2015, p. 345).

In turn, high self-esteem may be protective against developing a negative body image and corresponding weight concerns. Although empirical research on the links between racial socialization and weight concerns is very limited, one study showed that family racial socialization and higher prevalence of African Americans in the neighborhood appeared to reduce some of the negative psychological effects of being overweight (Granberg, Simons, & Simons, 2009).

The Role of School Composition

Perpetuation theory directs attention to "analysis of experiences in racial contexts during youth which leads people into similar racial contexts across institutions…" (Goldsmith, 2016, p. 3). In one study, perpetuation theory was applied to explain findings that girls who attended the same school had similar levels of physical activity regardless of race/ethnicity, whereas black and Hispanic girls who attended more racially segregated schools exhibited lower levels of physical activity (Richmond, Hayward, Gahagan, Field, & Heisler, 2006). In this study, I applied perpetuation theory in the context of weight concerns, testing whether the weight concerns of Black youth are higher when they attend schools with higher proportions of White relative to Black students.

The latter hypothesis, that African American youth will report more weight concerns when they attend schools with more White students, also is consistent with social learning theory, which holds that individuals model behaviors they observe in their social contexts (Grusec, 1992). Clark and Tiggemann (2006), for example, found that adolescents were influenced by their peers when it came to weight loss behaviors and body dissatisfaction. To the extent that White youth generally experience more weight concerns than Black youth, from a social learning perspective, I also expected that African American youth who attended schools with proportionally more White students would be more likely to internalize a standard of beauty consistent with a Eurocentric norm. In contrast, those in schools with proportionally more Black students would be protected from norms that stress thinness as central to beauty and thus report fewer weight concerns. In this way, the school context, specifically school racial composition, may shape the extent of African American youth's weight concerns.

The Role of Gender

Research on weight concerns has commonly found gender differences, with girls and boys showing different levels and patterns of change in weight concerns. In one study of a White sample, girls' weight concerns increased from early to late adolescence and then leveled off; while boys' weight concerns were fewer and remained relatively unchanged (Lam & McHale, 2012). Using the same sample, another study showed that, although weight concerns predicted self-esteem for both boys and girls aged 11-18, boys' weight concerns were significantly lower and boys' self-esteem was higher compared to girls. (Hochgraf, McHale, & Fosco, 2018). Finally, in a study of majority White adolescents aged 13-19, females reported having more pressures from family, friends and media to lose weight, while males reported having more pressures to gain weight. This pattern resulted in males being more concerned with increasing upper body size and females being more concerned with decreasing overall body size (Ata, Ludden, & Lally, 2007). Thus, in the study I expected to find that girls would have more weight concerns than boys, and given that girls are more at risk than boys, that sociocultural factors would be more protective for girls than for boys.

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Method

Participants

The data came from parents and youth in 162 two-parent families who self-identified as Black/African American; each family included fathers, mothers, and at least two adolescent-aged offspring, who participated in a short-term longitudinal study of gender socialization and development (McHale, Crouter, Kim, Burton, Davis, Dotterer, & Swanson, 2006). In this study, I focused on older siblings, from whom weight concern data were collected.

The sample for the study was generated from two mid-Atlantic urban centers that had dense African American populations; within the recruitment area, 38% of the households included married African American parents with at least one child between the ages of 6 and 17 years. Two recruitment strategies were used. First, African Americans who lived in the targeted communities were hired to recruit families by posting flyers in local businesses, providing information on the study to local churches and other organizations, and distributing flyers at youth activities. Families who wanted to be a part of the study then contacted the recruiters and their names were passed on to the project office. Approximately half of the sample was recruited through this process. A second method of recruitment was through purchasing a marketing firm list that included names and addresses of African American students in grades 4-7 who lived in the recruitment area. Letters were sent to families describing the study and including a number to call and a postcard to return to the project office if the family fit the study criteria and wanted to participate.

The background characteristics of the participants in the sample can be found in Table 1. The families were typically working and middle class based on the family's income and parents' education. In the sample, 47% of the youth were female and the average child was age 14.09 (*SD*= 2.09). Most parents were employed (98% of both mothers and fathers), with mothers working an average of 33.48 hrs/week (*SD*= 17.46) and fathers working on average 44.22 hrs (*SD*= 18.00). Although the average family income in the sample was almost $90,000 (*SD* = 55,880), incomes ranged from $3,500 - $525,000. School data from the sample highlighted the diverse school composition of the schools that youth attended, which ranged 0.01-1.0; the average youth in the sample attended a school in which about 55% of the students were African American.

Procedures

For the current study, the participants- mothers, fathers, and youth- were interviewed at home at annual intervals by two interviewers, almost all of whom were African American. In this study I used data from Phases 1 and 3 (hereafter referred to as Times 1 and 2) when data on weight concerns were collected.

The participants were given a brief description of the study and a review of informed consent procedures at the start of the visit. Then, the family members were interviewed individually. A variety of procedures including card sorts, response cards, and questionnaires were implemented in order to maintain interests in the study; for youth under the age of 13 and family members with reading difficulties, all questions were presented orally. Interviews lasted about two hours for parents and about one hour for youth. For almost all measures of the study, family members reported on their experiences during the past year. After all interviews were completed, family members received a $200 honorarium. The study was approved by the Institutional Review Board of the university.

Although families previously self-identified as Black or African American in the recruitment process, they were again asked whether they preferred to refer to themselves as Black or African American during the beginning of the interview. Their response during the interview, determined the way in which their race/ethnicity would be referred to during the remainder of the interview. Youth who did not living with two biological parents were also asked to state how they wished to refer to their parent figure(s), and this response also determined the way they would be referred to for the remainder of the interview.

Measures

Weight concerns was assessed with a 6-item measure, the Stanford Weight Concerns Scale, developed by Killen et al. (1996), which assessed adolescents' worries about body dissatisfaction, body shape and weight. Example items are, "How afraid are you of gaining three pounds?" and "When was the last time you went on a diet to lose weight?" Responses for each item were rescaled to a 6-point scale and summed, with higher scores meaning higher levels of weight concerns. Killen and colleagues reported a high level of cross-time stability ($r = 0.75$, $p < 0.01$). For this sample, the standardized Cronbach's alpha for older girls was 0.77 and 0.78 for older boys.

Youth ethnic identity was assessed using the Multigroup ethnic Identity Measure (Phinney, 1992). Example items are, "I feel a strong attachment towards my ethnic group," "I have a lot of pride in my ethnic group," and "In order to learn more about my ethnic background, I have often talked to other people about my ethnic group." For each of the 10 items, youth used a 4-point scale, with 1 being *strongly disagree* and 4 being *strongly agree*, to rate how well the item described them over the past year. This measure has shown good internal reliability, with a standardized Cronbach alpha for the sample of 0.82

Racial socialization was assessed using the cultural socialization subscale from a measure developed by Hughes and Chen (1997). An example item is, "I've read or provided Black history books to my child." For each of 5-items, mothers and fathers separately reported on their behavior using a 6-point rating scale that ranged from 1 = *never* to 6 = *very often*. Standardized Cronbach's alpha was 0.81 for mother reports and 0.86 for father reports.

School composition was obtained from the National Center for Education Statistics (Skinner, McHale, Wood, & Telfer, 2018) for the years during which youth attended the school. As noted, the proportion of students in the youths' schools who were African American ranged from 0.01-1.00 ($M = 0.55$, $SD = 0.35$).

Covariates. The variables youth age, family income, parent level of education, and youth gender were reported by parents. Youth gender was coded with 1= female and 2= male. Parent education level was coded with 12= high-school graduate/high-school equivalent (GED), 13= high-school plus vocational, technical, or job training, 14= some college, but no degree, 15= associate degree, 16= college degree, 17= some post college, but no advanced degree, 18= master's degree, 19= professional degree, and 20= Ph.D./doctorate.

Analyses

A series of linear regression models was conducted to address the study aims. Predictors were entered in steps. First, control variables (i.e., Time 1 weight concerns, youth age, family income, parent level of education, and gender) were entered into a model predicting Time 2 weight concerns. Control variables that were not statistically significant at this step were dropped to improve model parsimony.

Next, to test Hypothesis 1, separate main effects models were run for ethnic identity, racial socialization, and school composition, controlling for key covariates identified in Step 1. Finally, to test Hypothesis 2, two-way interactions with gender were added to main effects models. All analyses were completed in SAS version 9.4.

Results

Beginning with descriptive data (see Table 2), weight concerns were low on average and scores for ethnic identity and racial socialization were moderate to high. School composition was highly variable. In terms of the correlations between variables (see Table 3), weight concerns were highly stable over time, but other variables were generally uncorrelated. Beyond the correlation between Time 1 and Time 2 weight concerns, youth ethnic identity was correlated with mothers' racial socialization, mothers' racial socialization was correlated with fathers' racial socialization, school composition was correlated with mothers' racial socialization, youth age at Time 2 was correlated with ethnic identity, and family income was correlated with both mothers' and fathers' racial socialization.

Turning to the regression analyses (Table 4), in the first step (test of the control variables), gender was significant, with girls reporting more weight concerns than boys, consistent with prior research. Further, as noted, weight concerns at Time 1 was a strong predictor of weight concerns at Time 2. Neither age nor family income were significant control variables, however, so these were removed. In the second step, the tests of Hypothesis 1, results revealed that the variables, ethnic identity, racial socialization and school composition were not significant predictors of weight concerns in this sample. Finally, in step 3, the tests of gender moderation, no significant interactions emerged.

Discussion

Weight concerns are prevalent in adolescence but we know little about those of African American youth. The aims of this study were to assess the longitudinal associations between the sociocultural factors, ethnic identity, racial socialization, and school racial composition, and the weight concerns of African American youth and to test gender as a moderation of these linkages. I predicted that ethnic identity, racial socialization and school racial composition would be protective against African American youth developing weight concerns and that gender would moderate these effects such that the sociocultural factors would be more protective for girls than boys given that girls are at higher risk of developing weight concerns. The sociocultural factors were not significant predictors of weight concerns in this African American youth sample. However, as expected, adolescent girls did have slightly stronger weight concerns than boys.

The lack of significant results in the study may be explained by the low levels of weight concerns in the sample. The average for weight concerns at Time 1 was only 13.19 and at Time 2 was 12.74 on a scale with a possible range of 6.00 to 36.00, suggesting that most youth reported no or minimal weight concerns. The youth in this current study also had moderately high levels of the hypothesized protective factors, ethnic identity and racial socialization (i.e., above the midpoints of these scales). These low levels of weight concerns in this sample are consistent with the idea that African American youth may be protected from developing weight concerns. However, the low levels of weight concerns and relatively high levels of protective factors in combination with high stability of weight concerns over time, meant that there was limited variability remaining to explain differences among these youth's weight concerns.

Limitations of this study include the relatively small and homogeneous sample of African American youth, which may have limited variability in the measures of interest. Future research should include larger samples of youth, including youth from a broader range of ages. In addition, analyses did not take into account youth's actual weight, which may have been a factor in explaining variability in weight concerns. Additional future research directions include examining family factors, such as parent-youth relationships, to determine whether they have implications for African American youth's weight concerns.

Table 1

Background Statistics (N= 162 African American Families)

Variable	Mean	*SD*	Range
Family Income	$87,483	$55,880	$3,000-$525,000
Youth Gender[1]	1.53	0.50	1.0-2.0
Age (Time 1)	14.09	2.09	9.89-22.48
Age (Time 2)	16.31	2.14	11.92-24.71
Mothers' Education[2]	14.56	1.84	9.0-19.0
Fathers' Education[2]	14.21	2.36	5.0-19.0

Note: [1] 1 = female; 2 = male

[2] 12= High-school graduate/High-school equivalent (GED); 13= High-school plus vocational, technical, or job training;

14= Some college, but no degree; 15= Associate Degree; 16= College degree; 17= Some post college, but no advanced degree

18= Master's Degree; 19= Professional degree; 20= Ph.D./Doctorate

Table 2

Descriptive Results for Study Measures (N= 162 African American Families)

Variable	Mean	*SD*	Range
Weight Concerns Time 1	13.19	6.34	6.0-31.87
Weight Concerns Time 2	12.74	6.46	6.0-34.75
Ethnic Identity	3.11	0.42	1.76-4.0
Mothers' Racial Socialization	21.19	5.44	5.0-30.0
Fathers' Racial Socialization	17.27	6.36	5.0-30.0

Table 3
Correlations between Study Variables (N=162 African American Families)

Variables	1	2	3	4	5	6	7	8	9	10
1. Weight concerns Time 1										
2. Weight Concerns Time 2	.54***									
3. Ethnic identity	.07	-.02								
4. Mother racial soc.	-.07	-.01	.23***							
5. Father racial soc.	-.07	-.09	.08	.30***						
6. School Comp.	-.02	-.08	-.09	-.18*	-.15					
7. Gender	-.18**	-.23***	.02	-.01	.01	.08				
8. Age 1	.04	.00	-.11	.04	-.03	-.20*	.03			
9. Age 2	.03	.02	-.11*	.03	-.05	-.19*	.04	.99***		
10. Family Income	.06	.03	-.09	.18**	.21**	-.24**	-.06	.05	.04	

Note: *$p < .05$; ** $p < .01$; *** $p < .001$

Table 4

Coefficients (β) and Standard Errors (SE) from Regression Analyses Predicting Youth Weight Concerns

	Step 1		Step 2		Step 3	
	β	*SE*	*β*	*SE*	*β*	SE
Intercept	7.75*	3.39	14.24***	4.19		
Weight concerns 1	0.50***	0.07	0.40***	0.08		
Youth Gender	-2.31**	0.87	-3.42***	1.02		
Youth Age	-0.05	0.22				
Family Income	0.00	0.00				
Ethnic Identity			-1.40	1.22		
Mothers' racial soc.			0.08	0.10		
Fathers' racial soc.			-0.12	0.08		
School composition			-0.96	1.40		
Ethnic Identity X Gender					-0.46	2.51
Mothers' Cultural Socialization X Gender					-0.02	0.20
Fathers' Cultural Socialization X Gender					0.15	0.16
School Composition X Gender					2.08	2.78

Note: ***p < .05; ** p< .01; *** p < .001***

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Autonomy Expectation Discrepancies, Parent-adolescent Cultural Orientation Gaps, and Parent-adolescent Conflict in Latino Families

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Abstract

This study was designed to investigate linkages among autonomy expectations, cultural orientations, and parent-adolescent conflict in Latino families. Specifically, the study examined whether autonomy expectation discrepancies and cultural orientation gaps between parents and their adolescent were related to parent-adolescent conflict intensity. Participants were adolescents (11 to 17 years old) and their maternal caregiver (18 years and older). Results indicated that adolescent familism was significantly correlated to adolescent reports of parent-adolescent conflict intensity. Findings also revealed that adolescent sex was significantly correlated to adolescent autonomy age expectations, such that on average, adolescent females reported later age expectations, closer to 18 years of age or never, and males reported earlier age expectations, especially when it came to engaging in activities that typically have age restriction (i.e., doing drugs). However, both adolescent males and females had generally the same age expectations (14-17 years old) when it came to mundane tasks (i.e., chores). Lastly, the regression analysis showed only a marginal significance between adolescent familism and parent-adolescent conflict intensity.

Keywords: Parent-adolescent, Autonomy Expectations, Cultural Orientation, Familism, Latino Families, Conflict, Gender

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Introduction

The relational conflict between parents and their adolescents and contribution to adolescent adjustment has been a subject of consistent interest over the past several decades. Particular attention has been given to conflict frequency across adolescence (Adams & Laursen, 2007). Montemayor (1983) proposed that conflict between parents and their children increases during early adolescence, stabilizes during middle adolescence, and declines in late adolescence. Recent scholarship, however, reports a linear decline in conflict frequency from early to late adolescence, although there is an increase in intensity (Laursen & Collins, 2009). This latter pattern of increased intensity warrants investigations that focus on parent-adolescent conflict intensity and its potential consequences for youth outcomes.

Family scholars express the need for future research to adequately acknowledge the cultural diversity and complexity of contemporary family life (Bornstein & Sawyer, 2006). Ethnic-racial minority families, specifically, are embedded in diverse cultural (e.g., acculturation) and social (i.e., neighborhood communities) contexts that can shape family life (Cox and Paley, 1997). This suggests that family dynamics, including parent-adolescent conflict and the factors that contribute to its presence, may differ for families from diverse cultural backgrounds. For example, parent-adolescent conflict in Latino families in the U.S. derives, in part, as a result of differences in cultural orientations between parent and adolescent (Basáñez, Dennis, Crano, Stacy, & Unger, 2014). Latino adolescents adapt American values more easily and readily than do Latino parents, creating parent-child discrepancies, or gap, in cultural orientation (De La Rosa, Vega, & Radisch, 2000). Another factor that is implicated in parent-adolescent conflict are autonomy disagreements between parents and adolescents, which have been found to be associated with adolescent adjustment including low self-esteem, academic engagement, and academic confidence (Basáñez, Dennis, Crano, Stacy, & Unger, 2014). The current study extends previous work by providing an examination on factors (cultural values and autonomy age expectations) that may relate to parent-adolescent conflict intensity in Latino families.

Family Systems Theory

A family system functions as a unit comprised of subsystems that include individuals in relationships (Bornstein & Sawyer, 2006). Within a family system, parent-adolescent dyad relational domains have consistently been linked to adolescent outcomes (Steinberg, 2001; DuBois, Eitel, & Felner, 1994; Skinner & McHale, 2016; Telzer, Yuen, Gonzales, & Fuligni, 2016). For instance, the quality of the bond between parent and adolescent affects adolescents' emotional development, school performance, and social growth (Driscoll & Pianta, 2011). Specific to the current study, parent-child conflict is an important parent-child relationship domain that changes in adolescence (Laursen & Collins, 2009) and contributes to adolescent wellbeing (Adams & Laursen, 2007). Importantly, while both boys and girls report conflict with parents, adolescents reported a greater percentage of conflicts with their mothers than with their fathers (Montemayor, 1982). Given the importance of conflict within the parent-child relationship, it is important to identify factors that contribute to conflict, especially in Latino families raising adolescents who experience normative developmental changes and cultural adaptation concurrently, both of which can contribute to conflict. In the current study, we focus on predictors of mother-youth conflict.

Parent-Adolescent Conflict

　　Historically, three theories of adolescent development (psychoanalytic, sociobiological, and cognitive developmental) have been used to explain increases and changes in the nature of conflict between parents and youth (Laursen & Collins, 1994). The psychoanalytic perspective is a Neo-Freudian view that describes the alignment between an adolescent's physiological and behavioral maturation (Laursen and Collins, 1994). For example, once adolescents reach puberty, they begin to spend less time with their family and more time with individuals outside of their immediate family such as peers. This detachment from parents leads to parent-adolescent conflict as the adolescent readjust their relationship by substituting close family ties with peers (Laursen and Collins, 1994).

　　Sociobiological perspectives describe the way in which biological maturation causes an abrupt change in adolescent behavior, thus introducing heightened parent-adolescent conflict at the onset of puberty (Laursen and Collins, 1994). Cognitive development perspectives describe the way in which an adolescent's intellectual maturation provides a better understanding of the self and their relationships with others (Laursen & Collins 1994). The adolescent's new way of thinking increases parent-adolescent conflict as the adolescent begins to reject parent input in their decisions and attempt to gain autonomy from parents (Smetana, 1988). In line with a cognitive developmental perspective, we focus on adolescents' and parents' expectations of the ages when they each consider appropriate for the adolescents to engage in a number of autonomous behaviors. We specifically examined how autonomy age expectations from adolescents, parents, and the discrepancies within the parent-adolescent dyad in autonomy age expectations related to parent-adolescent conflict intensity.

　　Parent-adolescent conflict has been studied in terms of frequency (how often disagreements happen) and intensity (severity of disagreements). Frequency is the most prominent focus of parent-child conflict research thus far (Laursen & Collins, 1994), with intensity, studied to a much lesser extent. Several scholars have examined changes in frequency of parent-adolescent conflict throughout adolescence. Ashraf and Najma (2011) and Laursen and Collins (1994) both found the same pattern, wherein parent-adolescent conflict increases and peaks during the early years of adolescence and declines during late adolescence. Yet recent scholarship reports a linear decline in conflict frequency from early to late adolescence, as well as an increase in intensity (Laursen & Collins, 2009). A number of studies have examined the link between parent-adolescent conflict frequency and adolescent outcomes in Latino samples (e.g., Bámaca-Colbert, Umaña-Taylor & Gayles, 2012; Pasch, Tschann, Flores, Penilla, & Pantoja, 2006). For example, a study with Mexican American families found that parent-adolescent conflict frequency was associated with negative adolescent outcomes, such as anxiety, depression, anger, school misconduct, and substance abuse (Pasch et al., 2006). Less is known about conflict intensity among Latino families but a study by Skinner and McHale (2016) examined parent and adolescent reports of conflict intensity in African American families and their findings revealed that parent–adolescent conflict intensity had implications for youth adjustment and family relationships. Young adolescent siblings who report high conflict in the family reported more depressive symptoms and risky behavior than families who experienced low conflict (Skinner & McHale, 2016). Thus, in the current study we focus on factors that may contribute to the intensity of conflict that Latino youth experience with parents.

It is important to note that gender socialization practices based on traditional Latino cultures might generate more conflict in parent-daughter relationships than in parent-son relationships (Roblyer, Bámaca-Colbert, Rojas, & Cervantes, 2015). For example, when adolescents reach pubertal status, they tend to spend more time with peers than family (Larsen and Collins, 1994), but the expectation in Latino families may be for Latina girls to remain family oriented and tend to household tasks (Romo, Mireles-Rios, & Lopez-Tello, 2014). Thus, Latina girls may experience more pressure from family than Latino boys do fulfill household responsibilities, and this may create more conflict between the parent-daughter dyad as girls may try to address the unequal treatment. Past work has also underscored the salience of gender and how adolescent males and females have differing gendered experiences within family contexts due to socialization (Raffaelli & Ontai, 2004). For example, a study by Crean (2008) focused on Latino families and examined the effects of support and conflict within a mother-father-youth context. The study revealed that for boys' internalizing problems, mother and father support served as a protective factor regardless of the level of conflict with the opposite parent. In contrast, for girls, highly conflictive mother-daughter relationships were associated with increased internalizing and externalizing symptomology, and father support added little in predicting symptomology (Crean, 2008). Therefore, we examined whether gender (i.e., male and female) moderated the association between predictive factors and intensity of conflict in the parent-adolescent relationship.

Autonomy

The acquisition of autonomy is a crucial part of adolescents' psychological development, as they explore their identities aside from that of their parents (Smollar & Youniss, 1989). Two aspects of adolescent autonomy that have been studied are emotional and behavioral. Emotional autonomy refers to adolescents' subjective sense of emotional independence from parental figures (Grotevant, 1998). Behavioral autonomy is the extent to which the adolescent can self-govern himself or herself in the absence of parental guidance or monitoring (Grotevant, 1998). Ways in which adolescent behavioral autonomy has been examined include assessing the amount of freedom an adolescent is granted from a parent or the age expectations at which adolescents and parents expect youth to engage in certain behaviors, such as dating (Bámaca-Colbert, Umaña-Taylor, & Gayles 2012).

For most families in the United States, attainment of autonomy and independence is considered a central developmental task during the adolescent years (Zimmer-Gembeck & Collins, 2006). In Western societies, adolescents are expected to have an increased desire for individuation and parents increasingly expect their adolescents to be able to make their own decisions (Zimmer-Gembeck & Collins, 2003). However, these autonomy expectations and desires vary between cultures and are especially complex if families hold collectivistic norms within an individualistic dominant culture that emphasizes autonomy (Collins & Steinberg, 2006). For example, In Latino families, some parents perceive an adolescent's desire to engage in activities such as going to a friend's house or going to parties as a cultural discrepancy, instead of a normative characteristic that stems from autonomy, which may prompt conflict between parent and adolescent (Roblyer, Bámaca-Colbert, Rojas, & Cervantes, 2015).

Although Latino cultures place more value on collective support than individual autonomy (Zimmer-Gembeck & Collins, 2003), adolescents from Latino backgrounds in the U.S may aspire to behave in ways that mirror the mainstream American culture (Roche, Caughy, Schuster, Bogart, Dittus & Franzini 2014).

As a result, Latino youth may defy what is deemed acceptable to Latino cultures and their parents, and desire behavioral autonomy early on, which may not coincide with parents' culturally prescribed expectations on autonomy vis-à-vis interdependence (Roche et al., 2014).

In addition, traditional Latino cultural values place emphasis on gender scripts that allow male adolescents to receive behavioral privileges at younger ages than female adolescents do, which likely contributes to differing parental, as well as adolescent, autonomy expectations for daughters and sons (Bámaca-Colbert, Umaña-Taylor, Espinosa-Hernández, & Brown, 2012). The complex gender dynamics within Latino families is exemplified in a study by McHale, Updegraff, Crouter, and Killoren (2005) who found that older sisters with younger brothers still received relatively fewer privileges (i.e., going to a friend's house, going to parties) than their younger brothers. We will examine the role of autonomy expectations from parents, adolescents, and differences in expectations on autonomy within the dyad as predictors of parent-adolescent conflict intensity. Further, we will examine whether autonomy age expectations of adolescents vary as a function of adolescent gender.

Cultural Orientation

In ethnic-racial minority families, the cultural orientation of their family members can be characterized by the heritage and mainstream cultural practices, values, and identifications to which each member adheres (Schwartz, Unger, Zamboanga & Szapocznik, 2010). According to Berry's Acculturation Model, individuals who have contact with at least two cultural groups can fall under one of four categories. They may identify more with their heritage culture, adopt the new culture, identify with both cultures, or reject both cultures (Schwartz, Unger, Zamboanga & Szapocznik 2010).

One aspect of cultural orientation within families that has received significant attention in research is on the differences in cultural orientation that can emerged between parents and their children (i.e., parent-child cultural orientation gaps). Widely known as acculturation gaps (Szapocznik & Kurtines, 1993; Smokowski, Rose, & Bacallao, 2008; Birman & Trickett, 2001), it is postulated that immigrant children acculturate to their new culture at a quicker pace than their parents resulting in cultural gaps between the dyad which contributes to family conflict and, ultimately, youth maladjustment (Telzer, 2010). Historically, cultural orientation gaps within parent-adolescent Latino dyads have been studied by examining language proficiency, behavioral practices, and cultural values (Telzer, Yuen, Gonzales & Fuligni, 2016). Language proficiency measures how well the adolescent and parent can speak, understand, read, and write Spanish and English. Behavioral practices refer to the extent to which the parent and adolescent enjoy and engage in traditional practices from their heritage culture and from U.S. mainstream culture. Cultural values include domains tapping into family's heritage culture such as family obligations and familism as well as mainstream values such as material success, gaining independence and self-reliance, and competition and personal achievement (Knight, Gonzales, Saenz, Bonds, Germán, Deardorff, Roosa, and Updegraff, 2010).

Theoretical and empirical work on parent-adolescent cultural orientation gaps indicates that cultural gaps are associated with increased levels of family conflict (Coatsworth, Pantin & Szapocznik, 2002; Pasch, Deardorff, Tschann, Flores, et al., 2006), but findings are not always significant (see Telzer, 2010 for a review).

More recently, a longitudinal study with Mexican-origin families (Padilla, McHale, Rovine, Updegraff & Umaña-Taylor, 2016) revealed that parent-adolescent conflict predicted increases in parent-adolescent discrepancies in familism values, but not the inverse; the discrepancies in values did not predict subsequent parent-adolescent conflict. In the current study, we examined whether parent, adolescent, and the gap in familism values within the dyad were associated with parent-adolescent conflict intensity.

Current Study

To gain an understanding of what factors are related to parent-adolescent conflict intensity in Latino families in the U.S, we examined parents' and adolescents' expectations on autonomy and familism values, as well as the differences between the dyad in both of these domains (i.e., autonomy expectations discrepancy and familism gap), and their association with parent-adolescent conflict intensity. First, we examine whether all of our variables (adolescent conflict intensity, adolescent familism, parent familism, adolescent autonomy, parent autonomy, familism gap, autonomy age expectations discrepancy, adolescent sex) were associated with each other. We then investigated whether significant male-female differences in autonomy age expectations were present. Finally, we tested whether 1) autonomy age expectations from parents and adolescents were related to conflict, 2) parent familism and adolescent familism were related to parent-adolescent conflict, 3) the familism gap between parent and adolescent was associated with parent-adolescent conflict, and 4) autonomy age expectation discrepancies between parent and adolescent were associated with parent-adolescent conflict. Overall, this study aimed to increase the understanding of the factors associated with parent-adolescent conflict among Latinos families in the U.S.

Methods

Participants

Data were drawn from a small-scale cohort study ("Understanding Families, Adolescents, and Neighborhoods in Context" (FAN-C)) focused on African American and Latino families (i.e., caregiver and adolescent) residing in a small, urban, predominantly African American northeastern U.S. community that has experienced an influx of Latino immigration in recent decades. Latino residents represented 18.2% of the city population, with 82.6% growth from 2000 to 2010 (PASDC, 2011).

The Latino subsample for the current study consisted of 52 Latino maternal caregiver-adolescent dyads. There were two dyads with paternal figures, but they were not included in the analyses. The majority (58%) of the families lived in two-parent households. About of third of parents (35%) reported having a high school diploma and another third of parents (31%) reported having vocational schooling, college degree or advanced degree. The majority (50%) of family income was less than $20,000. The majority (32.7%) of the caregivers were born in Puerto Rico and the majority (55.8%) of the adolescents were born in the United States. On average, caregivers were 41 years old ($SD = 8.85$) and adolescents were 13 years old ($SD = 1.90$). A little over half of the adolescent sample were female (52%).

Procedures

Caregivers (18 years and older) and their adolescent (11-17 years) were recruited through community organizations and agencies in the targeted city and surrounding areas. Data collection took place at community organizations.

Upon arrival, bilingual (Spanish-English) personnel provided information to caregivers about the study procedures and obtained parental consent for child and self-participation. After parents agreed, research personnel obtained assent from adolescent.

Data were collected through paper-pencil questionnaires provided in the participants' preferred language (Spanish or English). The questionnaire took 1-1.5 hours to complete. Participants completed the questionnaire with an interviewer's assistance. The interviewer read the questions and participants circled the answers on their questionnaire. When participants preferred to complete the baseline questionnaires on their own, they were placed in a setting with other caregivers or adolescents who also chose to work alone, accompanied by a person from the research team available to answer any questions they may have. Caregivers received a $25 gift card to Giant (a local grocery store) and adolescents received a $15 gift card to a local movie theater (for 15 to 17 years old) or a $15 gift card to Toys R Us (for 11 to 14 years old) for their participation.

Measures

Familism values. The Cultural Value Scale (Unger, Ritt-Olson, Teran, Huang, & Palmer, 2002) was used to assess adolescent and caregiver opinions towards their family obligations. This scale is comprised of two subscales: Filial piety (10 items) measures obedience to parents (e.g., "I must obey my parents, whether I agree with them or not") and relative familism (4 items) assesses obligations to family (e.g., "No matter what the cost, dealing with my relatives' problems comes first"). For the larger project, only 14 items were included (6 items were not included in the survey), scored on a 4-point Likert Scale with responses to statements ranging from strongly disagree (1) to strongly agree (4); where higher scores indicated greater familism towards parents and relatives. Two scores were calculated: an individual mean score and a difference mean scored to tap into familism gaps. We computed cultural familism gaps by subtracting adolescents' scores from caregivers' scores, given that most research indicates that adolescents find it easier to adapt to the new country's values and practices and are, therefore, more likely to acculturate faster than their parents (Shwartz, Unger, Zamboanga, Szapocznik, 2010). Past work using the full scale reported Cronbach's alpha of .81 (Unger et al., 2002). With the current sample, alpha coefficients were .90 and .87 for adolescent and caregiver, respectively.

Autonomy age expectations. A 20-item Teen Timetable Questionnaire (Feldman and Quatman, 1988) was used to ask adolescents and their caregivers the ages at which they believed target adolescent should engage in a number of behaviors or activities (e.g., "Go to girl-guy parties at night"). Choice options included 1 = before age 12, 2 = 12-14 years, 3 = 15-17 years, 4 = 18 or older to 5 = never. Two scores were calculated, an individual mean score and a mean difference score to tap into the discrepancy in autonomy expectations between each dyad. We subtracted caregiver scores from adolescent scores such that greater differences scores indicated that caregivers had later autonomy age expectations than adolescents. This measure has obtained good reliabilities with Latino samples (Roche et al., 2014). With the current sample, Chronbach alphas of .92 and .81 were obtained for adolescent and caregiver reports, respectively.

Parent-adolescent conflict. A 15-item scale (Updegraff, Delgado, & Wheeler, (2009) modified from Smetana's measure on conflict (1988) was used to assess caregivers' and adolescents' reports of perceived conflict intensity within the dyad across several domains (e.g., physical appearance, friends, and romantic relationships).

If adolescents indicated that certain types of conflict happened with their caregiver, then they rated how intense the conflicts were with a 5-point Likert scale from 1 = very mild to 5 = very angry. Caregivers were asked the same questions, rephrased for the caregivers' perspective. This measure tapping into conflict frequency has obtained good reliabilities in previously studies with Latino samples (Padilla, McHale, Rovine, Updegraff, Umaña-Taylor, 2016). With the current sample, alpha coefficients .86 and .94 were obtained for adolescent and caregiver, respectively.

Data Analytic Strategy

First, preliminary bivariate correlations were conducted to explore associations between variables of interest. Then, we ran independent t-tests to investigate potential differences between adolescent males and adolescent females on autonomy age expectation items. We then conducted two hierarchical linear regressions. The first, explored whether the main effects (adolescent autonomy, parent autonomy, adolescent familism, parent familism) were associated with conflict intensity. The second regression tested whether the autonomy age expectation discrepancies and cultural orientation gap between caregiver and adolescent predicted parent-adolescent conflict intensity. Control variables considered included adolescents' age, family structure (two parent vs other), income level, and maternal educational level.

Results

All analyses were conducted using SPSS version 25. Descriptive statistics and bivariate correlations among variables of interest and demographics are presented in Table 1. Correlation analyses indicated that more adolescent-reported familism was significantly associated with more adolescent-reported conflict intensity ($r = .321$, $p < .05$). In addition, results revealed that adolescent sex was correlated with adolescent autonomy age expectations ($r = .297$, $p < .05$). We followed up with independent t-tests to investigate further this association.

Independent samples t-test analysis revealed significant mean differences between adolescent males and females on perceived autonomy age expectations across several domains (Table 2). Overall, females selected older ages ($M_{female} = 2.96$, $SD = 1.26$ versus $M_{male} = 2.0$, $SD = 1.25$) to engage in autonomous decision making such as choosing what clothes to wear. This general trend held true for decisions such as going out on dates ($M_{female} = 3.08$, $SD = 1.02$ versus $M_{male} = 2.21$, $SD = 1.10$)], going on overnight trips with both sexes ($M_{female} = 3.78$, $SD = .085$ versus $M_{male} = 3.1$, $SD = 1.07$), going to mix-sexed parties at night ($M_{female} = 3.22$, $SD = 1.05$ versus $M_{male} = 2.54$, $SD = 1.18$) and curfew ($M_{female} = 4.11$, $SD = .640$ versus $M_{male} = 3.58$, $SD = 1.02$). Two other activities had similar patterns as well. Specifically, on average, females reported older ages to drink ($M_{female} = 4.42$, $SD = .902$ versus $M_{male} = 3.91$, $SD = 1.04$), and to do drugs ($M_{female} = 4.70$, $SD = .542$ versus $M_{male} = 4.17$, $SD = 1.11$).

Two, two-step hierarchical linear regression models were conducted to examine whether adolescent sex, familism (from caregiver and adolescent), and autonomy age expectations (from caregiver and adolescent) predicted adolescents' reports of conflict intensity (Table 3). In the first model, adolescent sex was the only variable entered as a control in the first step. Other demographic variables (i.e., adolescent age, family income level, and maternal educational level) were not included as controls because they were not significantly related to the variables of interest. The independent variables (parent familism, adolescent familism, parent autonomy, and adolescent autonomy) were entered in the second step.

The overall model revealed no significant effects for adolescent-reported conflict intensity ($R^2 = 0.42$, (F (5, 43) = 0.064) but there was a marginally significant association between adolescent familism and adolescent-reported conflict intensity ($R^2 = .285$, $^\wedge p < .10$). In the second model, adolescent sex was entered in the first step. Familism gap and autonomy expectation discrepancy were entered in the second step. None of the regression paths reached statistical significance.

Discussion

The aim of the current study was to identify which factors (autonomy or culture) were associated with adolescent-reported parent-adolescent conflict intensity among a sample of Latino families residing in the U.S. At the bivariate level, we hypothesized that the more family oriented the adolescent would be correlated with less conflict intensity. Although a significant finding was present in the correlation analyses, the direction of association was opposite to what we expected. Specifically, adolescents who reported higher levels of familism also reported more parent-adolescent conflict intensity. It is possible that this finding is due to the adolescent being so present and invested in the relationship that the adolescent perceived disagreements as more serious matter than someone who is less family oriented. It is also possible that adolescents who are more family oriented spend more time with families and this gives many opportunities to engage in disagreements which can be perceived as more intense. Future research is needed to uncover additional factors that contribute to conflict intensity within the parent-adolescent relationship.

As expected, our results also indicated that being male or female was implicated in the age expectations that adolescents reported for different autonomous activities and behaviors. Specifically, results showed that, on average, adolescent females reported later age expectations, closer to 18 years of age or never, and males reported earlier age expectations, especially when it came to engaging in activities that typically have age restrictions (i.e., doing drugs). However, both adolescent males and females had generally the same age expectations (14-17 years old) when it came to mundane tasks (i.e., chores). This is in line with the idea that in Latino cultures, traditional gender scripts are emphasized with females being more likely to be more reserved than males (López & Chesney-Lind, 2014). The socialization gender scripts likely lead Latino adolescent males and females to differ in their expectations about when they should be more autonomous.

We also hypothesized that parent-adolescent familism gap and autonomy discrepancies were going to be associated with parent-adolescent conflict intensity, but our regression analysis indicated that adolescent familism was only marginally significantly associated with parent-adolescent conflict intensity. Autonomy expectation discrepancy was not significantly associated with conflict. It is possible that these factors did not reach statistical significance intensity due to sample size. More research with larger samples is needed. Further, longitudinal studies are necessary given recent work that suggest that changes in familism values may contribute to increasing or decreasing discrepancies between family members' values, with implications for family relationship quality (Padilla, McHale, Rovine, Updegraff & Umaña-Taylor, 2016).

Limitations and Future Directions

It is important to note some of limitations of the current study. First, our sample size was small and participants in this study were recruited from a geographical area considered a recent immigration hub for Latinos with a Black population that accounted for over 52% (United States Census Bureau) of the population in that region during the time study took place. Thus, the generalizability of these findings to Latino families residing in areas with different racial-ethnic population composition make up is unknown. For instance, Latino adolescents residing in a predominately European-American community may compare their experiences to their European American peers, who have different values and cultural norms, and autonomy issues may be more salient predictors of conflict intensity with parents in those regions. As a result, Latino parent-adolescent dyads residing in European American communities may experience more conflict, as the discrepancy between parent and adolescent values and expectations may be greater and have different meaning than when this discrepancy occurs within a minority context. Another limitation of this study is the use of self-report questionnaires in a cross-sectional study that only examined what individuals perceived at one given point in time. Reports may also have validity issues because individual could have overreported or under-reported the severity of disagreements. Thus, constructs may have failed to adequately address the dynamic interactions within parent-child relationships.

Despite these limitations, the study shows that gender is an important construct to consider when investigating autonomy issues among Latino families with adolescents. Future studies should include (a) larger samples of Latino families residing in areas with different racial make-up (b) employ of a longitudinal design where adolescents report the intensity of conflict when it happens, and (c) analyze potential differences between the U.S born Latino adolescents and the foreign-born Latino adolescents, which this study did not consider due to sample size.

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Table 1
Correlations among familism and autonomy

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Child conflict intensity	-												
2. Adolescent familism	.32*	-											
3. Parent familism	.14	-0.03	-										
4. Adolescent autonomy	.15	.24	-.15	-									
5. Parent autonomy	-.03	.16	.08	.19	-								
6. Familism gap	-.13	-.75**	.69**	-.28	-.05	-							
7. Autonomy Discrepancy	-.16	.11	.19	-.77**	.48*	.22	-						
8. Parent education	.02	-.15	-.12	.13	-.01	.07	-.12	-					
9. Family income	-.19	-.06	-.06	-.00	-.02	.01	-.02	.49**	-				
10. Mom's birth country	.06	.21	.05	.06	.22	-.06	0.09	-.17	-.13	-			
11. Adolescent's birth country	.06	-.02	-.05	.17	.21	-.06	-.01	.08	-.35*	.13	-		
12. Adolescent's sex	-.08	-.05	.12	.30*	.12	.14	-.19	.29	.20	-.13	-.04	-	
13. Adolescent's age	.04	-.02	-.19	-.09	-.07	-.08	.03	.28	-.03	0.01	.45**	.07	-
M	2.87	3.08	3.22	3.15	4.06	.14	.90	3.29	1.37	.86	.431	.53	13.0
SD	.83	.58	.53	.70	.5	.79	.77	1.8	.69	.35	.50	.50	1.91

Note. M indicates mean. *SD* indicates standard deviation. *P* indicates significance. **p < .05; **p < .01*

Table 2
Independent Samples T-test between Autonomy and Adolescents' Sex

	Male		Female			
	M	SD	M	SD	t	p
1. Choose own hair style even if parents disapprove	2.17	1.34	2.67	1.47	-1.23	0.22
2. Go to girl-guy parties at night (e.g. parties where there are both boys and girls)	2.54	1.18	3.22	1.05	-2.18	0.03*
3. No longer have to tell your parents where you are going	3.05	1.43	3.54	.948	-1.38	0.17
4. Prepare own dinner when home alone	2.71	1.2	2.67	1.30	0.12	0.91
5. Choose what clothes to wear, even if parents disapprove	2.0	1.25	2.96	1.26	-2.74	.001**
6. Watch as much TV as you want	2.04	1.12	2.44	1.28	-1.19	0.24
7. Go out on dates	2.21	1.10	3.08	1.02	-2.90	0.01**
8. Do things with friends instead of with your family	3.0	1.4	2.89	1.40	0.18	0.86
9. Smoke cigarettes	4.17	1.11	4.704	0.54	-2.08	0.05*
10. Stay home alone at night (without supervision) when parents are out	3.0	1.10	3.3	1.17	-1.05	0.30
11. Go on an overnight trip with friends of your own sex, without supervision	3.38	1.28	3.46	1.10	-0.26	0.80
12. Go on an overnight trip with both male and female friends, without supervision	3.1	1.07	3.78	.085	-2.52	0.02*
13. Come home at night as late as you want	3.58	1.02	4.11	0.64	-2.19	0.04*
14. Drink alcohol	3.91	1.04	4.42	.90	-1.84	0.07*
15. Watch my TV, movie, or video you want	3.04	1.26	3.33	1.04	-0.89	0.38
16. Choose own friends even if your parents disapprove	3.12	1.42	3.0	1.33	0.32	0.75
17. Decide how you spend your money (allowance wages, gift)	2.78	1.24	2.78	1.15	-1.2	0.24
18. Stay home alone if you are sick	2.75	1.48	2.96	1.22	-0.56	0.58
19. Not tell parents where you are going	3.54	1.35	3.96	1.13	-1.21	0.23
20. Stay home alone rather than go out with your family	3.21	1.50	3.63	1.11	-1.13	0.28

Note. M indicates mean. *SD* indicates standard deviation. *T* indicates t-test. *P* indicates significance. *p < .05; **p < .01

Table 3
Predictor factors of adolescent conflict intensity

Predictors	Adolescent's Conflict Intensity	
	ΔR^2	β
Step 1	0.008	
Adolescent's Sex		-0.087
Step 2	0.037	
Parent Familism		0.200
Adolescent Familism		0.285^
Parent Autonomy		-0.110
Adolescent Autonomy		0.146
Total R^2	0.045	

Note. ΔR^2 = change in R^2; β = standardized beta; Child sex: 0 = Male; 1 = Female.

Table 4
Predictor factors of adolescent conflict intensity

Predictors	Adolescent's Conflict Intensity	
	ΔR^2	β
Step 1	0.008	
Adolescent's Sex		-0.087
Step 2	0.037	
Familism Gap		-0.075
Autonomy Discrepancy		-0.159
Total R^2	0.045	

Note. ΔR^2 = change in R^2; β = standardized beta; Child sex: 0 = Male; 1 = Female.

Optimization of $K_{0.5}Na_{0.5}(NbO_3)$ Thin Films Using Pulsed Laser Deposition

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Abstract

In environments where wind, or solar energy harvesting are not accessible, piezoelectric microelectromechanical systems (PiezoMEMS) that include $Pb(Zr_xTi_{1-x})O_3$ (PZT), use vibration energy to provide clean energy. Due to concerns about lead exposure during the processing of lead-based materials, $K_xNa_{1-x}NbO_3$ (KNN) is being explored as a lead-free replacement. Pulsed laser deposition (PLD) was used to deposit a 500 nm $K_{0.5}Na_{0.5}NbO_3$ thin film onto a platinized silicon substrate.

By varying deposition parameters, such as temperature, pressure, target to substrate distance and even the energy density provided to the target, the optimal KNN thin film can be fabricated. Studying the microstructures and chemical composition of PLD deposited KNN thin films revealed an average grain size of 1.5 μm at 400mTorr and 2 cm of separation between the target and substrate. But X-ray diffraction scans show many unidentified peaks which infer the existence of many potassium and sodium deficient secondary phases. Additional work needs to be done in order to identify the deposition parameters that will create the most piezoelectrically efficient KNN thin film.

Introduction

Piezoelectric materials are widely used in piezoelectric microelectromechanical systems (piezoMEMS) devices such as actuators, sensors, and energy harvesters (Muralt 2009). Their ability to convert mechanical stresses to electrical energy makes these materials useful as a local source of renewable energy for low power applications, which is of interest for powering sensors for the internet of things. Lead zirconate titanate (PZT) is commonly utilized in piezoMEMS devices because it exhibits superior piezoelectric properties compared to other piezoelectric materials. However, health concerns about lead exposure during the processing and disposal of lead-based materials have driven research into alternative lead-free piezoelectric materials. Studies show a strong correlation between children exposed to lead and reckless adult behaviors such as theft and murder (Wolpaw, 2007). During processing, lead deposits coat the inside of the vacuum chamber and the resulting wafers can potentially contaminate tools that come into contact with the lead containing material.

Although protocols to handle potential cross-contamination from PZT-coated wafers have been developed by companies producing ferroelectric random-access memories, interest exists in alternative materials that have high actuation authority without containing lead.

Lead-free materials in piezoMEMS, such as potassium sodium niobate (KNN), present possible alternatives. However KNN's properties, a piezoelectric constant (d_{33}) of ~80 pC/N and a coercive field (E_c) of ~19 kV/cm (Dai, Zhang, & Chen, 2009), make it less efficient than PZT for many applications. Additional work is therefore needed. The goal of this work is to determine optimal growth parameters for KNN thin film with reasonably good piezoelectric properties. For this purpose, pulsed laser deposition (PLD) was used to deposit KNN films onto platinized silicon substrates; the films' microstructures and chemical composition were determined as a function of the deposition parameters. This paper investigates the effects of deposition temperature, pressure, and target to substrate distance on the measured d_{33} and E_c in KNN thin films. To implement films into energy harvesters more information needs to be collected on how piezoelectric energy harvesters work.

The crystal structure and composition of KNN is important in understanding how a piezoelectric energy harvester works. PZT and KNN have the same perovskite crystal structure (see Figure 1) with different atoms placed at the A and B-sites of the crystal. Pb populates the A-site of a PZT perovskite structure while K and Na populate the A-sites of a KNN crystal. The B-site (located at the center of the unit cell) is occupied by the ferroelectrically active ion. In PZT, the ion is zirconium but in KNN it is niobium; the displacement of this atom off the center of the unit cell gives it piezoelectric characteristics.

The maximum piezoelectric response occurs when the film composition is on the verge of going through a phase transition. The morphotropic phase boundary (MPB) is a nearly temperature independent boundary between two different ferroelectric distortions. In KNN, at the $K_{0.5}Na_{0.5}(NbO_3)$ composition, the maximum piezoelectric response comes from crossing the MPB between two orthorhombic phases (Dai et al., 2009). By depositing KNN films on this composition, higher piezoelectric responses are obtained. The correct chemical composition not only places the film on a favorable MPB for energy harvesting but, it is also one of the many deposition parameters that can affect film growth.
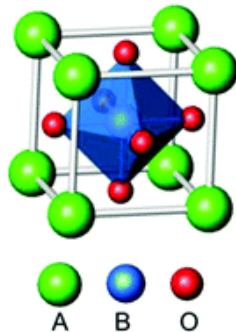

Figure 1. Schematic of a perovskite unit cell

The structure zone model proposed by John A. Thornton explains the mechanisms that drive thin film microstructure during growth; thermal energy and kinetic, or bombardment energy (Thornton, 1988).

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When growing films via a physical vapor deposition process, such as PLD, a higher amount of thermal energy applied to the substrate allows for surface diffusion of ions. According to the structure zone model, the ratio of substrate temperature (T) to melting temperature of the material deposited (T_m) determines the film microstructure. The first type of growth, called zone 1, occurs when the atoms stick to the spots where they arrive on the substrate with minimal surface diffusion ($T/T_m < 0.3$). This process is dominated by the transport of atoms from the surface of the target to the substrate. The next type of film growth is when $T/T_m < 0.5$ and the atoms have sufficient thermal energy that surface diffusion dominates the process. This produces columnar growth the zone 3 condition ($T/T_m > 0.5$) occurs when bulk diffusion dominates over surface diffusion (Thornton, 1988).

By studying the MPB composition of KNN thin films, and parameters that affect thermal and bombardment energy, the fabrication of these films can be optimized. The parameters that align to create KNN films with reasonably good chemical composition and microstructures using PLD can be transferred to more industrial deposition techniques. Sputtering is a good candidate for mass producing KNN thin films for use in handheld energy harvesting devices due to its similarities to PLD and ability to deposit on four-inch wafers. Before mass production of films can begin, the deposition parameters, using PLD, must be determined.

Materials and Methods

A one-inch $K_{0.5}Na_{0.5}(NbO_3)$ target with 5 mol% excess potassium carbonate (K_2CO_3) and 2.5 mol% excess sodium carbonate (Na_2CO_3) was sintered using standard bulk ceramic processing techniques. This was used for growth of KNN films on 0.25 cm^2 pieces of Pt/Ti/SiO$_2$/Si wafers. Excess alkali metals were added to offset the volatilization of these elements during high energy depositions. The substrate was ultrasonicated for cleaning in acetone, ethanol, and isopropyl alcohol for ≥ 5 minutes in each solution. While the substrate was ultrasonicated, pre-ablation of the target was performed at 20 Hz for 1200 pulses. After cleaning, the substrate was bonded to the substrate heater using Alpha Aesar silver paste cured at 300°C to ensure uniform thermal contact. Once the substrate was securely attached to the heater and aligned with the target, the system was pumped down to a base pressure in the 10^{-7} Torr range. Using the (ozone generator) the atmosphere inside the system was kept at a 10/90 mix of O_3/O_2 with a flow rate of 26 sccm.

1.) Optimization

To optimize the thin film growth parameters, depositions varying temperature, pressure, and target to substrate distance were performed. For high quality KNN thin films, atoms need to have enough thermal energy for surface diffusion to occur and the right amount of bombardment energy to crystallize the perovskite phase. Different deposition parameters affect atom mobility and the type of growth that occurs on the film. Atom mobility is mainly coupled with the amount of thermal energy available to the ions to undergo surface diffusion. Changing deposition temperature to achieve various T/T_m ratios allows for observation of different film microstructures. In this study, 650°C was chosen as the optimal deposition temperature in order to get a T/T_m ratio of 0.5 which corresponds to columnar growth. The other contributing factor to film growth, bombardment energy, can be modified through parameters such as target to substrate distance and deposition pressure.

Since the plasma plume shape changes at different pressures, becoming skinnier and shorter as deposition pressure increases from 100 mTorr to 400 mTorr, it was hypothesized that the substrate position within the plume would have an effect on the quality of the KNN film. To test this, films were deposited at three different positions within the plume: at the widest point, just inside the tip, and at the tip. To observe the effects of deposition pressure, the experiment was performed at different chamber pressures ranging from 100mTorr to 400mTorr (see Table 1.).

Table 1. Target to Substrate Distances at Various Deposition Pressures

"Optimal Distance" (cm.)	5.8	5.7	5.3	5.1
Wide Plume Width Distance (cm.)	2	2	2	2
Tip of Plume Distance (cm.)	6	6	5.6	5.7
Temperature (ºC)	650	650	650	650

2.) Characterization

After deposition, X-ray diffraction (XRD), using the Malvern Panalytical Empyrean X-Ray Diffractometer, was utilized to determine crystallinity and identify any secondary phases that arose from potassium and sodium deficiencies. Each scan was done using copper as the anode material in the X-ray tube with a 40-mA current and 45 kV voltage. The scans were 17 minutes in duration, ranging from 0-70° 2-theta. Next, each film was imaged using the Leo 1530 Field Emission Scanning Electron Microscope (FESEM) in order to see the surface microstructures and grain size (determined by the line intercept method). The imaging distance was 3 mm, and an acceleration voltage of 5 kV was used.

Results
Observations of the microstructure through X-ray diffraction revealed that KNN thin films deposited at the tip of the plume crystallized into the perovskite phase with minimal pyrochlore phase.

Depositions done at the widest part of the plume showed the most sodium and potassium deficient secondary phases. The [100] orientation axis peak was further intensified as deposition pressure rose from 100 mTorr to 400 mTorr. This shows that the perovskite phase crystallized at
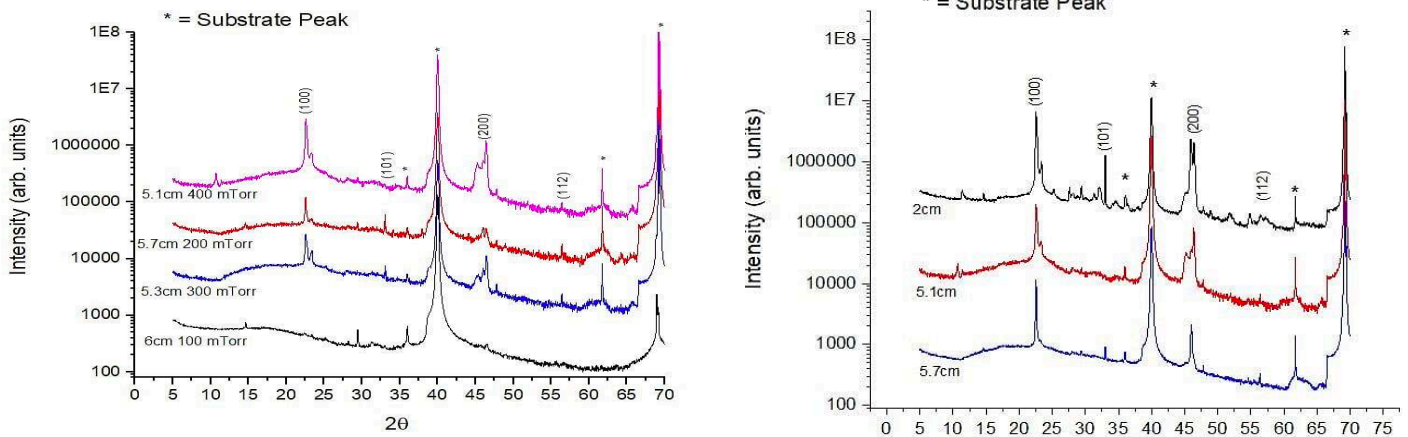

Figure 2. X-ray diffraction pattern of "optimal" target to substrate distance at 100, 200, 300 and 400 mTorr (left). Also pictured on the right, an x-ray diffraction pattern for depositions at 400mTorr at 2 cm, 5.1 cm, and 5.7 cm target to substrate distances.

FESEM images revealed further information about the microstructure and type of film growth achieved with respect to target to substrate distance. At a distance of 2 cm and pressure of 400 mTorr, the average grain size was 1.5 µm. As the target to substrate distance increased from 2 to 5.8 cm, the average grain size was reduced to 0.09 µm. Observing the KNN films with the naked eye shows a dull gray color (which is consistent with the high surface roughness visible in FESEM imaging).
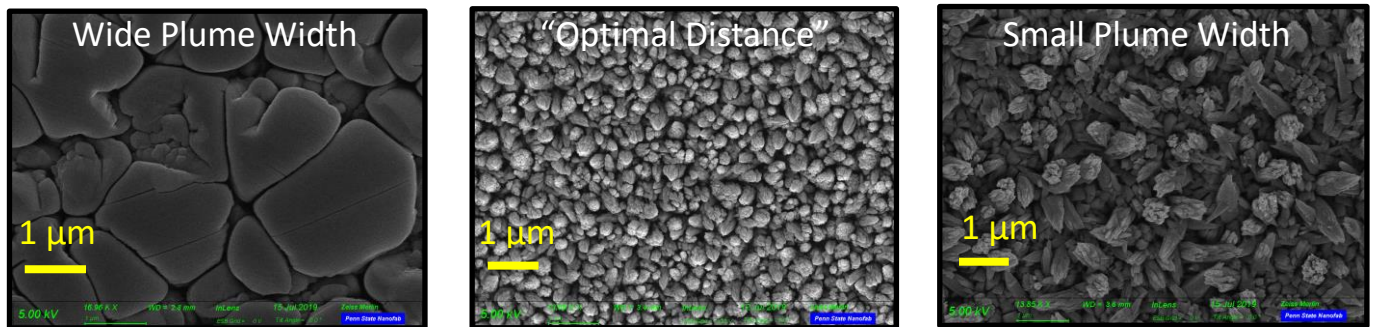
Figure 3. FESEM images of surface at 400 mTorr and each target to substrate distance

Further observation of film growth with respect to deposition pressure revealed that at 100 mTorr there was too much bombardment energy. It is possible the resulting re-sputtering promoted the appearance of secondary phases. As the pressure was increased up to 400 mTorr, the porosity of the films increased. Even with reasonably good perovskite phase crystallinity, due to the porosity and high surface roughness of the films, electrical measurements were not attempted.
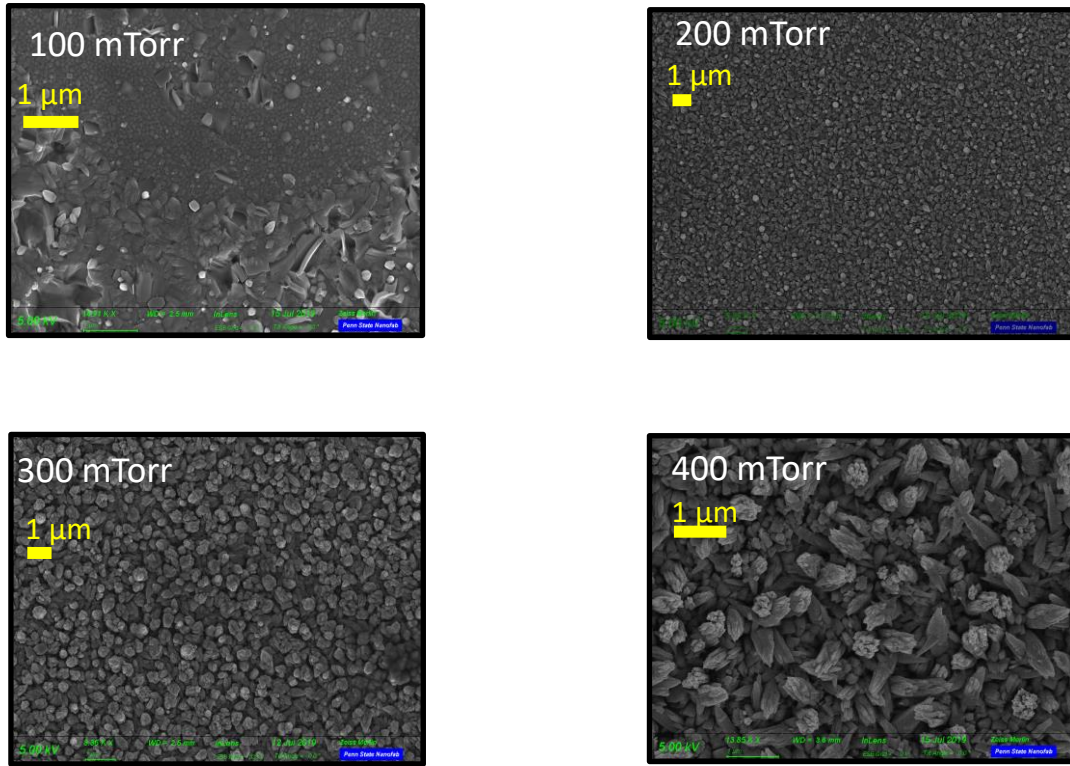
Figure 4. FESEM images of surface of depositions at "optimal" target to substrate distance. These distances are 5.8 cm at 100 mTorr, 5.7 cm at 200 mTorr, 5.3 cm at 300 mTorr, and 5.1 cm at 400 mTorr.

Conclusions

While strides have been made towards finding the correct target to substrate distance and deposition pressure, further optimization of the microstructures needs to be done in order to fabricate a KNN thin film that could replace PZT in piezoelectric energy harvesting devices. Parameters such as laser pulse frequency, target composition, and temperature can be changed in order to alter the film growth. To address the issue of surface roughness, deposition temperature can be changed in order to allow more surface diffusion. This study will be continued in order to find the deposition parameters to create films with better microstructures and phase purity for use in piezoelectric energy harvesting devices.

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Can Empathy Training Reduce Empathy Avoidances in the Context of Social Disparities: The Case for Empathy Experts

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Introduction

The term empathy, first coined by Edward B. Titchener, can be broken down into two components: *em* meaning in/into, and *pathy*, referring to feelings, sensitivity or perception (Edwards, 2013; "Root Words & Prefixes: Quick Reference," n.d.). Empathy is known for playing a vital role in our interpersonal and prosocial interactions, which helps provide an emotional bridge between individuals by allowing them to resonate with others, emotionally and cognitively, by taking on their perspective and experiences as their own. By understanding how others are feeling, individuals are more equipped to respond more appropriately to the present situation which aids in building trust and connection with others (Miller & Eisenberg, 1988).

Empathy as a motivated phenomenon

Although empathy is often seen as beneficial, effortless and automatic (Cameron at el, 2019), recent research indicates that it is not always as automatic as it seems as it may entail cognitive, emotional, and material costs. This has been referred to as a motivated account of empathy (Cameron et al., 2019; Zaki, 2014). A 2019 study by Cameron et al. suggests that the motivation to empathize derives from factors such as who we are empathizing with and in what context. These forces can shape an individual's response in an empathy eliciting situation. Cameron et al. demonstrated that individuals avoided an empathy eliciting situations when it was perceived to require cognitive cost (money, time and etc.) or when they felt they were not skilled at being empathic (low efficacy). This was found using the Empathy Selection Task, which uses a free-choice response format to assess one's willingness or motivation to engage in empathy. Participants were shown pictures of individual faces and the participants were given the choice to empathize (feel) with the target and attempt to feel the target's emotions or objectively describe (describe) the target such as external features, age etc. The ratio of empathy choices to the total number of choices was then used as indicator of empathy engagement which allowed researchers to participants motivation to engage in empathy.

Other research has indicated that people tend to choose to avoid certain situations based on costly decisions. The "Law of Least Effort", indicates that individuals are more likely to minimize the amount of effort they use in order to attain desirable outcomes (App et al). This same principle is likely linked to the cost-benefit analysis that individuals engage in when making decisions to empathize (or not) in a given situation.

Therefore, if attempting to share in the experience and feelings of a target (i.e., empathizing) is seen as effortful or difficult due to any of the reasons noted above, then this can lead to greater empathy avoidance.

Conversely, individuals who have some sort of training in engaging in empathy and have the necessary skills and tools to perspective take and share ideas may not feel the need to avoid empathy.

Experience sharing and perspective taking

Experience sharing and perspective taking are some facets of empathy which can overlap and be coactive in a situation. Experience sharing is shown to be beneficial by helping people learn each other's norms and emotions. Yet, experience sharing, according to Cameron et al. (2019) is seen as particularly difficult because vicariously resonating with others (e.g., experience sharing) can be cognitively effortful, which can then lead to greater motivation to avoid empathy. Higgins (1981) described perspective taking as the ability to see the world through another's eyes. It is associated with an increase in the willingness to help others and can be linked with decreases in prejudice (Todd, Bodenhausen, Richeson & Galinksy, 2011). Experience sharing and perspective taking have been shown to have multiple benefits, yet perspective taking and experiences sharing can also increase empathy avoidance. The uncertainty that is involved in attempting to share the experiences or taking the perspective of an unfamiliar stranger may demand a high cost for empathizing. However, the tendency to avoid empathy can also be offset by a sufficient reward or by changing people's efficacy for empathy. Cameron's study demonstrated that simply telling participants that they were more accurate than 50% of participants was enough to create an increased sense of efficacy (as demonstrated by self-ratings of efficacy and decreased cognitive effort) and eliminate empathy avoidance. On the other hand, empathy avoidance may be greater in contexts where the experiences of the target seem far outside of one's own experiences. One such context is when confronting social disparities involving an outgroup.

Empathy Motivation in the Context of Social Disparities

The factors discussed may be a driving force that make empathizing with an outgroup less likely. Cameron and Payne (2011) argues that the human emotion is set to respond more strongly to individuals than to groups. They also argue that empathy collapse, defined as a decrease in sensitivity toward groups of people when the number of people in need of help increases, is due to the attempt to regulate emotions. They tested the hypothesis by observing how often people gave to charities that involve one individual in need of aid vs. charities that aid a large group of people. They found that people donated more to an individual in need of charity vs. a charity that helps a group of people. They argued that the collapse of empathy was not because individuals were lacking compassion to mass suffering. Instead they argued that this was because of natural limits on the human emotional response which may not be able to process the large emotional input associated with mass suffering as opposed to an individual person suffering. Their findings support the idea that individuals tend to avoid empathizing more with numerous individuals in agony as opposed to a single victim of tragedy. Social disparities, another form of large-scale suffering, could also lead to more avoidance as seen in the previous studies above.

A study by Cho et al., (2019) was investigating whether individuals are more likely to avoid empathy when the stimuli they are asked to engage with invoke social disparities/inequalities. She examined this question by using a modified version of the Empathy Selection Task developed by Cameron et al., (2019).

Their modified task included 20 trials total, all portraying an African American target with a brief vignette implicating cause of the suffering as social disparities related or not.

They found that empathy avoidance was particularly strong and was associated with lower empathic efficacy in the context of social disparities. The social disparities context may be particularly likely to lead to empathy avoidance because it contains two aspects already known to relate to empathy avoidance: an outgroup context and mass suffering. These two characteristics of social disparities are likely to induce empathy avoidance as it is likely to be associated with greater cognitive effort and increased feelings of inefficacy because most people do not have the experiences to be able to perspective-take in that situation.

Empathy "Experts"

Although disparity contexts may be hard for most, would less empathy avoidance be seen among individuals who are given the tools to empathize more? Are there people who might show less avoidance in the context of social disparities? For our experiment, we studied a unique population to further understand the factors that may lead to less empathy avoidance /greater empathy engagement. We refer to them as *empathy experts* because they have been trained to engage in empathy or are engaged in empathy daily. We are assuming that due to their experience with or training in engaging empathically with others, that they are more less likely to show empathy avoidance due to increased feelings of efficacy at engaging in empathy and/or a resulting decrease in cognitive effort associated with empathy. One example of empathy experts can be found within the Penn State organization known as *World in Conversation*.

World in Conversation (WINC) is known for expanding perspectives and building an understanding on controversial topics through facilitated dialogue. Facilitated dialogue creates an understanding between individuals, locally and globally, on controversial topics such as race, politics, sexuality and social disparities and injustice. Facilitators are individuals who are trained to navigate the difficult dynamics that can occur between individuals in these dialogues, in order to foster genuine and honest communication with the ultimate goal of creating a better relationship that can produce a more eye-opening and productive conversations ("World in Conversation" n.d). Every World in Conversation facilitator has undergone at least 240 hours of training and yearly facilitators lead more than 1,200 face-to face dialogues, focused on practicing communication skills that encourage every perspective on a topic to be heard, examined, and constructively challenged.

WINC facilitators seek different perspectives in a conversation and trust that sharing of experiences and ideas will lead to a greater understanding of one's self and others. They are encouraged to take a neutral position during facilitated dialogues, even if their own feelings on a topic are not neutral. Aside from facilitating dialogues, facilitators take a class with other facilitators, from all different cultures and background, in which they are the participants of the dialogues in which they get to hear different perspectives while also sharing their experiences about different controversial topics and their lives. Thus, the skills, the conversations, and training which facilitators have undergone have allowed them to regularly engage in situations that use empathy and require them to get in touch with the feelings and experiences of others.

The Present Study

Prior work, such as the research done by Cameron et al. (2019), shows that people are motivated to avoid cognitive work, but no studies have examined how this domain-general preference applies to people who engage in experience sharing on a regular basis. The ability to navigate difficult social issues (such as those related to racism, social inequality, etc.) requires empathy as a crucial first step toward this process (Watt, 2007).

This study will examine if expert facilitators who are being trained to facilitate difficult dialogues around social issues (including social disparity) show a decreased tendency to avoid empathy and view empathy as less cognitively taxing or have higher perceived efficacy in engaging in empathy relative to non-facilitators in a context in which social disparities are highlighted. The findings of this study will help identify whether training in experience sharing and empathy might allow individuals to choose to engage with others even in circumstances when others tend to avoid it. By identifying such a skill, we can take steps toward improving intergroup relations in our society.

Using a sample of empathy experts from the WINC program as participants we will test our research question by conducting an online experimental study using the modified version of the Empathy Selection Task used by Cho et al. (2019), which features distressed African American individual with social disparities either implicated as the cause of the distress (or no cause given). We predict that the sample of empathy experts from the WINC program would choose to engage in empathy significantly more when compared to the Cho et al., (2019) sample due to greater experience and training in engaging in empathy.

Methods

Participants

Participants were World in Conversation student facilitators who were recruited via emails. The final sample consisted of 14 World in Conversation facilitators with an average age of 26 with 50% male and 50% female. In terms of race, 8 identified as White, 2 Black or African America, 1 Asian, 2 Mixed Caucasian/Other. Upon completion of the study each participant was emailed a $5.00 electronic amazon gift card to the email provided.

Measures

Modified Empathy Selection Task (EST). For the purpose of the present study participants completed a modified version of the Empathy selection task (Cameron Et al 2019). The original EST involves presenting participants with various pictures of a distressed individual. Participants then choose to either empathize with ("feel the target individual's internal feelings") or describe the target in the picture ("remain objective and identify the person's external features such as gender, age etc."). Afterward they are asked to write three keywords that reflects their selected option.

The modified version used in the present study uses 20 trials free choice trials were participants are specifically presented with images of a distressed African American individual with brief vignettes implicating the cause of the suffering as social disparities. For example,"In the US, if you apply for a job with a Black-sounding name, you are 50% less likely to get a call back than with a White-sounding name. The person in the photograph has been struggling to find a job". Next, participants choose between engaging in empathy (FEEL option) or remaining objectively detached (DESCRIBE option).

NASA Task load index. After completing the EST, Participants completed the NASA task load index which measures the participants perceived cognitive cost associated with each choice. The NASA task load index included questions regarding the degree of mental demand ("How mentally demanding was this option?"), effort ("How hard did you have to work to accomplish your level of performance with this deck?"), efficacy ("How successful were you in accomplishing what you were asked to do in this deck?"), and stress ("How irritated, stressed or annoyed were you by this option?). These different questions allowed us to examine how distinct facets of cognitive work might relate to empathy avoidance (Cameron et al, 2019).

Demographics. After participants complete all 20 trails, they proceeded to answer questions about their demographics, such as gender, country of birth, political leaning, age, and how many semesters they have served as a World in Conversation facilitator. We included a question about amount of time served as a facilitator to possibly be used as a moderator, given that greater amounts of experience could be associated with less empathy avoidance.

Additional Measures. Our survey incorporated additional measures that were not used in the current study. Participants completed the Interpersonal Reactivity Index (IRI) which is comprised of personal distress (PD) and Empathic Concern Scale (subscale of the interpersonal Reactivity Index) which measures participants' feelings of warmth, compassion, concern for others (Davis, 1980) and the Identification with All Humanity Scale (IWAH).

Procedures

Participants were recruited through an email sent out to a list of World in Conversation facilitator. The study was completed online via a Qualtrics survey. The first screen presented to the participant was the informed consent form and by continuing with the study, participants indicated their consent to participate. Once consent was obtained, the participants were given task instructions informing them that they would complete a series of trials in which they would be asked to make decisions. Participants then completed the modified Empathy Selection Task. Next, they completed the demographics questions along with additional measures. After the survey, a debriefing was provided to explain the purpose of the study to the participants.

Results

Data Analysis Approach.

The main dependent variable for the study was empathy choice, calculated as the percentage of total trials where participants chose to feel empathy over describe We tested whether the mean empathy choice score was significantly different from .50 using a one-sample t-test to see if there was evidence of empathy avoidance. We then compare these results to those of the previous study (Cho et al. 2019—the poster) in order to determine whether facilitators avoid empathy less, also using a one-sample t-test evaluated against the empathy choice scores obtained from Cho et al.

Preliminary Analysis

The main outcome of interest in the study was the percentage of trials that the participants chose to empathize over describe. Overall, the results denoted that individuals leaned toward choosing to empathize with the targets more than they chose to describe the targets objectively 62% vs 38%. The sample t-test revealed that this was significantly different from the 50% expected by chance, $t(13) = 2.70$, $p = .02$ indicating that there was less empathy avoidance in our sample.

Primary Analysis

Our hypothesis was that participants would show decreased empathy avoidance in the context of social disparity, due to previous training and experience with engaging in empathy, in comparison to the findings from Cho et al. (2019). An independent sample t-test revealed that the mean empathy choice in Cho's at al., (2019) social disparity condition (.41) was significantly different than the mean empathy choice in our condition (.62), $t(13) = 4.70$, $p = .00$. The mean of the conditions was opposite the direction as reported by Cho et al., (2019), with individuals showing more engagement with empathy rather than avoidance.

Discussion

Empathy plays a vital role in interpersonal and prosocial interactions and yet people tend to avoid empathy due to perceived cognitive effort and inefficacy (Cameron et al., 2019). This study focused on whether this avoidance might be reduced among expert facilitators who have been trained to facilitate difficult dialogues around social issues (including social disparities) as part of a university program (World in Conversation). We found that, compared to "non-experts," facilitators showed a tendency to engage in empathy, rather than avoid it in social disparity contexts.

Our study is one of the first to document empathy engagement with the Empathy Selection Task, as opposed to other studies that document a tendency toward empathy avoidance (Cameron at al., 2019, Cho et al., 2019). For example, Cameron et al. reported that participants were primarily avoiding empathy and that this was linked to the perception that trying to share in the feelings of others was a cognitive struggle. For the empathy experts in our study, however, the hands-on emotional experiences associated with facilitating difficult dialogues (empathizing, perspective-taking, appreciation of multiple viewpoints) may have helped diminish any concerns about inefficacy around feeling or sharing in the target's emotions. Thus, having the skills to understand that everyone's perspective and experience is needed may have allowed facilitators enough practice in using empathy that they were comfortable choosing empathy with greater frequency.

Although we were unable to test this given our current sample size, we suspect that facilitators would report a greater sense of efficacy in empathizing and feelings that less cognitive effort was required in completing the EST, relative to what has been reported in previous studies (Cameron et al., 2019; Cho et al., 2019). Although no other studies have examined how empathy experts fare in completing a task like the EST, we do have reason to believe that reduced feelings of inefficacy can lead to less avoidance. Specifically, Cameron et al. tried to manipulate sense of efficacy and found that they were able to make participants feel more efficacious, and this was subsequently related to less empathy avoidance. Or strategy in the present study was not to manipulate sense of efficacy, but to find individuals who we suspected would already have greater sense of efficacy. It would be interesting to also try to manipulate efficacy among a sample of empathy experts to determine whether there we can increase empathy engagement even further. Future studies can consider asking this question.

Implications

Our results do not imply that people will always not avoid empathy, but it does imply that empathy is a learned skill and that receiving training in empathy is associated with an increase in one's willingness to empathize. This can possibly contribute to advancing programs that align with training in empathy, such as the World in Conversation program.

By advancing programs such as World in Conversation we can help develop more empathy experts, who can be people that are doing academic, social and scientific work, while constantly engaging in empathy. Future work can also study other individuals who could be considered empathy experts. As an example, those with social justice training may also demonstrate less empathy avoidance in a disparities context. There may also be other individuals who are in fields of study where empathy is a primary skill that is needed such as nursing, clinical psychology, and education. There are likely many empathy experts out there, we just need to include them in our future research to determine how they approach or avoid empathy in difficult situations such as the disparities context we examined.

Limitations and Future Directions

Our study had numerous limitations. One weakness of the study was the sample size, unfortunately we were not able to recruit the number of participants we had initially targeted. The sample size of our study was also much smaller than that of Cho's study ($N = 14$ vs. $N = 130$), though the direction and magnitude of our results appear to be somewhat robust given that we still found a significant comparison with chance levels and the Cho et al. (2019) sample. Nevertheless, additional data should be collected in order to have greater statistical power to detect our effects of interest.

Another limitation of our study is the variability of ages and gender of the targets in the photos and the participants. This variability could have affected participants' choice to empathize or not. For example, participants could have felt that women or male targets were more deserving of empathy and we did not explicitly test for this. We also did not have enough of a sample size to examine gender difference in empathy engagement among our WINC facilitators. This is important because studies have shown that women are more likely to empathize more than men (Ta & Ickes, 2017). Another between subject factor that might be interesting to examine is race since previous research has already demonstrated empathy avoidance or deficits with outgroup members (Tarrant et al., 2009).

Lastly, our study did not adequately study possible individuals difference that might relate to empathy avoidance. For example, in the future we aim to study individual tendencies in being empathic (using the empathic concern subscale of the interpersonal Reactivity Index) might affect empathic choice. Unfortunately, we were unable to do so in the present data given the small sample size. Another individual difference factor of interest would be level of experience (in terms of time spent being a facilitator) and how long ago they last facilitated, both factors that should be included in future studies.

Conclusion

This study, when taken in consideration with prior research, demonstrates that empathy experts did show a decrease in empathy avoidance. It shows that empathy is a learned skill and with the help of training (or a class) we can increase an individuals' willingness to empathize. Our work is the first to show that receiving training in empathy is associated with an increase in empathizing and that engaging frequently in experience sharing might lead to less cognitive effort associated with engaging with empathy. Although preliminary, we hope this research will contribute to research on motivation and empathy and possibly contribute to training on empathy in order to take steps toward improving intergroup relations in our society.

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Personal to Political: How Gender is Associated with Black Activism

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Abstract

This study looks at how gender is associated with black activism through the experiences of five leaders in the Black Panther Party for Self Defense (BPP). By analyzing the autobiographies of *Angela Davis*, *Assata Shakur*, *Bobby Seale*, *Elaine Brown*, and *Huey Newton*, connections between activism, parental relationships, school perception, identity development, and an understanding of social inequality will be shown. Contributing factors for the individual's activism along with the similarities and differences in experiences as black men and women will be discussed. This study also examines the root causes of activism centering on youth experiences. While it may not answer the question of which gender is more active, it may provide further insight as to how black leaders are formed. This focus on the developmental stage for black youth may lead to a better understanding as to how ideas play out. Literature on activism and engagement will be used to analyze what are the most important themes for activism in black youth. Literature from the lives of select members of the BPP will be used to illustrate the rooted themes for black activism in youth between the genders.

Introduction

The leaders of tomorrow are being formed today. The leadership that is built today has to stand on the foundations of the past. The stakes for this building are raised when it comes to black youth. Society can influence the identity of a black person extremely positively or negatively depending on what is seen heard and understood. Not every experience is positive, however, it is worth examining what the positive and negative experiences are, which can develop a black boy or girl into a leader. With the rise of black activism in the Black Lives Matter movement and presidential elections in 2008, a major question that has been asked is who is leading these movements regarding gender and for what reasons.

Literature Review

When looking at the order of the literature, the intention was to look at activism and engagement for all youth with the work of Pancer et. al, and progressively get more specific to then see what the important factors for black youth were in the work by Hope et. al.
Finally, since there is minimal applicable research for activism in specifically black boys and girls (Hope 467), the final literature looks at major works about each group, and what affects each one's mindset/behavior.

The first level of looking at what is important for activism comes from Michael Pancer and Mark Pratt's study on what distinguishes the activists from the uninvolved. This study looked at adolescents between the ages of 16 and 22. They created a scale called the youth inventory of involvement which asked them questions like "how likely are you to participate in a political campaign" and how likely are you to do community service and based off their answers (scaled from 1-4) this provided a score for each student. These scores were then used to put students into clusters based on their "activism score." They were placed into Activists, Helpers, Responders and Uninvolved.

These were not the only things that the survey measured, however. They used the youth social responsibility scale, which looked at responsibility, the ego identity status, the Lamborn et al Scale and the self-esteem scale. They used these 5 scales to then compare back to the groups to see which ones had the strongest associations (Pancer 745). With the data they had, they found that the most common thing for the activists was the theme of authoritative parenting. This was largely defined as seeing their parents as warm and strict. The next most common things were having higher self-esteem and having a more developed identity (Pancer 751).

Hope et al. conducted a study about what is important for civic engagement for black youth. The participants in the study were around the same age as in the Pancer and Pratt study, and Hope looked at what some of the key activators are for them. What they found was that one of the key activators for black youth was having a critical understanding of the world they were in (Hope 461). This means not only seeing the injustices in the world but having a structural understanding of why inequality exists. A key aspect of this also found that political cynicism had no major effect on how engaged students are (Hope 463). When the youth were prepared to interrogate injustice and inequality, there's a higher chance of them wanting to enact system change. This also meant that having a quality civic education is critical (Hope 462). It was found that when students have a good understanding of their government and history, things become clearer in why things are structured the way they are in American society so they can actively engage with it. This leads to the final critical piece for black students, which is political efficacy. This was understood as the feeling of being able to make a difference in politics (462).

For black boys and men, there are a plethora of things that were influential in development and growth when it comes to life and specifically life as someone active in their community. Much of this had to do with one's matriculation through school. Washington mentions in their article that black men are the least matriculated out of any identity group (20). This is critical because for many, college campuses end up being the training grounds for many activists. Black men typically have a lack of role models for them. The population of black men has been reduced to mass incarceration, violence, and drug abuse, and without them in the community, black boys had significantly more challenging times finding positive influences in the community that can relate to them. For black boys, the schooling process can be particularly disenfranchising, most teachers are white, and an even higher percentage are women, so they are likely to have their assertiveness deemed as aggression in class (22). This "aggression" is usually harshly punished, and it turns many black boys away from continuing in the same way. They are more likely to be diagnosed as mentally retarded or emotionally disturbed, and more likely to be put in the slower classes. The feeling criminalized usually turns out in them talking out in class more and the cycle increases upon itself. This idea can lead to them seeing school as feminine (25).

The last thing is that black boys are how they will respond to this combination of things that affect their lifestyle. Washington continues with the fact that because black boys feel like they have a low sense of control, especially in the classroom, they will resort to putting their energy into things that they can control. This could manifest in being the class clown or looking to be a sports team.

For black girls' women, some of the challenges are the same as men, but with increased risk, and consequences. Patricia Hill Collins noted how outstandingly high the pressure was on black girls and women to perform service work (46). Although it may not necessarily be private domestic work. Black women are still overrepresented in low paying service jobs like nursing assistants or fast food employees. This is all before considering the unpaid physical and emotional labor of running a household. Many black girls and women must help out with the childbearing and raising process, even if they are not mothers. When looking at identities, black women are placed on the "other" half of binaries, which make them inherently seen as subordinate. An example of this is how they are black as compared to white, female compared to male, emotional compared to reasonable, and body-centered compared to mind centered (70). This "othering" leaves them subject to exploitation, particularly sexual. While facing exploitation, black girls and women have a challenge when it comes to beauty standards. Black men are criticized when they are too black, but because they are male, not as much of their identity and self-worth are hinged on it (89). This is different for black girls and women because of the increased emphasis society has on physical attractiveness for all women.

In summary, a few findings from the literature stood out. Parental guidance is the strongest influence in the Pancer et al. is understandable, and at the same time should not be looked over. While still noting that having an identity of self and values/ideas is critical. Hope et. al. illustrated that "knowing the government is bad" is not enough, and the combination of political efficacy, civic education, and an understanding of structural inequality is important. Washington's article highlighted that for black boys, most issues are centered around what may or may not take place in the classroom. Collins offered a different perspective on how black women have to take on their role as black and as women in the world, particularly with them being hypersexualized and what challenges they may face in their double marginalized identity.

These readings show a few rooted themes that come up for both men women and may give room to some differences between black men and women. Parental relationships will be used as the first theme due to its strongest association in Pancer et. al. Education and school perception will be used in the second theme because of Hope et. Al.'s reference to civic education as well as Washington and Collins point to it was relevant in what may or may not be given to black boys and girls. The themes that will be used for analysis will be parental/guardian relationships, education, identity, and understanding of inequality. These four themes will be looked at through the lives of 5 leaders in the BPP.

Analysis
The leaders that were associated with the BPP were chosen due to their significance in African-American culture and the history of the United States. Their individual ideologies, as well as those of the party, have served as the foundation. The party was originally formed to combat police brutality and racism during tumultuous times in the 1960s.

Inspired in part by the teachings of Malcolm X, the group sought to protect black people and empower and lead them to have their own rights. Their free breakfast programs and other grass-root things like clinics were crucial for the people they were around. In their bold approach to stand against, police brutality, the Black Panther Party was known to be armed and willing to fight back when attacked or when people in the community were attacked. Their defense created alarm in the national government which led them to launch a counterintelligence strategy to cause distrust and dismantle the Black Panther Party. Many of the party's leaders did not make it through the time period. Most of the others were exiled or put in jail for extended periods of time.

The leadership in the party is important today because they fought through the toughest of times in the party. Their work stands out to this day as essential to the formative ideas of black activism and social justice movements around the world. For this study, we want to find out how well these concepts applied to the lives of these activists. Elaine Brown was the chairwoman for the Black Panther Party for self-defense, following the flee of Huey Newton. She played a major role in the development of the party's major community service programs, and as chairwoman, she developed the liberation schools.

Huey Newton was a co-founder of the Black Panther Party and for a long time its minister of defense. He held that position until 1974 when he fled to Cuba. After returning to the United States, Newton got his doctorate degree from UC Santa Cruz. Newton was killed in 1989.

Angela Davis was an associate of the party as an assistant professor at UCLA. She became a household name when she was put on the FBI's most-wanted list for allegedly kidnapping and murdering a judge. Her trial was a profile with people across the country putting together money for bail. Davis was later found not guilty. Bobby Seale was also a co-founder of the Black Panther Party and served as chairman until he left the Party in 1974 due to dispute with Huey Newton.

Assata Shakur was involved with the Black Panther Party in Oakland, California and Harlem, New York. In New York, she organized the free breakfast program as well as other programs benefiting the community. After being convicted for murder and later acquitted, she escaped prison and was granted political asylum in Cuba. The four main themes chosen were:

Parental and Guardian Relationships
Pancer et. al. found that the most strongly associated variable with engagement is authoritative parenting. A way that it could be commonly understood is "warmth and strictness" this could be understood as making sense because a parent or guardian has an active guidance role for their child but does not get too close to them whereas the child does not take them seriously. The parents can provide enough reasoning for punishment.

A clear example of this would be in the case of Elaine Brown and her mother Dorothy. Dorothy was a single mother and worked relentlessly at a dress press making factory. She fought hard for Elaine to get into a "good" school to start her childhood off and maintained a hard stance on how important grades were. This stuck with Elaine as she maintained high grades throughout her academic career. At home, Dorothy and Elaine slept in the same bed.

Bobby Seale grew up in a household with two parents, but they were very different. Bobby's father, George was a carpenter and was physically abusive towards, Bobby, his siblings, and his mother. "In Lonely Rage", Seale cited many times where his father would come home and yell at him over things that at the time seemed pointless, like chewing loudly at the table.

Education and School Perception
Many of the activists were pushed strongly by their parents to perform in school. The outcomes of the push varied greatly. Huey Newton notably disliked school at an early age, due to the teachers belittling him and making him feel less valuable than the white children. By the time he hit third grade, Huey and his friends figured out how to manipulate the white children to do the work for them. Huey did not know how to read because he spent so much of his time fighting with teachers. He knew that the problem was the school system; he had no problem with learning. Bobby Seale also believed that school was not necessary for him and he spent his early teens cutting class often.

Identity Development
Assata Shakur shows the clearest situation of identity development and where someone is in the world. She articulates how much she struggled with being poor and black—and having to deal with the overt racism of southern white people while also battling with the covert racism of white ones. She realized because she was a young black woman, people would think she was older than she was and sexualize her. Grandparents were big on personal respect…" who's better than you?" nobody. Was not allowed to play with the alley cats/kids. One thing that was drilled into her head since birth though was that in the education realm, black people were just as good as the whites. Most fights came from being called to black or ugly or something related to anti-blackness, and that's what they believed, being called black was the worst insult in the book. She saw in junior high that all the black kids got put in the slow classes, she loved English and history. She was very aware not to get pregnant when a guy would pressure her to give him some in middle school. Huey Newton credits his father as one of the strongest influences in his life. His father was the ultimate figure he could look up to. Huey called him strong, unafraid of speaking back to white people, and morally sound. The time he spent ministering had a large effect on the value system he had as well. His father's explicit preoccupation with paying bills was also a formidable trait that Huey looked to not have.

Understanding Social Inequality
Angela Davis grew up in Montgomery, Alabama, and went to an all-black elementary school due to segregation. Her family had modest financial stability because both of her parents were employed. As young as second grade, Angela noticed the severity of certain people's situations: at lunchtime, some would be made to sit outside the lunchroom and eat. This plain contrast was something that stood out clearly in the life of Elaine Brown as well. Elaine grew up in North Philadelphia and spent a lot of her childhood in government housing. She could see early that there were a lot of other black people that had a better life than her. As she matriculated through school, she also saw the extent to which white people had "good lives" of luxury.

Discussion

Social justice work does not look like what it did in 1960, but it does still require black men and women that are dedicated, resilient, understanding and smart. The patterns of what shapes black activists should be cultivated in a healthy way so that there is more positive black leadership that can advocate for people fighting all types of inequality, whether it's sexual, racial or economic. This study aimed to identify major themes for activism in the past to see if they possibly may carry through to now.

A noticeable thing from looking at the lives of these activists is the importance they took to certain things in their development. There were key moments in the process that more closely related to the identity development of women that lead to their activism, in particular, the encounters of sexual assault and violence for both Assata Shakur and Elaine Brown. Their experiences had a marked effect on their lives because they had to advocate for themselves as both as black people and women. Their fight was taken with a stage of seriousness earlier even though it was not fully developed.

During second-wave feminism in the early 1960s, the phrase "the personal is political" was popularized. It was a call to acknowledge that the rights of women were being politicized and controlled by men even though it fell within.

This study has shown that for women, understanding that their personal identities are political plays a critical role in their upbringing and activism. Even if it is not large-scale political activism, they know they must defend and advocate for themselves as women and as black people. This study could provide a basis for further study into contemporary examples of the association between gender and activism for men and women. It was conducted with a male/female binary. It does not consider people that are transgender or in different places along the gender spectrum.

This study also focuses on a limited number of leaders, and their upbringing may not be representative of their gender. Someone that is continuing in this area of study should look at how interpersonal relationships affect black activism. There is a plethora of information about black activism and this study serves as an example of how much that can still be unpacked in relation to gender.

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Controlling Optical Properties of Complex Emulsions via *γ*-cyclodextrin Degradation for Colorimetric Sensing Applications

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Abstract

Structural coloration plays an important role in daily phenomena as one of the main mechanisms of color in nature and materials. Complex emulsion droplets consisting of hydrocarbon and fluorocarbon oils have previously been shown to exhibit iridescent structural color via total internal reflection based on the size, shape, composition, and orientation of the droplets.[1] Our study works to further explore the optical properties of complex emulsion droplets and their applications through the use of an enzyme-active surfactant solution composed of α – amylase, γ – cyclodextrin, Triton X – 100 , Capstone FS – 30. We aim to quantize the sensitivity of O/O/W emulsion droplets for colorimetric sensing capabilities and enzyme activity through the correlation of color patterns to droplet shape, size, and volume ratio.

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Introduction

Structural coloration is one of the main modes of color in nature among pigments and bioluminescence. This mode of color arises from micron and nano-structures that are on the same scale as the wavelengths of visible light, which act to diffract or reflect the light impacting them. Structural color is observed in organisms such as peacock feathers,[1] neon tetra fish[2]; in natural phenomena such as glories and rainbows; and in household items such as CDs and DVDs. Goodling et al. have also shown that structural coloration can be caused by monodispersed complex emulsion droplets formed of fluorocarbon and hydrocarbon oils.[3]

Simple oil in water (O/W) emulsions are composed of oil droplets in a larger water continuous phase. The spherical droplets formed are the result of the high interfacial tensions caused by interactions between the two liquids. Without the addition of surface-active agents ("surfactants"), this system would be prone to Ostwald ripening and coalescence. Surfactants act at the interface of substances to lower interfacial tensions between the two phases and allow for the formation of stable emulsion droplets. This provides a gateway to forming more complex systems of O/O/W, W/O/W, etc., which can be made reconfigurable by changing surfactant concentrations.[4]

Goodling et al. utilized reconfigurable hydrocarbon and fluorocarbon double emulsions to generate vibrant colors via the total internal reflection of white light. The total internal reflection mechanism begins with white light impacting the tree way contact point between the two oils and outer water phase. The light then becomes separated according to wavelength as it is reflected at the interface between the two oils and exits at the opposite side of the droplet. Separation of colors depend on the number of reflections that an electromagnetic wave experience. Due to this mechanism, the coloration in these emulsion droplets is heavily reliant on the refractive index match between the two oils, droplet size, shape of the interface between the oils, and the orientation of the droplet.[3]

Enzymes offer remote controllability over these emulsions by continuously changing the curvature of the oil-oil interface. A previous study by Zarzar et al. utilizes interactions between the enzyme α – amylase, the sugar γ-cyclodextrin, and the hydrocarbon surfactant Triton X-100 (TriX), among others, to develop a system that quantifies the enzyme activity.[5] Enzyme responsive surfactant is formed by mixing the Triton X with γ-cyclodextrin, as they form a 1:1 inclusion complex in solution.[6] This complexation process renders the TriX inactive as a surfactant and causes the biphasic O/O/W emulsion droplets to only respond to free fluorosurfactant in solution. The addition of α-amylase causes the degradation of γ-cyclodextrin via hydrolysis, thus freeing the TriX and gradually changing the droplet shape to a hydrocarbon favored phase.[5]

These findings of coloration and enzyme interactions may be combined and utilized to remotely and thoroughly study the continuous impact of droplet shape on the color projection patterns of complex emulsions. It can also give insight into the continuous changing nature of interfacial tensions between the hydrocarbon and fluorocarbon oils and can offer the beginnings of color control in the complex hydrocarbon/fluorocarbon emulsion system. Observation of α-amylase is also useful for the detection of physical and psychological stress in humans and animals.[7,8] For example, alpha-amylase levels that are observed to reach four to six times their reference value (normally 26 – 102 FAU/L in adults) in plasma can be an indication of pancreatitis – inflammation of the pancreas.[9,10]

Methods

Chemicals. All chemicals were used as received. Capstone FS-30 (Cap) and perfluorohexane(s) (SynQuest Laboratories); Triton X-100 and α-amylase from *Aspergillus oryzae* (Product A8220, Batch SLBV4784) (Sigma Aldrich); sodium acetate and hexane(s) (Fisher Scientific); hydrochloric acid, 1N (Ricca Chemical); γ-cyclodextrin (Tokyo Chemical Industry); heptane (VWR International).

Sodium acetate buffer. The sodium acetate buffer solution was formed by adding hydrochloric acid (1N) to an aqueous sodium acetate solution (0.2 M) until the pH of the resultant solution was near a pH of 5.2. The pH was monitored using the Mettler Toledo Seven Compact s220 pH/ion meter. The sodium acetate buffer solution was then used as the standard solution for all subsequent stock solutions of Triton X-100, Capstone FS-30, γ-cycodextrin, and α-amylase.

Droplet fabrication. Biphasic emulsion droplets were fabricated via microfluidics using a 4-inlet 100 micron channel depth hydrophilic glass microfluidics chip (Dolomite). The two inner channels were used for hydrocarbon and fluorocarbon oil flows, while the outermost channels were used for aqueous surfactant flow. Flow channels were connected to reservoirs of desired liquids via 30 inch poly ether ether ketone (PEEK) tubing of inner diameter 0.0025 inches and outer diameter 1/16 inches. Liquid flow within the microfluidics chip was controlled by the Fluigent MFCS-EZ pressure controller. Pressures ranges for the inner and outer channels ranged from 250 – 350 and 2000 – 3000 respectively. Typical inner phases included combinations of heptane, hexane, and perfluorohexane, while combinations of Capstone FS-30, Triton X-100, and γ-cyclodextrin served as common outer phases.

Microscopic Imaging. All transmission photomicrographs were taken with the Nikon Eclipse Ti-U inverted microscope. Droplets orient with the denser fluorocarbon phase downward. To image the side-view of the droplets the containment dish was shaken to induce the droplets to roll onto their side. Then an image was captured with an Image Source DFK 23UX249 color camera. Photomicrographs of droplets in reflection were taken with the Zeiss Axioscope upright reflection microscope at exposures between 5 – 30ms.

Macroscopic Imaging. Samples for macroscopic images or videos were first prepared by filling a 35-mm petri dish lid or 24-well plate with a monolayer of emulsion droplets. All petri dishes and well plates were painted with black acrylic paint to limit reflection from the bottom layer of plastic. For small area illumination, a specific area of the droplets was exposed to a Thorlabs LED light (MWWHF2, 4,000 K, 16.3 mW) fit with a 200 µm-diameter fiber optic cable and collimating lens (CFC-2X-A). For large area illumination, an Amscope LED 50 W light with a collimating lens was used to illuminate the full sample. Images of color projections were collected by placing a hemisphere of a ping-pong ball with a three-millimeter hole in it on top of the sample and illuminating a small area of the sample. Images and videos were collected using a Canon EOS Rebel T6 DSLR camera mounted on an optical table with the light source. Phone images and videos were collected with the Galaxy Note 8 phone camera, and the phone flash was used as the only source of illumination.

Angle measurements seen in text were measured using the optical table or with the Android application Bubble Level (v 3.23) of ±0.1º accuracy. A diagram of ping-pong ball imaging used in this experiment may be observed below in Figure 1.
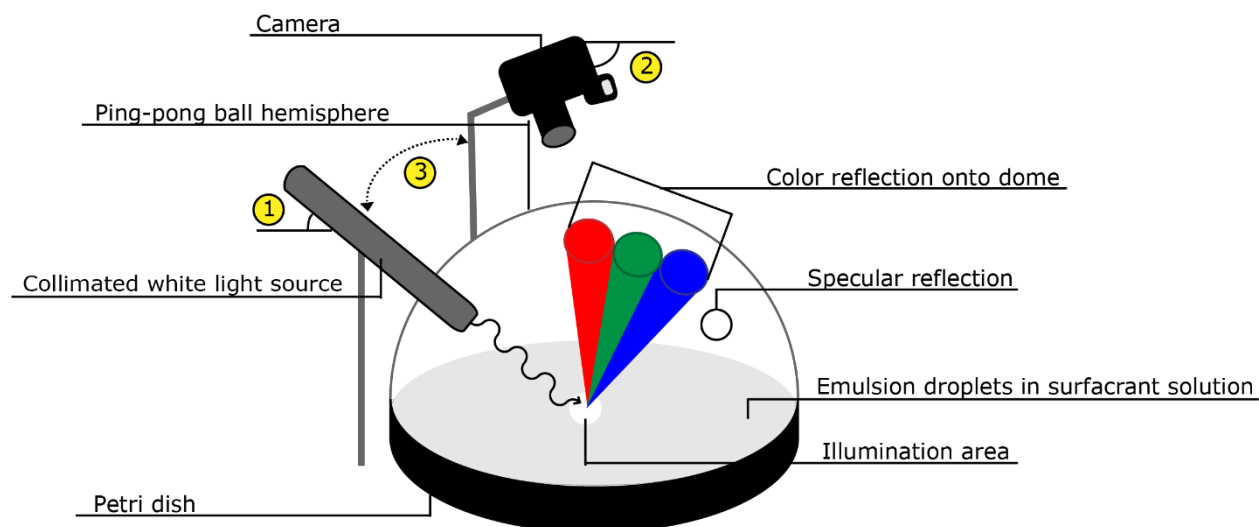

Figure 1. A simplified diagram of the ping-pong ball projection method adapted from Goodling et. al.[3] A ping-pong ball hemisphere is placed on top of a petri dish lid containing emulsion droplets in aqueous surfactant solution. Droplets are illuminated with a white light source and then produce a band of coloration onto the dome. Coloration within the graphic has been limited to the red, green and blue spots for simplification and to prevent obstruction of detailing, as true color order and position patterns vary by droplet shape and size. Numbers 1, 2, and 3 correspond to and define illumination angle (IA), camera angle (CA), and light-to-camera angle (LCA) respectively. Items are not drawn to scale.

α-amylase calibration, detection, and transition. Amylase calibration was conducted by filling two wells of a 24-well plate with one milliliter of 0.2 wt% Capstone FS-30 and then 19 microliters and 24 microliters of 0.2 wt% Triton X-100 to the separate wells. Other wells were filled with one milliliter of 5:1:6 or 5:1:8 ratio by weight of Capstone FS-30: Triton X-100: γ-cyclodextrin (CTγ) with Capstone being 0.2 wt% in concentration for amylase detection or transitions respectively. A monolayer of perfluorohexane (PFH) and 1:1 heptane/hexane by volume emulsion droplets formed via microfluidics was then added to each well. Lastly, detection wells were exposed to 100 microliters of alpha amylase stock solutions ranging from 88.3 - 883 FAU/L and transition wells were exposed to 1 – 5 microliters of 10 wt% amylase stock.

Results and Discussion
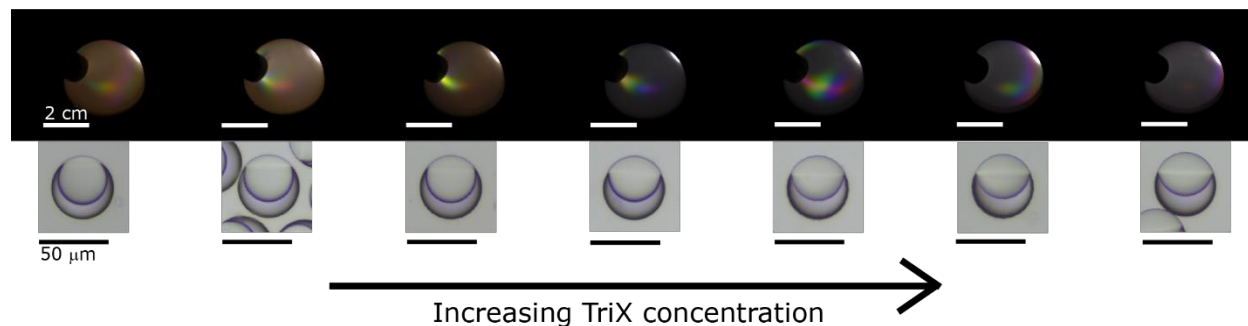
Band position as a function of droplet shape

Figure 2. Summary images of ping-pong ball projections accompanied by corresponding microscopic images of perfluorohexane and a 1:1 mixture of hexane and heptane by volume beginning in 0.175wt% Capstone and continuing with additions of Triton X. From left to right, the Cap:TriX weight percent ratio in aqueous solution decreases causing emulsion droplets to go from a fluorocarbon favored phase to a more hydrocarbon favored phase. This change in droplet shape resulted in changes in the colors projected onto a ping-pong ball hemisphere. Image analysis was conducted for droplet shapes ranging from a fluorocarbon favored phase (no TriX) to a fully Janus phase (12.5 Cap:TriX ratio), however coloration was observed in ping-pong ball projections where emulsion droplets were submerged in surfactant solutions with Cap:TriX ratios ranging from 35.0:1 to 20.5:1. Macroscopic imaging settings: LA – 50º, CA – 50º, LCA – 60º.

Images of ping pong ball projections were taken in series with additional amounts of added Triton X-100 in order to simulate the amylase transition period in sequential static images. Side by side projections may be seen above in Figure 2, where a band of color is visible between the Capstone to TriX weight ratio of 35:1 to 20.5:1. The band is seen to first appear in an area farthest away from the light source. The beginnings of coloration may be seen just as the hydrocarbon phase peeks out of the fluorocarbon shell, which is a more fluorocarbon favored shape than those modelled in Goodling et al.[3] The color band then sweeps towards the light source, and then back out away from the source until no coloration is visible. Changes in the position of the color band are associated with the change in the shape of the emulsion droplet by the three-way contact angle as expected given the findings in Goodling et al. In addition to this, the most vibrant coloration may be seen when the angle of light incidence matches the three-way contact angle. This may be due to a higher probability of incident light rays hitting the three-way contact point in a suitable manor for reflection at that angle.

When emulsion droplets were placed in the enzyme active surfactant solution and exposed to α-amylase, the full color band sweeping motion is visible as the droplet shape changed continuously. The full sweeping motion may be viewed in Movie S1 which exhibits continuous footage of a ping pong ball projection over these emulsions. During the transition, as many as six distinct colors may be seen at any given time. This continuous sweeping motion poses more information about the total internal reflection mechanism for droplet coloration.

Models in Goodling et al. do not currently predict coloration at such a drastic and nearly spherical three-way contact shape. Thus, an updated system of modeling is needed to mathematically predict color patterns at more concave contact points. This additional range of coloration implies that droplets may be more sensitive than orginally documented and have an added area for detection in colorimetric sensing applications.

Color variation as a function of droplet size and illumination angle
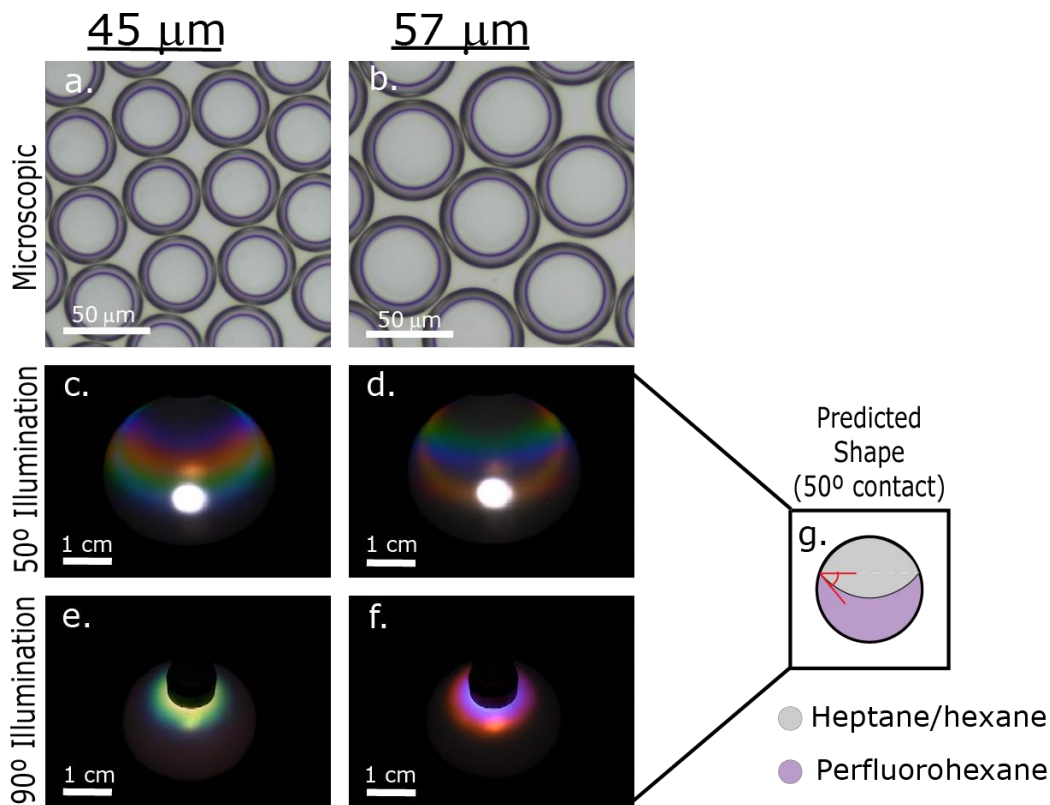

Figure 3. A comparison between droplets of two sizes and their influence of the color projections given off by the droplets. Images in the left-hand column correspond to emulsion droplets that are 45 microns in diameter, while images in the right-hand column correspond to droplets of a 57-micron diameter. Images a. - b. are microscopic top-down view images of PFH and 1:1 hexane/heptane by volume emulsion droplets submerged in 0.2 wt% Capstone in the two sizes specified. Images c. – d. are snapshots of ping-pong ball projections cast by emulsion droplets undergoing an amylase transition at its brightest state and with an IA of 50°. Images and e. – f. are also snapshots of ping-pong ball projections cast by emulsion droplets undergoing an amylase transitions. These images were taken during the same stage of the amylase transition to gain knowledge of color projections at the same droplet shape as images c. and d. at a different IA of 90°. Image g. is a sideview estimation of an emulsion droplet with similar shape to the predicted 50° three-way contact angle. This angle is believed to correspond to the brightest state of the amylase transition in images c. and d., and it is equivalent in measurement to the angle of illumination. Macroscopic imaging settings: CA – 50°, LCA – 60°.

In accordance with the results seen in Goodling et al., coloration varied by droplet size, even during the amylase transition. Figure 3 and Movie S2 show two samples that varied by sizes bordering 50 microns. Emulsion droplets in Figure 3a had a diameter of about 45 microns whereas droplets in Figure 3b had a diameter of about 57 microns. Figure 3c and 2d are snapshots of the amylase transitions of the corresponding samples in Movie S2 at their most vibrant state. Movie 2 shows the full side-by-side amylase transitions at a 50° illumination angle where both samples undergo the same sweeping motion of the color band, however the color order of the band is modified based on the size of the emulsion droplets within the sample.

Angle dependence of color positions on light angle incidence is also expected, and was shown to be apparent in Movie S3, where changing the 50° light incidence to 90° incidence shows a different color pattern and a difference in the origins of the sweeping motion of the color band. As seen in Movie S3, at 90° light incidence the color band originates and remains in a halo around the light source. This halo broadens and thins in a pulsing motion. Both samples exhibit instances when colors in the band do not form a full ring around the light source. This phenomenon may be due to concentration gradients of alpha-amylase in the surfactant solution and further action should be taken to maintain homogeneity in the sample. It was also noted that at a 90° light angle incidence only a maximum of three distinct colors may be seen using the projection method.

The comparatively lower amount of colors visible and continuation of coloration around a single spot on the projection indicates that the 90° illumination angle may be a better viewing angle for simplistic colorimetric sensing. At this angle, color changes are less variable, shorter in duration, and remain vibrant throughout most of the transition. These aspects make tracking simple vibrant colorimetric changes in one area easier for the price of less sensitivity. In using an emulsion system for enzyme activity detection, a clear starting and ending point of the amylase transition should be established. The beginnings of this application and implementation would benefit from the simplicity of recording the time between two distinct colors in the amylase transition, rather than tracking the band position in relation to the light source and color pattern within the band.
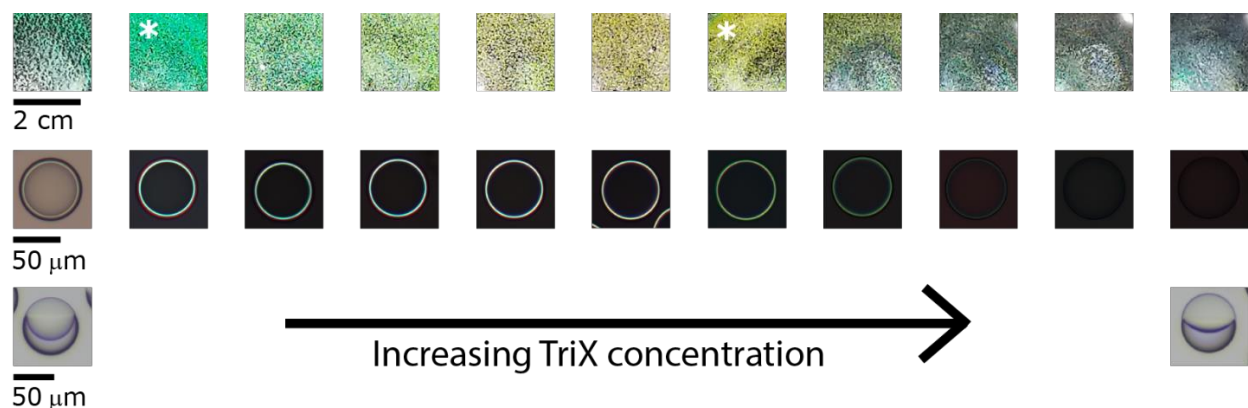
Figure 4. Images relating droplet shape of PFH and 1:1 Hep/hex drops to images see by phone and 10X magnification reflection microscope. Droplets began in 0.2 wt % Capstone and were introduced to higher concentrations of TriX from left to right and images in the same column correspond to the same droplet state (same size and shape). Top row images were captured by phone camera 18 inches above and parallel to the sample. This row displays the macroscopic effect of the emulsion droplets when imaged with phone flash in a light environment. Asterisk markers were placed on images with most saturated coloration and serve to mark suitable stages for the beginning and end points of amylase transition tracking. The middle row of microscopic images was collected via reflection microscope where vibrant coloration may be seen to radiate from the three-way contact ring of emulsion droplets. Coloration in this ring closely resembles coloration exhibited macroscopically in phone images in the top row. Bottom row images exhibit a microscopic sideview of emulsion droplets at the beginning and end of the TriX concentration range tested.

In response to viewing emulsion projections at 90° incidence, phone images and videos were taken of the amylase transition and simulation with the phone flash serving as the illumination source. Static phone images were taken with the phone remaining parallel to the sample and compared to microscopic reflection and transmission images of the emulsion droplets, as seen in Figure 4. Coloration found in phone images closely match coloration of the three-way contact ring of emulsion droplets in the reflection microscope studied. This congruence indicates that both of these methods are equivalent in color detection possibilities. The direct imaging of the illuminated area in such a manner also allows for color information to be collected that would not otherwise be visible in the ping-pong ball projection, as the light source blocks this area in that method. A full amylase transition recorded by phone may be seen in Movie S4.

Phone and microscopic reflection imaging, when in focus at the center of the sample, usually yielded coloration limited to one color. This provides a more simplistic view for colorimetric sensing than the methods previously tested with ping-pong ball projections and opens pathways for comparatively easy computer automated color matching in regard to the other methods tested. This also method allows for amylase detection by recording the amount of time it takes for emulsion droplets to go from its most vibrant color state to another color.

These states, as an example are marked with asterisks in Figure 4 and correspond to a specific surfactant concentration of TriX and Capstone. Trials were expected to differ in color due to possible changes in droplet size and volume ratio in each droplet batch.[3] To combat this, each trial was calibrated by placing droplets in surfactant solutions of know concentration for the beginning and ending states to serve as a reference.

Controlled alpha amylase transition (from first instance of color to no color) times at room temperature (27 °C) ranged from 5 – 40 minutes in the 88 – 883 FAU/L range tested with time trials ranging from 2 – 18 minutes between calibrated color states. In order to further calibrate the limits of detection of the emulsion droplets, more time trials of the amylase enzyme should be conducted at 37 °C between activities from about 10 to 800 FAU/L in order to derive a continuous function for the relationship between enzyme activity and stage transition time. This is in accordance with body temperature and should increase the efficiency of the enzyme. Thus, trials will run more quickly, and less sample will be needed to achieve similar results.

Conclusion

A more comprehensive range of coloration in fluorocarbon/hydrocarbon emulsion droplets was explored via enzyme responsive surfactant solution. All findings in Goodling et al. were upheld with additional information found about the beginning stages of coloration in perfluorohexane and 1:1 hexane/heptane by volume droplets. Future studies should work to continuously correlate droplet shape with color band position by performing more detailed static image analysis at smaller changing increments in Triton X-100 and Capstone FS-30 ratios. Straight-on 90° illumination offers less color sensitivity than glancing 50° illumination angles, with three colors being projected during the amylase transition at 90° illumination when compared to a maximum of 6 colors at 50° illumination. This position of illumination while using a phone flash and camera allows for the beginnings of simple α-amylase detection via colorimetric calibration. Alpha-amylase activity ranging from 88 – 883 FAU/L were detected at stage transition times ranging from 2 – 18 minutes. Future studies should be conducted to determine the limits of detection of the emulsion droplet system. This may be done by performing more time trials to gain better knowledge of amylase activity and stage transition time dependence for field testing applications.

Supplemental Information

Supplementary images and all videos may be found in a Box folder found at the url: https://psu.app.box.com/folder/84795564653. All video descriptions and parameters may be found below.

Movie S1. Ping-pong ball projection of perfluorohexane and 1:1 heptane/hexane emulsion droplets after alpha-amylase was added to the drops in CTγ aqueous solution. Light incidence: 50º Camera angle: 50º Light-to-camera angle: 90º Video duration: 07 mins 06 secs at 25x speed.

Movie S2. Side by side view of ping-pong ball projections of perfluorohexane and 1:1 heptane/hexane emulsion droplets after alpha-amylase was added to the drops in CTγ aqueous solution. Light incidence: 45º Camera angle: 65º Light-to-camera angle: 180º Video durations: 07 mins 30 secs at 25x speed Left: Droplets in sample are 45 µm in size Right: Droplets in sample are 57 µm in size.

Movie S3. Side by side view of ping-pong ball projections of perfluorohexane and 1:1 heptane/hexane emulsion droplets after alpha-amylase was added to the drops in CTγ aqueous solution. Light incidence: 90º Camera angle: 65º Light-to-camera angle: 180º Video durations: 07 mins 30 secs at 25x speed. Left: Droplets in sample are 45 µm in size Right: Droplets in sample are 57 µm in size.

Movie S4. Phone video of perfluorohexane and 1:1 heptane/hexane emulsion droplets after alpha-amylase was added to the drops in CTγ aqueous solution. Phone angle: 90o Phone Height: 5 inches above sample Video Duration: 05 mins 30 secs at 30x speed.

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Gender Attitudes in Liberia: The Sirleaf Administration

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Abstract

As the first woman president in Liberia and in Africa the effectiveness of Ellen Johnson Sirleaf's administration had come into question. How much has her gender affected attitudes toward her? While gender attitudes can create a negative spotlight for female politicians, within the post-war Western African context it can be seen as a positive. I show that when taking into account Model 1 and Model 3 in Table 1 gender attitudes show that women predict evaluations of Sirleaf at 0.111 and 0.112 times higher than men on a scale of 1-5. This implies that gender is not largely significant factor when assessing Sirleaf.

Introduction

In January of 2006, Ellen Johnson Sirleaf was sworn in as head of state for Liberia. She was the first modern female president on the African continent and in Liberia. Her election was particularly noteworthy as Liberia is poor and female executives are typically associated with more economical stable countries (Inglehart and Norris, 2003).

While Sirleaf proved to be a supported candidate largely during her time as head of state, African societies are still highly patriarchal. This introduces questions of how women as leaders are viewed in these male dominated communities. This research aims to answer the question of how Liberian citizens assessed the Sirleaf Administration (2005- 2018)? Is there a correlation between how women are viewed in Libera and how the people viewed Sirleaf as the head of state?

This study proposes three theories (1) Gender attitudes had a negative influence on how Liberian citizens assessed Sirleaf. (2) Gender attitudes had a positive influence on how Liberian citizens assessed her. (3) Gender attitudes had no influence. The results Liberians are voting based on Sirleaf's ability to perform as president, with no correlation between gender and gender attitudes and their opinion of Sirleaf. The findings of this study were contradictory to the existing literature on the ideals of women in politics, which generally show that there is a gap between men and women where women are usually under represented (Fraile & Gomez, 2017).

Theory

This study proposes three theories (1) Gender attitudes had a negative influence on how Liberian citizens assess the administration of former president. (2) Gender attitudes had a positive influence on how Liberian citizens assess the administration of former president. (3) Gender attitudes had no influence on how Liberian citizens assess the administration of the former President.

When considering gender in society, it is common for societies to be led by men, also known as patriarchal societies. This type of community is also common in West Africa, where men control most aspects of life such as social, financial, and political (Grewal, 2013). These patriarchal views allow for the creation of stereotypes were men are dominant, stronger, and smarter. Men and boys are expected to lead and women are expected to exercise less power. These ideals transfer to politics because men are usually the individuals that control the working aspects of civilization which is attributed to their access to political knowledge (Fraile & Gomez. 2017). This can also be seen in the Afrobarometer Round 5 (2011) which support how women are more then often treated unfairly by courts and police[2].

Gendered attitudes within politics are found all over the globe, even in democratic societies. These attitudes can be negative which can lead to biases that bar women from entering political spheres; these attitudes can be severe enough that countries have responded with gender quotas, which force gender representation in elected government. which have led to gender quotas. The presence of gender quotas can be taken as a sign that policymakers recognize societal bias against female candidates. Since many African countries have gender quotas, this suggests that women are a marginalized and their accomplishments in politics are not well known (Bauer, 2012).

In most sub Saharan African countries, women are the marginalized group in social settings and this extends to politics. In regards to African women in the political sphere, the number had increased to women holding 22.4 percent (IPU, 2014) in national legislation, and while this number exceeds the national average of 21.8 percent (IPU, 2014) this is still a lower percentage of women in government. This is an ongoing trend in specific countries such as Uganda 17.6 percent, Rwanda 56.3 percent, and Tunisia with 26.7 percent of women in legislation and a wide range of African countries implementing legal measures to allow more women to enter into government (Bauer, 2012). This trend seems to be on the rise particularly in war-stricken country such as Liberia.

Some studies analyzed how male and female candidates are represented in the media, one in particular focused on the 2006 political campaign in Liberia in which the difference in media representation between Ellen Johnson Sirleaf and her running opponent, George Weah (Anderson, Diabah, & hMensa, 2011). The researchers pulled excerpts from articles in various news sources such as *The Washington Post*, *The New Zealand Harold*, *BCC News*, *CNN*, and *The Ghanaian Times*. Within these articles, reporters focused mostly on Sirleaf was a "mother, grandmother, and widow" even when speaking about her educational background and political platform while Weah's personal life as a husband and father are never reported (Anderson, Diabah, & hMensa, 2011).

In this context, identify with these titles of "mother, grandmother, and window" could create the idea that Sirleaf is not fit to lead the country because her roles as "mother, grandmother, and widow" are of more importance and she is more dedicated to the expectations of these titles, then leading the country.

These biases sometimes manifest themselves in media and harp on the idea that women are ineffective leaders, do not belong or are a novelty in politics. Clothing and style are two componence that are usually discussed when covering Sirleaf especially after she was elected as president. News reporters refer to her style positively and attributing her clothing to her national identity while there are not articles that directly address Weah's attire at all (Anderson, Diabah, & hMensa, 2011). While the reference is positive, in mentioning Sirleaf's clothing in the reports it takes away from the issues she may have been addressing or focuses less on her education and experience (Anderson, Diabah, & hMensa, 2011) which could work to strip her authority as a leader for the viewer.

All of this seems to support the first theory introduced in the study: (1) Gender attitudes had a negative influence on how Liberian citizens assess the administration of former president, Ellen Johnson Sirleaf.

However, there is also reason to believe that gender may have worked to her advantage, particularly in the Liberian context. While the bias ascribed to women can extended negatively to politics, women especially Sirleaf, could use these biases to propel their political platforms. Ellen Johnson may have been able to utilize the image of "womanhood" and "motherhood", two terms that are not usually synonymous with leadership, to win two consecutive elections (Moran, 2012). This ideal is completely different from the claims of (Bush, 2011) which focus on the use of quota implementation. In the study, Moran explores the implication of political affiliated women whom identify with these roles, also known as "motherist" politics (Van Allen, 2001).

Moran (1989) explains the constructs that defines a woman in West African context such as giving birth and being a mother, which are enforced not only by the men but also women "for their physical protection and for the protection of their own sets of values and definitions" (Moran, 1989). A commonality in Grebo culture is to have complementary political leadership roles where the male and female elders that compose a council and judge issues within the society, the female council is referred to as "bio nyene". This term translates loosely to head of state, which means that in this space women can be leaders which is highly dependent on their status as a mother and woman, but this power is extends solely to issues involving women (Moran, 1989). As explained by Moran (1998) women with this society are utilizing their womanhood to further issues that only affect women not all of society.

As stated before, in traditional West African societies it is not uncommon for women to be leaders, specifically dealing with the problems that impact women but this has transition to more modern governments particularly in post war societies like Liberia. Rwanda is one example of this, women's organizations within Rwanda have taken a leading role in rebuilding society and the lives of women (Burnet, 2008). In Rwanda women's organizations became an integral part of the political sphere from 1994-2003, their work included rebuilding networks for families that were torn apart, build social support systems that were formerly lost, and helped the vulnerable people of Rwanda. Women are more likely to fund programs and pass laws that deal with society building and social welfare (e.g., Bolzendahl & Brooks, 2007).

Also, women's movements and involvement usually changing current gender relations and allow for a return to politics (Hughes & Tripp, 2015).

All of this particular literature stands to support the second theory introduced in this study: Gender attitudes had a positive influence on how Liberian citizens assess the administration of former president, Ellen Johnson Sirleaf.

The literature that has been provided before has been contradictory stating the negatives and positives associated with women and leadership, but some literature suggests a balance between to the two extremes, also known as dual-sex societies. This "dual-sex" society allows women to control affairs concerning women (Okonjo, 1976). These duties are practiced in a traditional context, when practiced and applied to state politics, the idea of the "mother" or "grandmother" begins to a line with leadership and power. According to Sofola (1998), "the dual-sex system of socio-political power sharing fully developed by African peoples and based on the following perceptions of womanhood 1) as the divine equal of a man in essence, 2) as a daughter, (3) as a mother; (4) as a wife". This explanation frames womanhood as an advantage instead of a downfall which is the reason female leaders continue to be of value particularly in Western African societies.

This type of dual-sex political system could be seen in the Yorba tribe which is located in Western Africa, where the tradition describes the female King, Oba and other influential women with in the culture. Women such as Ivalode Aniwura and Morenike who served as political leaders in their tribes and saved their people from war through political diplomacy are also important in Yorba history (Ikpe, 2004, pp. 19-28; Agaba, 2007, pp. 73-89; Aiyede, 2007, pp. 182-199, Ojiakor, 2009, pp. 142-151). While I have explained this type of system when discussing motherist politics (Van Allen, 2001), within the context of dual-sex societies explained by Sofana (1998) women can govern for issues that affect both men and women, not just women alone. This literature provides insight of pre-colonial African leadership hierarchy were gender is not a detriment.

The idea of dual-sex societies, along with the negative biases that bar women from politics, and the positives that propel women's political platforms causes contradiction. This contradiction leaves space to wonder which of the two extremes will describe the correlation of gender attitudes in politics in Liberia. The literature on women in politics expresses contradiction as stated before, which leads to the third theory proposed in this study: Because West Africans are used to seeing both women and men in positions of equal power, gender attitudes had no influence on how Liberian citizens assess the administration of the former President, Ellen Johnson Sirleaf.

Methods

In this study, data collected from Afrobarometer Round 5 (2011), will be examined in order to test how gender attitudes on women effect how Liberians viewed the Sirleaf administration. The data used in this study focuses on public attitude surveys with topics related to politics, government, economy, and overall society within Liberia. The sample size of this data is chosen randomly and consist of 1,200-2,400 participants with a sampling margin error of =/- 2.8% - 2.0%. The participants are given in person interviews. The subjects who participate in the study are of legal voting age, which is 18 in Liberia.

To determine whether gender is affecting attitudes toward Sirleaf, I looked for a relationship between gender attitude and evaluations of Sirleaf's performance. Specifically, I use a question that asks voters men only as leaders vs. women leaders ok. If Sirleaf's gender is affecting how people see her, we should see a correlation between how voters perceive her and how they feel toward powerful women in general. Similarly, to the extent that women are less biased against other women, there should be a correlation between respondents' gender[1] and their attitudes if their assessment of Sirleaf is gendered.

To ensure that I am not inadvertently picking up the effects of other variables correlated with gender attitudes, I control for age, partisan, education, living environment such as city or rural, socioeconomic status, gender, and ethnicity focusing particularly on the ethnicities that are closely related to Sirleaf such a Gola and Mandingo. In Model 2, I add controls for food and water insecurity, trust of the ruling party, corruption, and women empowerment and in Model 3, I add unfair treatment of women by traditional leaders, unfair treatment of the courts and police, and honesty. These controls isolate respondents' perceptions of outcomes and policies under Sirleaf, which allow evaluations of Sirleaf's presidency to be correlated with specific aspects of her performance.

Women leaders in this chart represents the question inquiring if responds prefer men or women leaders. Treatment in the chart refers to question of how often women are treated unequally by traditional leaders. Empowerment refers to how people handling empowering women. Courts and police treatment refer to the question of how often are women treated unequally by the police. Food insecurity ask respondents how often do they go without food and water insecurity refers to how often respondents go without clean water. Both of these questions control for the socioeconomic status of the respondents because those who are poor generally will often go without food and water.

Sirleaf linage suggests that she is from the Gola tribe so this study controls for respondents who answer that they are part of the Gola ethnic group/tribe. Education in the chart asks for the respondent's highest level of education which ranges from no formal schooling secondary/high school completion. Party trust in the data chart is the question which ask respondents how much they trust the current ruling party. The question of how corrupt respondents believe the president is, is stated in the chart as corruption.

Honesty relates to measuring how honest respondents are when answering the survey's questions, this measurement is at the discretion of the interviewer. Those who live in urban areas of Liberia as opposed to the rural areas, have different types of access to government which is why this variable was included in the data chart. Respondents were asked whether they lived in rural or urban setting. Age in the chart accounts for the age of the respondents.

Table 1: Afrobarometer Round 5 2011

	Model 1	Model 2	Model 3
	Presidential Performance		
Women as Leaders	0.056* (0.024)	0.021 (0.023)	0.013 (0.024)
Rural	0.016 (0.054)	0.005 (0.051)	-0.008 (0.052)
Female[1]	0.122* (0.055)	0.087 (0.052)	0.111* (0.053)
Gola Tribe	-0.359** (0.136)	-0.301* (0.129)	-0.391** (0.134)
Education	-0.000 (0.005)	0.001 (0.004)	0.006 (0.005)
Age	0.008*** (0.002)	0.005* (0.002)	0.004 (0.002)
Food Insecurity		-0.028 (0.023)	-0.029 (0.023)
Water Insecurity		-0.033 (0.020)	-0.028 (0.021)
Trust Ruling Party		0.314*** (0.023)	0.313*** (0.023)
Corruption		-0.135 *** (0.031)	-0.123*** (0.032)
Empowering Women		0.049 (0.026)	0.053* (0.026)
Tribal Leader Treatment of Women			-0.054** (0.018)

Courts and Police Treatment of Women[2]			-0.013 (0.025)
Honesty			-0.181 (0.109)
Constant	2.259*** (0.125)	2.114*** (0.162)	2.255*** (0.170)
N	1124	1004	923
Standard errors in parentheses * $p<0.05$, ** $p<0.01$, *** $p<0.001$ DV: Presidential Performance OLS Simple Regression			

The regression chart above shows the answer data from the questions that were important pertaining to this study.

Results

The regression model illustrates that when the participant's gender is female the only two models that show significance is the first which controls for women as leaders, rural living environment, age, level of education, and Gola tribe affiliates. It can be concluded that when taking into account the first and third regression models gender attitudes show that women predict evaluations of Sirleaf at 0.111 and 0.112 points higher than men on a scale of 1-5. While this is significant, the value of gender is less significant than the other figures in Table 1.

The regressions show that there is substantial relationship between gender and assessment of presidential performance, there are other variables that exhibit a stronger relationship when measured against presidential performance and control for all of the other variables, which include individuals who identify as being a part of the Gola tribe, trust of the leading party, corruption, treatment by traditional leaders. This can be concluded because the values of coefficient for each of these values are higher than that of the value of gender[1].

In the third model when measuring Gola tribe affiants while holding constant all of the other variables, the value is -0.391, which explains that those who are of Sirleaf's tribe have a negative assessment of her. This could suggest that Sirleaf may not be providing the Gola community with extra resources or funding.

The next significant variable is trust of the leading party which is highly significant, especially when control for all the other variables in the chart. The value is 0.313, this most significant regression model within the chart which can suggest that when Liberians support a leader, they are more concerned with the party the leader is a part of as oppose to any other factors.

The last regression model for corruption when holding all other variables constant produce a value of -0.123. The negative relationship suggests that those who believe Sirleaf is corrupt will not support her, while it is only in relation to gender, this is a significant value and the assumption can be made that Liberian people are not afraid to speak out against the government. This purposes that Liberia may be moving progressively towards democracy because citizens are open to using their freedom of speech.

In conclusion, as stated before, the regression supports that gender bias does not largely influence how people assess Sirleaf's performance. This means that Liberian people are voting on the president's ability to perform, which is also supported by the negative relationship between the president performance and corruption, and the positive relationship between trust of the leading party and presidential performance. This research answers the questions of the relationship of politics in gender/ gender bias within the country which contradicts pervious ideals of women in politics.

This study also provides a different type of research on a leader that is completely new. Sirleaf's administration ended in 2018 and as stated prior she is the first female president in Africa. Studies on female leaders specifically at the presidential level is limitedly available making this study important in assessing women at high levels of leadership.

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The Relationship of Mindfulness and Meaning in Life Among College Students

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Abstract

This paper theorizes the relationship between mindfulness and meaning in life during the collegiate years. Experiencing meaning is a vital developmental task during early adulthood; finding innovative ways to cultivate college students' meaning in life is an imperative practical challenge for colleges and universities today. This exposition provides a conceptual framework regarding how these two psychological variables, mindfulness and meaning in life, may be related to each other. This paper describes specific processes that link these two variables. A review of the empirical evidence for the linkage between mindfulness and meaning in college students is performed. Based on this review, a future research study is proposed that directly examines this association in a sample of first-year college students, half of whom participated in a course designed to teach them mindfulness and thereby, improve their sense of meaning and flourishing in life.

Key Words: mindfulness, meaning in life, college students, conceptual review

Introduction

      Can being more mindful help young people find more meaning in life? – How are mindfulness and meaning in life related during the early years of college, and why? This essay explores these questions and describes potential mediating processes that explain why mindfulness and meaning in life may be related. Whereas some scientific studies have found that there is a moderate positive correlation between mindfulness and meaning in life (e.g., Allan, Bott & Suh, 2014; Baer et al. 2008), no studies have empirically identified *why* mindfulness and meaning in life are related. Why they are related in college-aged students is explored.

Social Significance

      The college years are an important time to explore issues of meaning in life. This age group, sometimes called emerging adulthood, is a distinct period between ages 18 and 29 (Arnett, 2014). Emerging adulthood is a theorized to be dynamic period of life that differs from adolescence and adulthood (Arnett, 2000). Research on emerging adulthood has focused a lot on young people who attend college in industrialized societies of the West. Thus, this work is relevant at The Pennsylvania State University.

The relationship between mindfulness and meaning in life is important during emerging adulthood because at this time because young people may experience a loss of meaning in life due to various stage-specific factors. Jeffrey Arnett (2000) states that, "emerging adulthood is a time of life when many different directions remain possible, when little about the future has been decided for certain, [and] when the scope of independent exploration of life's possibilities is greater for most people than it will be at any other period of the life course" (pp. 469). Emerging adults have personal responsibilities, but the strength of these obligations might be less than in other life stages (Arnett, Žukauskienė, & Sugimura, 2014). The majority of young people between the ages of 18 and 29 do not believe that they have reached full adulthood yet, and many are searching for purpose and meaning in their personal, social and professional lives (e.g., Damon, 2010). In a broader context, there is little institutionally and culturally imposed structure on young people in the United States as they make the transition into adulthood (Schulenberg et al., 2004). Although the lack of structure and life facilitation can promote greater self-selection of life paths, it can also leave room for uncertainty and lack of purpose.

Finding purpose and meaning in life is a salient task of young people and the lack of its discovery may result in poorer mental health. Youth is a formative period of cultivating a sense of purpose, but culture does not always teach young people about meaning and flourishing. Traditional categories of youth purpose, such as family, community, faith, work, and country, may seem obsolete to today's youth. Young people have their worldviews dominated by parents, teachers, counselors, peers, the media, and influential others (Mariano & Going, 2011), but it is at the critical age of emerging adulthood that they have to begin deciding on what is meaningful to themselves. Emerging adults begin to personally entertain meaning and future-oriented questions for the first time in a serious manner. Educational and media influences may no longer support such purposes (Damon, Menon, & Bronk, 2003). Feelings of living in between concrete age groups might elicit feelings of depression and anxiety in some emerging adults, especially those who believe they should feel more adult at their current age than they actually are (Arnett et al., 2014). Emerging adults in contemporary culture may lack a sense of meaning in their lives during this central period of growth. Their mental health could also be affected by this ever-changing culture and its views on the growing population of young people.

A focus on mindfulness and meaning during college is also important because a lack of mindfulness and purpose may be part of what is a mental health crisis among emerging adults both during and after the transition to college today (Hibbs & Rostain, 2019). Developmental transitions, representing major life changes within individuals' social roles and contexts, can contribute to declines in college students' mental health (Schulenberg, Sameroff, & Cicchetti, 2004). For instance, anxiety and mood disorders are prevalent during the emerging adult years. Generally, feeling anxious or depressed is common during emerging adulthood (Arnett et al., 2014). Such mental health conditions take people away from the present moment (e.g., anxiety relates to worrying about the future, depression relates to worrying about the past). Rumination, absorption in the past, or fantasies and anxieties about the future can pull one away from what is taking place in the present (Brown & Ryan, 2003).

Attentional distractions now saturate the lives of emerging adults unlike previous generations. Emerging adults may often find themselves without adequate social support, leading them to rely on social media to obtain validation virtually (Arnett et al., 2014). Relying on social media for validation allows people to distract themselves from reality which may isolate them from their true thoughts and feelings. Absorption in social atmospheres online can cause people to evade the present moment and lose sight of what is meaningful in their lives.

Mindfulness trainings and interventions may be able to mediate the sense of meaning in life. By knowing themselves, their values, and passions through mindfulness, they may be better able to pursue activities and actions that lead to a meaningful life. A core characteristic of mindfulness has been described as *open* or *receptive* awareness and attention (Brown & Ryan, 2003). Meaning in life may happen when one has a sense of coherence in their life. There are relatively few studies about this topic, but there are implications that mindfulness can help lead to mediating processes that may alleviate a loss of meaning in life. More studies are needed to popularize mindfulness and cultivate meaning in life in early college students.

Conceptual Model

Why might mindfulness improve meaning in life? In this section, I define mindfulness and meaning more clearly and explore how mindfulness may lead to greater meaning in life through mediating processes (see Figure 1). Specifically, I propose that mindfulness *teaches* people to pay attention, decenter, and broaden their attention. This mindful state of attention then can serve various functions such as emotion regulation and meaning making. Mindfulness practices may then *allow* people to engage in mediating processes that are related to meaning in life, including emotion regulation, reappraisal and making meaning, and saving the positive aspects of experiences. By fostering positive reappraisals and positive emotional experiences, mindfulness may generate deep eudemonic meaning that promotes resilience and engagement with a valued and purposeful life (Garland et al., 2015). The ability to make meaning out of life's moments may come from possessing the skills to react to stimuli in one's life in a new and refreshing way.

Definitions of Mindfulness

Mindfulness can be defined through two components proposed by Bishop et al. (2014): 1.) the self-regulation of attention so that it is maintained on immediate experience, allowing for increased recognition of mental events in the present moment, and 2.) the adoption of a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance. In a different approach, mindfulness is conceptualized as serving five functions: observing experience, describing experience, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience (Baer et al., 2008). This helps explain how present-centered attention that is curious, open and accepting may be helpful in emotion regulation for instance, through non-judgment and non-reactivity.

Definitions of Meaning in Life

Viktor Frankl (1959) argued that people function best when they perceive a sense of meaning and possess a life purpose, a unique mission to strive for throughout their lives (Steger, 2012). Meaning in life can be defined as the extent to which people comprehend, make sense of, or see significance in their lives.

Sometimes, this definition also includes the notion that meaning in life is reflected in people's strength and intensity of desire and effort to establish and/or augment their understanding of their lives (Steger, Frazier, Oishi, & Kaler, 2006). In Park and Folkman's (1997) conceptual model, meaning has two components: 1.) global meaning and 2.) situational meaning. Global meaning refers to the most abstract and generalized level of meaning. This entails people's basic goals and fundamental assumptions, beliefs, and expectations about the world. Situational meaning refers to the interaction of a person's global beliefs and goals and the

circumstances of a particular person-environment transaction. Situational meaning involves the appraisal of person-environment transactions, which in turn influences how people cope with the demands of those transactions and their outcomes. Situational meaning has three major components. 1.) appraisal of meaning – the initial assessment of the personal significance of specific transactions between the person and the environment, 2.) coping processes – the processes in which people search for meaning once a situation has been appraised as stressful, and 3.) meaning as outcome – the meaning that the person makes in the aftermath of an event; meaning as outcome is a potential product of coping efforts (Park & Folkman, 1997). Mindfulness might clarify meaning through reappraisal and reflection on outcomes after the fact.

Mediating Processes Between Mindfulness and Meaning in Life

Mindfulness may increase meaning in life through various mediating processes. Mindfulness may affect meaning after (e.g., reflecting) something happens, during something happening (e.g., the present moment), and before (e.g., planning) something happens. For instance, Shapiro, Astin, and Freedman (2006) proposed that the three axioms of Intention, Attention, and Attitude (IAA) that are the building blocks of mindfulness may lead to greater meaning in life by paying attention, following intentions, and being open to experiences. Similarly, the Mindfulness-to-Meaning Theory (MMT) is a temporally dynamic process model of mindful positive emotion regulation that elucidates downstream cognitive-affective mechanisms by which mindfulness promotes health and resilience (Garland & Fredrickson, 2019). The MMT has two primary, empirically tractable hypotheses regarding processes that mediate between mindfulness and meaning: 1.) reappraisal and 2.) savoring (Garland and Fredrickson, 2019). Positive reappraisal through mindfulness is not intended to recast negative experiences as positive. The process of positive reappraisal that stems from mindfulness involves broadening the scope of one's appraisal to appreciate that even adverse experiences are potential personal transformation and growth. Reorienting one's reaction towards adverse experiences, provides a chance to make a meaning out of stressors and break maladaptive cognitive habits (Garland, Farb, Goldin, & Fredrickson, 2015). Thus, mindfulness may promote meaning by facilitating turning toward challenge and difficulty in life and seeing new lessons therein.

Other hypotheses that detail what mindfulness allows people to engage in are highlighted. 1.) Be authentic – bring attention and awareness to oneself to clarify personal values, and intentionally align one's behavior with personal values to confer meaning in life because people are their authentic selves. 2.) Engage with suffering – increase the threshold of understanding suffering. Instead of pushing suffering away or becoming over-identified with it, people are able to make meaning out of suffering. This connects back to the idea of non-reactivity in mindfulness practices. Struggles are a part of everyday life and people are more likely to make meaning instead of shying away from, rejecting, or refusing to come to terms with suffering. 3.) Seek pleasure wisely – understand that chasing certain pleasures are only short-term fixes, and chase meaning instead. In this instance, mindfulness helps us discover long-term happiness and understand short-term happiness. The source of happiness lies not in the object but in attitude towards its conditions.

<u>Evidence of Associations</u>

This section describes considerations in the existing scientific studies that have examined the relationship between mindfulness, meaning in life and possible mediating processes. In a study (Pearson, Brown, Bravo, and Witkiewitz, 2014) with 1,277 participants – comprised of a Southeastern university students and Southwestern university students – with mean ages of 21.95 (SD = 5.45) and 20.71 (SD = 4.31) respectively. Pearson et al. (2014) found that trait mindfulness was moderately associated with higher decentering (β=.31, *p* < .05), which was moderately associated with a higher perceived purpose in life (β=.40, *p* < .05). Bloch, Farrell, Hook, Van Tongeren, and Penberthy (2015) conducted a study with 205 participants, with a mean age of 20.69 (SD = 1.61), involving mindfulness and meaning in life. Time 1 analyses revealed that the presence of meaning was positively correlated with all five factors of mindfulness: observing (r = .17, *p* < .05) describing, acting with awareness, non-judging of inner experience, (r = .32, .26, .26, respectively, *p* < .01), and non-reactivity to inner experience (r = .19, *p* < .05). Based on Mindfulness-to-Meaning Theory (MMT), Hanley & Garland (2014) conducted a study with 101 participants, with a mean age of 22 (SD = 5.64), and found that dispositional mindfulness was significantly related with self-reported positive reappraisal (β = .31, *p* < .01), a key process of meaning making.

The Self-determination Theory (SDT), suggests that mindfulness may lead to greater authenticity, which in turn leads to increased meaning in life (Allan et al., 2014). In a study with 305 participants, with a mean age of 19.37 (SD = 1.40), Allan et al. (2014) found that mindfulness was significantly correlated with meaning in life (r = .23, p < .01) and all four components of authenticity: awareness, unbiased processing, behavior, and relational orientation (r = .33, .45, .34, and .30, respectively, p < .01)). Meaning in life was also significantly correlated with all four components of authenticity, as well: awareness, unbiased processing, behavior, and relational orientation (r = .52, .19, .35, and .29, respectively, p < .01). However, the relationship between mindfulness and meaning in life was no longer significant once all four components of authenticity were included in the model as mediators. Awareness was the only component of authenticity that positively mediated the relation (r = .49, p < .05), and unbiased processing negatively mediated the relation (r = -.14, p < .05) between mindfulness and meaning in life. Increased self-awareness may explain the positive relationship between mindfulness and meaning in life.

Relatedly, Schlegel, Hicks, Arndt and King (2009) conducted a study with fifty-nine participants, with a mean age of 19.11 (SD = 1.12), involving their true/actual self-concepts and meaning in life. True self and meaning in life were significantly correlated (r = .34, *p* < .01).

The correlation between mindfulness as a state and meaning in life is consistent with studies linking mindfulness to purpose in life and psychological well-being; meaning in life positively correlates with well-being outcomes and negatively correlates with indicators of poor well-being (Allan et al., 2014). King, Hicks, Krull, and Del Gaiso (2006) conducted a study with 568 participants, with a mean age of 20.91 (SD = 2.00) and found that general positive affect was significantly related to general meaning in life (β = .53, p < .001).

Mindfulness-based interventions consistently have positive outcomes, suggesting that increased mindfulness is related to decreases in psychological symptoms (Baer et al., 2008). Galla (2016) conducted a study with 132 youth, with a mean age of 16.76 (SD = 1.48), who participated in a meditation retreat. Within-person change in mindful attention was associated with significant reductions in perceived stress and rumination and increases in positive affect.

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By improving wellbeing, mindfulness may indirectly support meaning making as individuals move out of a "narrow and protect" mode of functioning. Thus, mindfulness may promote meaning through improved wellbeing.

<u>Summary/Discussion</u>

This essay conceptually reviewed how mindfulness and meaning in life are related in emerging adults in college. Mindfulness and meaning in life were defined, evidence for why emerging adulthood is a critical period of life for many young people in today's culture was featured, and potential mediating processes were discussed. Current scientific literature does not yet know how and why mindfulness and meaning in life are related during the period of emerging adulthood. Finding out how these variables are related may have practical implications for education and prevention services. It is essential to research and understand how meaning in life can be present in the lives of young people and fostered by mindfulness practices.

The main hypothesis behind this review was that practicing mindfulness gives people a conscious space of awareness and ability to gain insight into self, others and life. As a form of receptive awareness, mindfulness may create a space where one is able to view their cognitive and behavioral options, rather than solely reacting to interpersonal events in repetitive patterns. Awareness to present experience, regulating the focus of attention, observing, and attending to one's thoughts, feelings, and sensations from moment to moment may all provide opportunities for making meaning in life. All thoughts, feelings, and sensations that arise are seen as relevant and are to be observed. This leads to an alertness of what is occurring and is often described as a feeling of being fully present and alive in the moment. In addition, the commitment to maintaining an attitude of curiosity associated with mindfulness, that stance of being non-judgmental and non-reactive, provides additional opportunities for making meaning in one's life. While there is empirical evidence that mindfulness and meaning in life are positively correlated, a comprehensive theoretical model that explains the relationship of mindfulness and meaning in life has not yet been fully tested empirically.

More research is needed to test a full model of mindfulness, mediating processes, and meaning in life. A future study will be conducted involving an analysis that directly tests the mindfulness and meaning in life conceptual model. A sample of first-year college students who took The Art and Science of Human Flourishing, a class that taught them mindfulness, meaning in life, and other topics related to human flourishing, will be used in this study. Students in this class will be compared to a matched set of controls who did not take the course. The data includes the constructs of mindfulness and meaning in life – the responses of the students will be analyzed and compared to matched controls in terms of positive change in these constructs over time, and in terms of the strength of their association with each other over time in the two groups (treatment, control). The Art and Science of Human Flourishing provides one quasi-experimental study that will tell us more about how we can increase both mindfulness and meaning during this key transitional period in the lifespan.

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Figure 1.

Mindfulness → **? Mediating Processes** → **Meaning in Life**
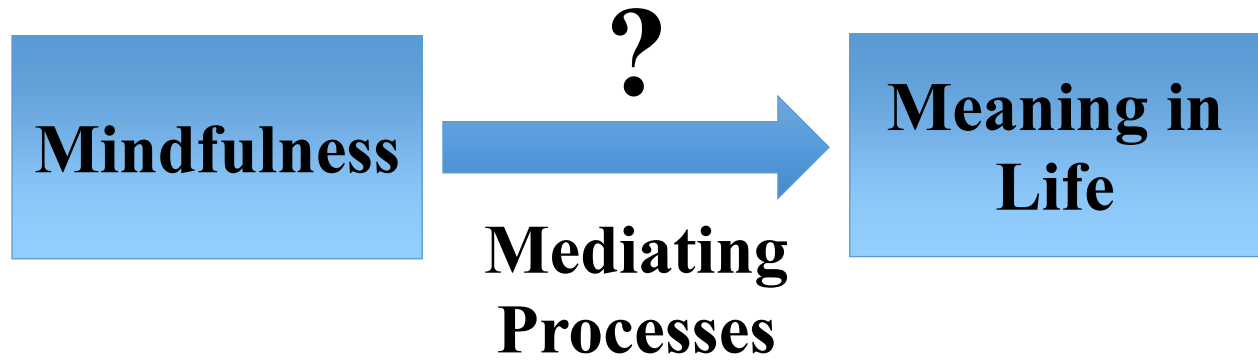
A model of mindfulness and its relationship with meaning in life; arrow denotes mediating processes.