Unlocking Young Minds: An Examination of Minority Mental Health in the Juvenile Justice System

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UNLOCKING YOUNG MINDS: 
AN EXAMINATION OF 
MINORITY MENTAL HEALTH IN 
THE JUVENILE JUSTICE SYSTEM

Brandie Bentley
Dr. Yvette Colón, Mentor

ABSTRACT

A substantial number of minority youth in the juvenile justice system have mental health issues, and many do not have access to necessary mental health services and support. This paper is an extended review of literature that examines present racial disparities in the juvenile justice system and further, explores the disproportionate racial and ethnic differences in mental health service utilization prior to, during, and after involvement in the corrections system. Additionally, this paper will discuss contributing factors that influence minority youth interaction with mental health services, including federal policy, community resources, and socioeconomic status. Based on the findings of this research, recommendations for future research regarding young offenders from racial and ethnic minority backgrounds and their needs for mental health resources and support will be offered.

Keywords: mental health, juvenile justice system minority, racial disparities

INTRODUCTION

The juvenile justice system works both to correct behavioral issues and foster positive outcomes for young offenders. In working holistically to improve the condition of youth, the juvenile justice system also attends to the mental health needs of this population, and at times is the first opportunity for these young people to receive mental health services (Watson, Kelly, & Vidalon, 2009). Correctional facilities are expected to provide offenders with minimum psychiatric care; however, reports suggest
that youth involved in the system are profoundly underserved in areas of mental health (Abram et al., 2015).

The treatment of individuals with mental health issues in correctional institutions dates back to the 1700s. When examining the criminal justice population, an individual with mental illness is categorized “either by having a history in the year before incarceration of being diagnosed, hospitalized or treated for a mental disorder, or by meeting DSM criteria for a disorder based on a diagnostic interview” (Child Mind Institute, 2015, p. 10). The Treatment Advocacy Center states that from 1770 to 1820, individuals with mental illness in the United States were routinely confined in prisons and jails (Torrey et al., 2014). Because this practice was regarded as inhumane and problematic, until 1970 such persons were alternately confined in hospitals. After 1970, however, we returned to the earlier practice of confining individuals with mental illness in correctional facilities. This is a reoccurring issue that is gradually gaining attention due to the recognition of the importance of treatment of those with mental illness in prisons, as well as an identified need for an increase in community-based mental health services and resources.

According to Adams and Ferrandino (2008), mentally ill inmates now comprise a substantial portion of the prison population, and evidence suggests that both the size of the population and the seriousness of their illnesses are increasing. Problems associated with incarcerating individuals with mental illness include jail and prison overcrowding, the presence of behavioral issues that are disturbing to other prisoners and correctional staff, the common victimization of prisoners with mental illness in disproportionate numbers, the deterioration in the psychiatric condition of inmates with mental illness as they go without treatment, jail and prison suicides in disproportionate numbers, and disproportionate rates of recidivism (Torrey et al., 2014).

The incarceration of those who are mentally ill is a systematic problem that affects both inmates with mental health issues as well as others involved with the criminal justice system, such as correctional officers, and both sides are often left powerless and forced to choose between few very insufficient options. Torrey
et al. (2014) explained that although correctional officers are neither equipped nor trained to do so, they are typically required to house hundreds of thousands of seriously mentally ill inmates. In many cases, they are not even able to provide inmates with proper psychiatric medication. The use of other options, such as solitary confinement or restraining devices, though sometimes seen as necessary, may produce worsening symptoms in inmates (Torrey et al., 2014). When things go wrong, as they often do, prison and jail officials are given the blame.

All sectors of the corrections system, including the juvenile justice system, are impacted by this issue. Underwood and Washington (2016) state that in the 1990s, many states saw a reduction in mental health services for children, and many communities began using the juvenile justice system as an alternative option for treatment. These researchers also assert that the U.S. juvenile justice system has moved away from a particular focus on punishing, towards providing a rehabilitative model of care. As a result, “an increased reliance on youth corrections systems to care for the mental health or other specialized needs of youth offenders has developed” (Underwood & Washington, 2016, p. 2).

Underwood and Washington (2016) write, “Estimates reveal that approximately 50 to 75% of the 2 million youth encountering the juvenile justice system meet the criteria for a mental health disorder, and approximately 40 to 80% of incarcerated juveniles have at least one diagnosable mental health disorder” (Underwood & Washington, 2016, p. 2–3). In addition to the large percentage of youth in the juvenile justice system that identify as having mental health issues, youth of color are disproportionately impacted. In 2001, the surgeon general released a report on mental health that identified racial/ethnic disparities in mental health service use as a major public health problem, coupled with ongoing racial disparities in mental health care (Office of the Surgeon General, 2001).

Although mental health issues are a present concern across all racial and ethnic groups, considerable disparities exist in the mental health system. Further, racial and ethnic minority populations, including African Americans and Latinos, are both
significantly less likely to utilize mental health services, compared to Whites (Fong, McRoy, & Dettlaff, 2014). These disproportionate rates exist beyond access and utilization, and according to Fong et al. (2014), racial disparities are present in all of the following areas: need, availability, access, utilization, appropriateness, and outcomes of services. By falling victim to various practical, cultural, and environmental contributing factors, the likelihood of having an untreated and/or undiagnosed mental health concern is high in communities of color. Research shows that due to various external and cultural factors, youth from minority backgrounds, such as African Americans and Latinos, tend to have low rates of utilization of mental health services prior to and during their involvement in the justice system (Watson et al., 2009).

The United States has developed numerous federal and state policies with the goal of improving the condition of the mental health system. According to Algeria, Perez, and Williams (2003), policies including the Americans with Disabilities Act (ADA), the Mental Health Parity or Equal Coverage Laws, and Mental Health Benefits in the Affordable Care Act all attempt to transform the mental health system by recommending equal opportunities and additional insurance coverage for mental health disorders. These laws also regulate health insurance, provide reforms in Medicaid and Medicare regulation, and include employer-based mandates such as mental health parity (Algeria et al., 2003). Through reform, mental health services have increased and may continue to grow, but overall, these policies do not explicitly identify and address the needs of ethnic minority populations. Though these policies are in place, they in large part only impact individuals who have mental health care insurance coverage, leaving many minority individuals without the care they require. Without receiving appropriate care, minority individuals with mental health concerns are overrepresented among the poor, homeless, and criminal justice populations, and their mental health needs continue to go unrecognized, undiagnosed, and untreated.

Schaefer and Stefancic (2003) assert that because mentally ill offenders do not receive necessary and proper treatment while being incarcerated, and incarceration exacerbates their symptoms, many professionals have declared that jail is no place for offenders...
with mental health issues, and have criticized the criminal justice system for having no alternative to incarceration. Desai, Falzer, Chapman, and Borum (2012) state that often there is an association between mental illness and delinquent behavior, and if mental health concerns are addressed and appropriately treated, this may result in delayed entry into the juvenile justice system and even reduce recidivism. In order to combat present disparities and increase the level of mental health resources and support for racial and ethnic minority juvenile offenders, it is vital to analyze the factors that contribute to this ever-growing issue. Not only is it essential to examine internal and cultural factors, but it is equally critical to examine the environmental and systemic influences that work to either motivate or discourage young minority offenders from receiving mental health resources and support.

LITERATURE REVIEW

Influential Factors

A high level of mental health disorders exists among young minority offenders, and significant evidence suggests that the mental health treatment needs of youth involved in the juvenile justice system are not being met (Liebenberg & Ungar, 2014). In addition to this, researchers assert that ethnic minorities, in most cases African American and Latino detainees, receive significantly fewer mental health services prior to incarceration in comparison to their White counterparts (Abram et al., 2015). Liebenberg and Ungar (2014) add that when young offenders are either incarcerated or being supervised in the community, they do not receive proper referrals and interventions to address the mental health challenges they may face. The lack of mental health service utilization prior to, during, and post involvement with the juvenile justice system sets many minority youth up for increased risks of undiagnosed and untreated mental illness, and also unfavorable outcomes that may result in an increased likelihood of recidivism.

Individuals with mental illness from all backgrounds represent a vulnerable population, facing barriers such as a lack of comprehensive services and the high cost and social stigma associated with mental illness (Fong et al., 2014).
However, an individual from a minority background faces a double marginalization as both a person of color and a person with mental illness. With these preexisting barriers coexisting with culturally specific challenges, it is particularly difficult for minority populations to access and receive adequate mental health treatment. Youth are an extremely vulnerable population, as service utilization is influenced by recognition of need, typically by an adult caregiver; it has been found that parents from minority backgrounds are less likely than Whites to identify and seek help for their child’s mental health issue (Gudiño, Lau, Yeh, McCabe, & Hough, 2009). Youth must rely on their personal and familial education and understanding of their challenges; thus, their utilization of mental health services is impacted by both the personal perceptions and beliefs of their surrounding family unit.

Minority youth face a unique set of barriers and systematic obstacles, and there are various contributing factors that work to influence their willingness to receive mental health services. Abram et al. (2015) defined these factors as, “poverty and poor education, inadequate health insurance and ineligibility for Medicaid, racial/ethnic minority status, a history of arrest, and a small social network” (p. 7). Additionally, culturally specific challenges faced by minority populations seeking mental health treatment include different cultural perceptions about mental illness and well-being, racism and discrimination, a greater likelihood to be uninsured, cultural differences in help-seeking behaviors, language and other communication barriers, and personal perceptions and attitudes (Simmons School of Social Work, 2015). In addition to access barriers, fear and mistrust of mental health services exists among racial and ethnic minority populations. This general mistrust of physicians and psychiatric professionals results from a combination of factors, including the profession’s historic Eurocentrism, practitioners’ cultural bias, the stigma surrounding mental illness, the patient’s past experiences of medical abuse, and adverse experiences with medication (Atdjian & Vega, 2005).

Garland et al. (2005) found significant racial differences in the likelihood of youth receiving various mental health services. Figure 1. illustrates the rates of any reported mental health service use for Non-Hispanic White, Latino American, and African
American youth, ages 6–18, involved in one or more of five San Diego County public sectors of care, including alcohol and drug abuse, child welfare, juvenile justice, mental health, and public school special education services (Garland et al., 2005). Interviews to gather reported information were taken between late 1997 and early 1999. Figure 1. illustrates the significant differences across racial/ethnic groups for the use of outpatient, informal, and any mental health service, but not for 24-hour-care services. Twenty-four-hour-care services include residential treatment center/group home services, inpatient care in a psychiatric hospital or psychiatric unit within a hospital, and in-patient alcohol and drug abuse treatment (Garland et al., 2005). According to Garland et al. (2005), there was no overall effect of race/ethnicity on likelihood of use of 24-hour-care services, both before and after controlling the effects of various predictors. Overall, the results of this study highlight the presence of racial and ethnic disparities in mental health care utilization for vulnerable youth (Garland et al., 2005).

Figure 1. Rates of any reported mental health service use for Non-Hispanic White, Latino American, and African American youth, ages 6–18 (Garland et al., 2005).

Abram and colleagues (2015) examined how young offenders’ personal thoughts and attitudes may deter them from receiving mental health services. In order to gain a deeper understanding of the interpersonal factors that contribute to mental health service usage, Abram’s team of researchers conducted a longitudinal study of 1,829 young people detained at the Cook County Juvenile Temporary Detention Center in Chicago (CCJTDC), and surveyed the detainees’ personal
perceptions about mental health services. The survey sample included respondents between the ages of 10 and 13 or older than 14, who were either processed as a “juvenile” or as an “adult.” Similar to detainees nationwide, the majority of offenders in the CCJTDC are male and most belong to racial/ethnic minority groups, with 77.9% of the population identified as African American, 16% Hispanic and 6.1% either non-Hispanic white or “other” (Abram et al., 2015). Researchers used the Service Utilization and Risk Factors interview and surveyed youth who had a history of or were currently using mental health services. The study evaluated specific barriers, including “a belief that the problem would go away or could be solved on one’s own, being unsure of the right person or place to get help, difficulty in obtaining help, concern about what others would think, and worry about cost” (Abram et al., 2015, p. 4).

The results of this study indicate that the two most common beliefs among young offenders were that they could independently solve their mental health issues, or that their issues would disappear, and secondly, that young offenders were not sure how to go about receiving assistance and contacting outside resources (Abram et al., 2015). One of the most significant findings of the study was that 31.9% of African American youth and 35.9% of Latino respondents stated that they did not have a mental health concern, versus 11.7% of the non-Hispanic White respondents (Abram et al., 2015). Less than 0.5% of both the African American and Latino males surveyed had received services outside of school before being in the detention center, in comparison to 83.1% of the Non-Hispanic White male population (Abram et al., 2015). Abram and colleagues conclude that even in meeting the criteria for mental illness, many of the surveyed youth claimed they did not have mental health issues and felt there was no need for a mental health service referral, as they were confident in their independent ability to seek out and acquire services. The findings of this research also suggest that internal factors had less of an impact on the present racial disparities in mental health service utilization among this population. However, external factors such as a lack of minority service providers, poverty, and sociocultural barriers may be more prominent contributing factors to the racial disparities in service use (Abram et al., 2015).
Youman, Drapalski, Stuewig, Bagley, and Tangney (2010) conducted a study on 414 White and African American inmates held in a metropolitan area county jail. The researchers examined the level of mental health treatment the inmates received prior to and during incarceration. Results from this study indicated that while African American inmates were much less likely to have access to and participate in mental health treatment prior to being in jail, while incarcerated, few sought treatment, even when it was available (Youman et al., 2010). These findings suggest that if there were a greater level of access to community mental health services prior to incarceration, racial disparities in mental health treatment utilization may possibly be reduced (Youman et al., 2010). The results of this study imply that the correctional system can capitalize on an individual’s receptiveness to receive mental health services while incarcerated, as elevated symptoms are so prevalent.

Youman et al. (2010) also assert that cultural differences between Whites and minority populations might also help to explain racial disparities in mental health treatment utilization prior to incarceration. When providing mental health services, it is essential to examine how individuals from diverse backgrounds respond to challenges and tailor solutions and services to their personalized needs. Practitioners must possess cultural competency, for it is critical to recognize the pivotal role that culture plays in mental health, the recognition of mental illness, and the availability of mental health services.

Diagnosis Bias

Receiving an accurate diagnosis of a mental health disorder is a factor that creates disparities in mental health care for minority juvenile offenders. Mizock and Harkins (2011) examined the disproportionately high rates of “conduct disorder” in young African American and Latino populations and showed how over-diagnosis in this area has implications in both mental health practice and the juvenile justice system. “Conduct Disorder” is defined in the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000) as a recurring set of behaviors that are harmful to others and must include 3 or more of the following
criteria to be present within the past 12 months to qualify for the diagnosis: aggression to people and animals, destruction of property, deceitfulness or theft, and serious rule-breaking or defiance. Symptoms must persistently interfere with functioning in academic, social, or occupational roles. The diagnosis of Conduct Disorder is characterized by antisocial behavior and is a prerequisite to the adult diagnosis of Antisocial Personality Disorder (Mizock & Harkins, 2011, p. 244).

Mizock and Harkins (2011) report that behavioral symptoms are often mislabeled as “conduct problems,” resulting in inappropriate treatment. Instead of being directed to mental health services, youth of color are more commonly seen as delinquents and thus receive improper referrals and diagnoses. Mizock and Harkins (2011) show that there is a prevalence of youth with conduct disorder diagnoses in the juvenile justice system, and the American Academy of Pediatrics (2001) found that juvenile detainees of color who were diagnosed with conduct disorder were more likely to receive formal prosecution and harsher punishments than White American detainees.

Limited community mental health resources may also lead to minority youth being diagnosed with conduct disorder (Mizock & Harkins, 2011), and behavioral problems associated with mood or anxiety disorders are often overlooked. For example, adolescents with obsessive-compulsive disorder may exhibit strong opposition to rigid rules in the classroom and at home; children with bipolar disorder as well as ADHD may engage in destructive behavior, and those with social anxiety disorder often refuse to attend school and may express defiance toward teachers in the school setting (Mizock & Harkins, 2011). Such actions are responses to underlying mental health concerns but are instead identified as a need for behavioral correction. Since many of these behaviors are displayed in an academic setting and attributed to defiance and insubordination, minority youth are disciplined in schools at disproportionate rates. Gudiño and colleagues (2009) state that in schools, African American students are far more likely than non-Hispanic Whites to receive severe disciplinary penalties for similar behavioral offenses. These behaviors may be caused by trauma and other external factors, and a response
including proper mental health evaluations should be considered. In most cases, school officials and other adults label these actions as behavioral problems, and a common response is for the youth to be disciplined while the underlying mental health problem may go undiagnosed and untreated.

Rawal, Romansky, Jenuwine, and Lyons (2004) examined the potential differences in mental health needs and service utilization among White, African American, and Hispanic youth involved in the juvenile justice system. These researchers found that mental health needs were apparent across the entire sample; however, differences in the types and severity of needs, depending on race, were present (Rawal et al., 2004). Rawal et al. (2004) report that Hispanic and African American youth displayed significantly more severe symptoms of conduct disorder and criminal delinquent behavior than that of White youth. Conduct disorder is connected to externalizing traits such as antisocial behavior, impulsivity, and compositionality, and for youth of color, an expression of these behaviors more often leads to involvement in the juvenile justice system, rather than to mental health services (Rawal et al., 2004).

Underwood and Washington (2016) assert that mental disorders such as affective, psychotic, anxiety, disruptive behavior, and substance use disorders are common among youth in the juvenile justice population. The symptoms of these disorders increase the youths’ likelihood of engaging in aggressive behaviors that may lead to arrest (Underwood & Washington, 2016). Factors such as low socioeconomic status, violence, and experiences with racism at an individual and systemic level—all issues commonly faced by racial and ethnic minority youth—may enhance risk factors for conduct problems and mental health concerns. In identifying the impact of such factors, practitioners should differentiate between conduct problems and mental health concerns and work to provide appropriate diagnosis and treatment (Mizock & Harkins, 2011).

**Internalized and Externalized Symptom Expression**

Hoeve, McReynolds, and Wasserman (2014) state that although there are high levels of mental health needs in the juvenile
justice population, in comparison, service access is generally low. The researchers conducted a study to examine the factors that determine who receives mental health and substance abuse service referrals, and whether there is a link between service referrals and juvenile recidivism (Hoeve et al., 2014). The study found that, “about 75% of those with either substance use disorder, with or without another disorder, or with comorbid disruptive behavior and an internalizing disorder, such as depression or anxiety, received service referrals. In contrast, only about 40% of those with internalizing disorder alone received referrals” (Hoeve et al., 2014, p. 385). These results also suggest that there is an under-identification of those with internalizing issues such as depression and anxiety, and often this population’s needs are not properly addressed. In the study, mental health status, measured with the V-DISC, was available prior to making decisions about service referrals; however, internalizing mental health issues still remained unmet (Hoeve et al., 2014, p. 385).

To further explore the differences in service utilization, Gudiño and colleagues (2009) examined ethnic and racial disparities present in youth mental health service use based on problem type (internalizing/externalizing). Similar to the findings of Hoeve et al. (2014), these researchers also found that internalized issues often go untreated, and additionally, White youth are much more likely to receive services in response to internalized symptoms than youth of color (Gudiño et al., 2009). Externalizing mental health behaviors, including oppositional defiant disorder and conduct disorder, are more likely to receive mental health attention than internalizing behaviors (Gudiño et al., 2009). In a longitudinal study of high-risk youth, Thompson (2005) reports that 7% of children with internalizing problems received mental health services, whereas 22% of those with externalizing problems received services. Externalizing problems are generally more disturbing to others and are more readily identified by parents and other adult figures, while internalized symptoms cause more personal distress for the individual (Gudiño et al., 2009). For youth of color, externalizing behavior quickly receives certain diagnoses and services, resulting in an overrepresentation of youth of color in both special education and juvenile justice programs (Gudiño
et al., 2009). The findings suggest that minority youth may have serious internalized mental health needs going unmet, while there may be an over-identification and referral of externalizing behavior (Gudiño et al., 2009).

**Disproportionate Minority Contact**

Along with the contributing factors that impact racial disparities in mental health care among young offenders, systemic influences also aid in the overrepresentation of youth of color in the juvenile justice system. Disproportionate Minority Contact (DMC) refers to both the overrepresentation of minority populations in the criminal justice system, as well as the disproportionate rates of arrest, detention, and disposition among minorities in comparison to the general population (Desai et al., 2012). Desai et al. (2012) reported, “Whereas minorities comprise 34% of the total population under 17 years of age in the United States, they make up about 62% of those charged in juvenile court, and African American youths are detained at five times and Hispanics at two and half times the rates of Caucasian youth” (p. 33). Studies focused on DMC have reached four conclusions about the causes and consequences of DMC in the juvenile justice system: (1) DMC is manifested in every phase of the justice system, and it is also present in almost every geographic region in the United States; (2) there may be underreported cases of DMC due to inconsistent data gathering on race and ethnicity; (3) DMC is a persistent phenomenon, and it is steadily increasing; and (4) DMC “has yet to be accounted for in full by either social factors or the nature and extent of criminal activity, or some combination of both, as evidenced by the perseverance of DMC when controlling for legal and extralegal factors” (Desai et al., 2012, p. 33).

**Working Towards Change**

Not only do young people with multiple mental health issues have a higher likelihood of committing an offense, but evidence also suggests that co-occurring mental health issues are connected to increased rates of recidivism (Liebenberg & Ungar, 2014). In an effort to work towards change, there are various approaches to
address these issues within the correctional system and to lower the current racial disparities in juvenile justice and mental health.

One approach is to implement procedures for reducing DMC. Cabaniss, Frabutt, Kendrick, and Arbuckle (2007) examined strategic elements that have been found to be effective in reducing DMC in the juvenile justice system, including “decision-point mapping and data review, cultural competency training, adding more community-based prevention and intervention programs as detention alternatives, removing decision-making subjectivity through standardized screenings and protocols, reducing barriers to family involvement, and cultivating state leadership to legislate system-level change” (p. 395). Their results indicate that documented success is usually a result of combined approaches, versus utilizing one single approach to reduce DMC (Cabaniss et al., 2007).

Shaefer and Stefancic (2003) recommend the use of diversion programs with a goal of reducing recidivism, treating individuals with mental health issues, and implementing proper discharge procedures that include sufficient follow-up care as means of decreasing recidivism. Mental health training for corrections officers generally tends to be infrequent; however, research suggests that ongoing training has the potential to bring considerable rewards in terms of improved facility management (Adams & Ferrandino, 2008). Because the justice system is often the first interaction many youth of color have with mental health services, it plays an important role in the identification and referral of youth for appropriate care (Underwood, Warren, Talbott, Jackson, & Dailey 2014). Underwood et al. (2014) suggest that mental health screening and assessment must be done in a culturally competent manner that addresses the ethnic, linguistic, and cultural identities of incarcerated youth. The juvenile justice system should also prepare youth for transition back into their communities by connecting them to community-based mental health services that can provide proper aftercare (Underwood et al., 2014). As a result, patients and their families may learn how to better navigate the mental health system, receive access to services, and manage their mental health needs.

Mental health policy must work to recognize and combat the environmental factors that impact individuals and their
mental health. Social determinants of health—the conditions in which people live, learn, work, and play—are directly connected to an individual’s overall well-being (Centers for Disease Control and Prevention, 2015). Housing, education, and socioeconomic status influence the access individuals have to proper care within their community. Racial minorities experience low socioeconomic status disproportionately in terms of income, occupation, and education, and this stress has been significantly associated with mental health (Fong et al., 2014); improved housing conditions and education have a direct effect on mental health by increasing safety and community resources and by also strengthening one’s ability to cope with adversity and experience a sense of control over one’s life and future outcomes (Algeria et al., 2003). By implementing strategies that address both environmental and cultural influences, policy could actively work to decrease racial disparities in the mental health care system.

Placing an emphasis on providing culturally inclusive, community-based mental health services will provide an environment with improved access to comprehensive mental health services, prior to and post involvement, for youth in the juvenile justice system. When examining the connection between receiving services and rates of recidivism, findings support the idea that mental health service access has a positive impact, and when young people receive mental health services, recidivism is decreased or prevented (Hoeve et al., 2014).

CONCLUSION

Efforts to properly care for minority young offenders with identified mental health concerns are in need of support. Although there are both state and federal policies in place to create and disperse mental health resources, youth from racial and ethnic backgrounds with criminal involvement are more likely to go without receiving such support. The implications of untreated mental health problems are vast and complicated, and mental health services, or the lack thereof, have a substantial impact on the lives of incarcerated youth of color. We are in need of improved mental health care services and resources that are culturally
sensitive and specifically focused on the unique needs of young ethnic and racial minority offenders. In proposing solutions that properly address the disparities discussed above, greater access to comprehensive services, and a potential decrease of racial disparities in mental health care may be achieved.

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DEVELOPMENT OF BIOSENSORS FOR SMALL ENVIRONMENTAL TARGET MOLECULES USING CE-SELEX

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ABSTRACT

Microcystin is a naturally occurring liver cyanotoxin that can be found in water bodies around the world. Cyanobacterial blooms occur worldwide and can potentially contaminate municipal drinking water supplies with various toxins. These events are hazardous, naturally occurring processes that can be worsened by anthropogenic activities. The past 50 years have shown notable changes in global climate, likely due to environmentally detrimental human activities. Our environmental impacts have increased the frequency and severity of these events in the past decade. Developments in water quality control and maintenance have greatly reduced exposure to contaminated water, but current methods to detect microcystin are expensive and take several hours to complete. Aptamers are single-stranded DNA sequences with a high affinity to bind to a specific target. A simple to use, aptamer-based method could reduce water quality testing time and cost and allow more frequent testing by quality technicians and consumers alike. Selection of aptamers can be done using an in vitro selection process, Systematic Evolution of Ligand Exchange, combined with capillary electrophoresis.

INTRODUCTION

Humans live on continents, which are geologically temporary dry patches in a world of water. Our continents have always been impermanent when contrasted with the seemingly ever-abundant presence of water. Water and life on earth are linked as cycles that drive each other, and the vitality of every culture and civilization pivots on the development and maintenance of
methods for collecting and utilizing water. Human populations increase as technology develops, but our water needs have become even more crucial to our survival. Through innovation we have been able to utilize water from the earth’s vast oceans, small streams, and the water trapped in deep underground aquifers.

**Math Matters**

Life on Earth should be untroubled in the pursuit of water, considering the abundance of this resource. However, a mere 3% of the earth’s water is freshwater. Most of the freshwater is locked up in ice and in deep aquifers, leaving less than 1% of the freshwater in easily accessible surface waterways. Oceans cover 70% of our planet and contain 97% of the earth’s water, but not a single drop is fit for our immediate consumption. Less than 0.1% of the water on earth is potable surface water; yet this is what keeps over 7 billion of us alive.

**Water Contamination**

**Municipal water contamination**

Municipal water treatment has significantly improved our ability to operate as a functioning and healthy civilization. Water treatment typically involves filtering out organic matter, sanitizing common bacterial contamination, and regulating the concentration of ions present. Public water sanitization allows us to trust that we will not be harmed while using municipal water and, in the United States and other developed countries, we can trust public sanitization the majority of the time. Regardless of Americans being avid consumers of water, utilizing 80–100 gallons a day (USGS, 2016), not including the water needed for food production, very little can be actively done to regulate and ensure the safety of the water we consume. Boiling water is not a common practice for Americans, unless bacterial contamination has been detected and reported to the community. Personal carbon filtration is more common among higher socioeconomic status consumers, where municipal water sites are better regulated than in lower socioeconomic communities (Koskei et al., 2013).
water testing kits can be costly, inaccessible, and have significant room for user error. The truth is that communities with fewer resources to test their water for safe consumption are more prone to experience water contamination (Yang et al., 2013; United States EPA, 2015). There is a need to give people the power to test their water in a simple and affordable way.

**Small molecules as environmental contaminants**

An environmental contaminant is a potentially harmful substance in the soil, air, or water. These substances can be produced anthropogenically or naturally and introduced deliberately or accidentally into the environment. Environmental toxins have the potential to cause cancer, disrupt endocrine functions, or generally harm human biological functions at various levels of severity. Environmental toxins can be relatively small molecules such as volatile organic compounds, pharmaceuticals, mycotoxins, and cyanotoxins. The vast range of environmental toxins reflects the importance of sustaining a healthy local and global ecology. Not only are monitoring and regulating toxins important, but having the ability to perform these tasks with speed, efficiency, and accuracy is crucial.

**Cyanobacterial Blooms**

Cyanobacterial blooms have received an increasingly intense review in the past few decades. Research regarding cyanobacterial blooms focuses on a variety of factors about the cause and effect of these events. In August 2014, a cyanobacterial bloom in Lake Erie contaminated the drinking water for the city of Toledo with various toxins, including microcystin. Half a million people were unable to use the municipal water supply for two days. Such events place humans and wildlife that inhabit affected areas at risk. Developments in water quality testing and treatment have greatly reduced the risk of exposure to contaminated water, but current methods to detect toxins such as microcystin can be time-consuming, limiting the speed with which a contamination event can be addressed (Ward et al., 1997). Tests for specific toxins usually require technicians to travel to the site, take samples, and then travel back to the laboratory to conduct sample analyses.
**Microcystin**

Microcystin is a liver toxin produced primarily by two genera of cyanobacteria, Microcystis and Planktothrix, and can be found throughout the world. The World Health Organization guideline value for microcystin is 1 µg/L, with a tolerable daily intake of 0.04 µg/L (United States EPA, 2015). If this liver toxin is present in greater concentrations, significant health risks could follow. Microcystis and Planktothrix blooms do not always produce toxins; however, the frequency of toxic events has increased in recent years. Additionally, one of the primary toxins involved in the 2014 water contamination event in Lake Erie were microcystins, as seen in **Figure 1**.

![Figure 1](image_url)

**Figure 1.** The general structure of a microcystin molecule with most common variations depicted, sites X and Y, are marked to represent the location of amino acid variations.

The general structure of microcystins remains the same with variations in amino acid composition at positions X and Y. I will be discussing microcystin-Leucine-Arginine (microcystin-LR), shown in **Figure 2**. This is the most common and one of the more detrimental of the many different permutations of microcystins. Microcystin-LR has been posed as the surrogate of detecting any microcystin, of microcystin producing cyanobacterial-bloom events (United States EPA, 2015).
Persistent molecules, microcystins are structurally stable at the high temperatures and typical ranges of pH in natural surface waters. These factors make them particularly difficult to remove from contaminated waters (United States EPA, 2015). Water contaminated with microcystin cannot be used to drink, cook, or bathe in. Microcystins are not removable by boiling water. Municipal water plants can utilize carbon filtration to remove microcystin from water. However, due to the nature of cyanobacterial blooms, filtration becomes more difficult when the water quality is low during large events. This is because the activated carbon filter becomes plugged with everything else in the water, which leaves consumers powerless in their ability to take action to prevent the consumption of microcystin-contaminated water.

It is important to reiterate that not all Microcystis and Planktothrix blooms are toxic, but current data has suggested that the frequency of toxic blooms has been on the rise (Hudnell, 2008). This change can be due to a variety of reasons, but one of the main causes to this phenomenon is anthropogenic impact. Global climate change leading to an increase in precipitation and fertilizer runoff foster an environment for algal blooms to occur. Additionally, older lakes can be more prone to severe events due to eutrophication, which is the natural aging process for fresh surface waters. Cultural eutrophication—human impact causing
eutrophication—increases the speed of the aging process. While certain human impacts are likely the cause of this phenomenon, exact sources cannot always be identified.

The most common methods for testing the presence of microcystin in a sample are biological assays and instrumental techniques. The enzyme-linked immunosorbent assay (ELISA) is a biological assay that utilizes an antibody selected for an antigen present on microcystin (Carmichael and An, 1999). An instrumental technique commonly used to detect microcystin is HPLC, high-performance liquid chromatography, which separates molecules by polarity (El Semary, 2010). Eluted components in HPLC can also be analyzed by their UV-Vis spectrum for characteristic peaks. This method can take hours to days to complete, as it requires samples collected at the site to be transported back to the laboratory before analysis.

**Biosensors**

Biosensors are a class of analytical devices made of biological materials that have the ability to signal the presence of a chemical, or to change of composition of a solution. This is often due to some sort of binding activity that allows for detection. The most common materials used for the sensitive biological component are tissues, microorganisms, enzymes, antibodies, and nucleic acid. Biosensors have current applications in glucose monitoring, ozone detection, industrial food processes, etc. Biosensors are desirable compared to instrumentation due to their ease of use, speed, and low cost; additionally, methods that utilize biosensors are often portable, which can greatly increase the efficiency of the analysis.

**ELISA.**

Enzyme-linked immunosorbent assay (ELISA) is a popular analytical technique in wet biochemistry laboratories. It is commonly used to detect and quantify a variety of biologically relevant molecules such as hormones, proteins, peptides, and antibodies. There are several ELISA methods, as depicted in Figure 3, though the basic principles still apply across all techniques. Each method is plate-based, meaning that the biosensor component is attached to a solid surface. The target is detected by antibody
recognition. Coloring agents turn these recognition events into a visible color, which can be used to determine the concentration of the target in the sample. While ELISA is a common and effective method for detecting targets, utilizing the technique can be time consuming and not as cost effective.

![Figure 3. Various ELISA techniques.](image)

**Aptamers.**

A class of biosensors made of a single-stranded oligonucleotide, much like antibodies, aptamers bind to their targets with high affinity. They have the ability to fold about a target molecule via hydrogen bonds, which allows them to be used to detect target molecules in complex mixtures (Upadhyay et al., 2013; Walter and Engelke, 2002).

Though antibody science is a well-known and highly developed field, aptamers have the potential to be more reliable than antibodies, due to their pH and temperature stability. Additionally, once an aptamer sequence is known, it can be easily synthesized in the lab and therefore does not suffer from batch-to-batch variability, which may occur with antibodies that require a host animal to facilitate formation.

Previous research has shown that aptamers have been successful in binding to targets of varying sizes, from large proteins to smaller antibiotics (He et al., 2012; Fredriksson et al. 2002). Our goal is to improve the method for selecting aptamers that have a high affinity and selectivity for small target compounds, specifically microcystin. This research hopes to employ a combination of techniques that will enable us to develop an aptamer for a small molecule, such as microcystin.
EXPERIMENT

CE-SELEX

SELEX

Systematic Evolution of Ligands by EXponential Enrichment (SELEX) is an *in vitro* process for aptamer selection. The SELEX process thins out a large library of random DNA sequences until only the most desirable sequences remain, as seen in Figure 4. This is accomplished by taking a very large library of random sequence DNA and incubating it with a target molecule. DNA that binds to the target can then be partitioned off from the fragments that did not bind. The bound sequences are then subjected to the polymerase chain reaction (PCR) in order to greatly increase the number of copies of the favorable DNA sequences for use in the next round of selection. This process continues until the aptamer with the highest affinity and selectivity for the target is found.

![Diagram](image)

**Figure 4.** SELEX process of selecting desirable bound sequences from unbound sequences from a library.
Capillary electrophoresis

For the partitioning step of this process, we will be utilizing capillary electrophoresis (CE). When DNA binds to the target, both the size and charge is different, which allows partitioning between the bound and unbound sequences to occur. CE is a highly efficient separation method that works by separating the molecules based on their size-to-charge ratio. When DNA binds to a large target, such as a protein, the size-to-charge ratio of the DNA-protein complex is much different than that of the DNA alone, which allows partitioning between the bound and unbound sequences to occur.

Microcystin Modification for Selection

Cysteamine as a link

Microcystin-LR contains many shielded functional groups that make reacting the compound with other molecules difficult. Cysteamine can be used as a biologically compatible spacer between microcystin and another molecule. This reaction was carried out with a 2000–4000 molar excess cysteamine in carbonate buffer at a pH of ~9.6. The reaction was mixed at 30°C for 30 min. to an hour (Feng et al., 2012). The thiol group on cysteamine reacted with the alkene as depicted in Figure 5.

Figure 5. Microcystin and cysteamine with reactive functional groups circled.
Upon completion of the reaction, the reaction solution undergoes extraction to separate the product from excess cysteamine. To detect the presence of unreacted cysteamine, gold nanoparticles were used during column rinsing step, as gold and thiol groups have an extraordinarily strong interaction. Gold nanoparticles are a deep red color in solution, and when in the presence of the thiol groups on the unreacted cysteamine, the solution immediately turns dark blue. Excess cysteamine was considered completely removed when no additional blue color was observed. The extraction solution, 100% acetic acid and 0.1% TFA, was evaporated off with rotovap, taking care to place potassium carbonate in a bumper bulb to neutralize the TFA vapor. Cysteamine attached to the microcystin can facilitate a reaction with a larger molecule, effectively increasing the size-to-charge ratio of the target molecule. This increase in electrophoretic mobility allows for a larger difference in migration time between the DNA bound to the target and the DNA that did not bind.

**Synthesis of Concepts**

CE-SELEX has only been very successful when the target is a fairly large molecule, such as a protein. The target used in this research, microcystin toxin, is much smaller. CE-SELEX is difficult to achieve with small particles because DNA is a very large compound and the molecular targets in question are extremely small in comparison. This makes it very difficult to use CE to separate the bound DNA from the unbounded DNA, since the DNA-target complex is not much different in size and charge compared to the unbound DNA. To solve this problem, and make separation using CE possible, we can modify the electrophoretic mobility of the microcystin by conjugating the small molecule to a larger molecule. This effectively makes the target larger, and thus the DNA that binds to the target-complex will be more easily partitioned from the DNA that does not bind (White et al., 2010). The larger molecule facilitates an increase in size and charge to allow for partitioning from the DNA that does not bind to the target.
Once the microcystin has been successfully conjugated to the larger molecules, we can use it for CE-SELEX. This is done by taking random sequence (RS-60) DNA and incubating it with the microcystin conjugate. This solution is injected into a CE system. Running a buffer through the capillary, to allow the sample to run from the injection side to the collection side, carries out the collection. Both the DNA library and the targets are fluorescently tagged, and since they fluoresce at different wavelengths, separation can be monitored visually by shining lasers of different wavelengths at the capillary; when the targets and DNA pass by the laser and fluoresce, a detector measures the relative intensity and plots it against migration time. **Figure 6.** depicts how we are able to discern when to start and stop collection; because the DNA-target has a more positive charge than the unbound DNA, it will move faster through the capillary. This will be recognized by being the first peak with a significant amount of abundance.

**Figure 6.** Electropherogram representing the difference in migration time between the target with bound DNA and unbound DNA. The collection window cuts off unbound DNA to ensure that only bound sequences are being selected.
When the complex has migrated all the way through the capillary, collection stops and the RS-60 DNA that did not bind is washed out of the capillary. This unbound DNA shows another much larger peak at longer migration times. The bound sequences are then put through PCR to increase their abundances. This results in a new, enriched library that will be put through another round of SELEX. After a few rounds of SELEX, the remaining DNA should be the most strongly binding sequences. Negative selection is run against the conjugate molecule to which the target was attached in order to ensure the aptamers remaining have a high affinity for the target, rather than the conjugate molecule.

CONCLUSION

SELEX is a well-established method that has mainly been used for large targets, such as proteins. Because the goal is to select for very small targets using a target-conjugate, we are approaching the problem in a novel way. This research will help present more efficient methods for selecting aptamers for small targets and is the first step in the development of aptamer-based biosensors for water quality testing. Not only can this research be applied to environmental targets, but it may also be applied to other areas of research, including physiology and medicine. There are many harmful environmental molecules; if this method is successful, there could be an aptamer for each one.

REFERENCES


LEARNING IS NOT CHILD’S PLAY: ASSESSING THE NO CHILD LEFT BEHIND ACT

Gwendolyn J. Dean
Dr. Barbara Patrick, Mentor

ABSTRACT

This research examines the implementation and impact of the 2001 No Child Left Behind Act (NCLB) on education quality. More specifically, it outlines how states defined NCLB provisions, including trajectory selection, reporting techniques, confidence interval use, and methods used to inform the public of outcomes. It also discusses NCLB's impact on education outcomes by assessing changes in fourth grade reading scores under NCLB. This qualitative study includes several demographic variables that will allow the study to control for the impact that NCLB's implementations has caused and its effect on school districts that have taken on this process.

Keywords: performance reporting, sanctions, data manipulation, NCLB provisions, vulnerable populations, transparency

INTRODUCTION

Questions about the quality of education provided by public school systems have raised concerns and led to federal reforms such as the 2001 No Child Left Behind Act (NCLB). NCLB legislation required all 50 states to ensure that 100% of public school students were proficient in reading and math within a designated time frame. This goal placed a significant amount of responsibility on teachers, administrators, and the individual
school districts for any and all academic achievements and failures of their students (U.S. Department of Education, 2006). The failure to meet performance targets and goals had several important results: schools could suffer a loss of funding and be publicly criticized because their performance results were published; students were given the opportunity to attend a higher performing school, and teachers thus experienced a loss of job security. These sanctions were to be implemented over the course of a five-year timeline if the school failed to perform at expected levels (U.S. Department of Education, 2006).

Though NCLB aimed to improve the quality of education that many racial minorities and low-income students receive, many questions remain about how NCLB was implemented and whether or not it has achieved its goals. Stiefel, Schwartz, and Chellman (2007) argued that NCLB has had both a positive and negative effect on education. Studies show that the stronger accountability system tends to result in gains in the test scores of African American and Hispanic students in both the fourth and eighth grade; however, school segregation still plays a role in determining whether the racial test score gap can be reduced, since many schools are still segregated today (Stiefel et al., 2007).

Patrick (2013) pointed out that states have used different methods to implement NCLB. For example, some states have found loopholes in the legislation, allowing them to bypass federal rules and regulations. One such example is the way the public is granted access to performance data about local schools. Some states use the Internet as their primary means of releasing performance results to parents and the general public. Low-income parents who do not have access to the Internet may not receive performance results about their child’s school. Other examples include employing a less visible form of print media to inform the public of test results or using a 75% confidence interval to manipulate the way test scores are calculated. Though Patrick’s (2013) work highlights some of the ways states manipulated the implementation of federal NCLB legislation, there are many other important provisions and elements of NCLB that are not commonly discussed.
This paper will build on Patrick’s (2013) work by further highlighting NCLB elements that were manipulated by some states, thus providing a more holistic view of the NCLB Act. This research will assess whether or not performance management advocates’ assumptions that the use of performance reforms in the public sector will improve the quality of services citizens actually receive, and it will address the quality of performance systems developed under federally-mandated reforms by asking, “have states developed meaningful performance accountability systems under the NCLB Act?”

Concerns About the Quality of Education

Both policymakers and citizens have expressed concerns about the quality of the public education system. These concerns are particularly notable in districts that serve low-income and underrepresented students. Cooper (2005) wrote that low-income Latino and African American mothers in urban areas felt that public educators “did not care about their children” and, therefore, did not provide them with a high-quality education. Archbald (2004) and Saporito (2003) produced work that supported Cooper’s finding by stating that low-income or high-poverty parents wanted to choose where their children attend school, so that they might receive a better education. Other researchers demonstrated that public education reforms have begun to address parents’ and citizens’ concerns by shifting from the development of policies that viewed poor families and minority students as a “problem to which schools provide a solution” to a system in which teachers and administrators are viewed as the “problem” (Little & Bartlett, 2010; Patrick, 2013). Federal legislation such as the 2001 No Child Left Behind Act has promoted this shift in perspective.

No Child Left Behind

The No Child Left Behind Act (NCLB) was created to help school districts efficiently and effectively improve academic achievement and meet performance goals. The legislation was
implemented in public school districts to ensure that states were doing their job in educating their students in such a way that the students actually learned the material. This goal would be accomplished by developing specific guidelines that outlined how states would execute their reforms. These reforms included the requirement that school districts demonstrate adequate yearly progress (AYP), which determined how school districts planned on meeting their yearly goals, the funding that school districts used in case of failure to meet those goals, and other state and local education policies (U.S. Department of Education, 2006).

The NCLB Act focused on improving the quality of education in school districts and gathered data through the testing of elementary and secondary school students in the subject areas of reading and mathematics (U.S. Department of Education, 2006). One of the biggest concerns at both the state and local levels of education is the test-taking abilities of the target population (Cooper, 2003). Historically, African American and Latino low-income students’ test scores have lagged behind those of their more affluent White counterparts (Stiefel et al., 2007). In order to address this, NCLB legislation required states to segregate low-achieving groups of students into isolated subgroups and to report their test scores separately. Schools had to ensure that 100% of students in these subgroups tested “proficient” or higher in both reading and mathematics by the end of the 2013–14 school year (Saporito, 2003). Although this goal placed underrepresented students who have been traditionally left behind by the public school system at the forefront of the education reform agenda, this subgroup remains of great concern throughout the nation because of its lack of resources (Stiefel et al., 2007).

Over the years, school districts were evaluated to ensure that they reached their AYP within the time frame used to determine their eligibility to receive federal funding (Porter, Linn, & Trimble, 2005). The threat of lost funding served as motivation for districts to improve their test scores, particularly in African American and Latino student populations (U.S. Department of Education, 2006).

With the addition of incentives, teachers gained an additional opportunity to improve the quality of their teaching
The focus was placed on creating improvements in three specific groups: rural teachers, science teachers, and current multi-subject teachers (Muller & Schiller, 2000). Almost 5,000 school districts in the United States are considered rural; in most cases, teachers instruct more than one subject for which they have not received adequate training (Carnoy, Loeb, & Smith, 2001).

Under the new incentives for rural teachers, teachers would have an additional three years to become qualified in the additional subjects they teach (Muller & Schiller, 2000). Along with the incentives in professional development, intense supervision and structured mentoring were recommended (U.S. Department of Education, 2006). In addressing multi-subject teachers, the guidelines allowed states to streamline the evaluation process by developing a method for these teachers to demonstrate that they are highly qualified in each of their subjects and could maintain the same high standards in subject matter mastery (Stiefel et al., 2007). Science teachers could also prove they were highly qualified; some states determined, based on their current certification requirements, how science teachers would demonstrate their qualifications in either a “broad field” science or individual fields such as physics, biology, etc. (U.S. Department of Education, 2006).

**Trajectories**

The U.S. Department of Education outlined four types of trajectories, or timelines, used to record and map AYP progress over a 12-year span (Patrick, 2013). The four trajectory models included straight-line, stair-step pattern, front-load, and back load. Initially recommended by the U.S. Department of Education, the straight-line trajectory established equal incremental increases in performance that would ultimately lead to the targeted 100% proficiency goal. Therefore, if half of the eighth grade students demonstrated proficiency in a specific subject at the start of 2002, that state would have to increase the annual measurable objective by 4% each year in order to reach the 100% proficiency goal by 2014 (Porter et al., 2005). A stair-step pattern trajectory provided the first increase in performance in either 2004 or 2005, with succeeding increases every second or third year (Patrick,
2013). Given this additional two to three-year time span, states had more time to avoid public criticism and sanctions if the state was determined to be underachieving (Patrick, 2013). Front-load trajectories required significant increases early in the NCLB process, with smaller increases in the following years (Patrick, 2013). Frontline states experienced immeasurable pressures in the beginning of the implementation process in comparison to back-load trajectories, which measured performance closer to the 2014 deadline (Patrick, 2013). Once President Bush left office, most back-loaded states set their accountability target for the 2007–2008 school term (Porter et al., 2005).

**Confidence Intervals**

Confidence intervals allow the statistical manipulation of overall and subgroup scores so that schools can more accurately meet AYP requirements (Patrick, 2013). Without the implementation of confidence intervals, states would fail to produce their outcomes (Porter et al., 2005). For example, if 45% of the students in a specific subgroup proved proficient or above in math, and the year’s objective was 50% or more proficient, the school would meet the AYP requirement if the confidence interval had a width of 12 percentage points (+45 or -6) (Patrick, 2013).

Without the use of different trajectories, subgroup requirements, and confidence intervals, many schools across the country that have met AYP requirements would not have been able to do so (Porter et al., 2005). This conclusion offers insight on the usefulness of performance reforms that affect the lives of millions of Americans, especially those individuals who come from low-income and underrepresented communities, who greatly depend on government educational services (Patrick, 2013). **Table 1.** shows detailed data on which states implemented the use of trajectory selection as well as a 75% confidence interval to achieve AYP and performance goals.

**Sanctions**

NCLB has created a timeline of consequences for those districts that do not achieve AYP. The law requires school districts to use annual tests to demonstrate that their students have reached 100% academic proficiency (Carnoy & Loeb, 2002).
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<th>75% confidence interval, no.1= do not use</th>
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Table 1. Data Assessment Index (Patrick, 2013). (Continued on next page).
It is expected that school districts will close the academic gap between economically advantaged students and students of different economic, racial, and ethnic backgrounds.

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Table 1. Data Assessment Index (Patrick, 2013). (Continued from previous page).
No Child Left Behind requires failing districts to develop a Six-Year Plan (Table 2.), (Porter et al., 2005). The first year a district misses AYP, the district is granted a probationary year. The second consecutive year a district misses AYP is described as the “First School Year Improvement” and provides parents with the opportunity to transfer their child to a school in the district that has stronger test scores, at no cost. This sanction is designed to apply market pressure to public schools that are classified as “failing”; either the school will improve student performance and meet performance goals, or it will lose enrollment and subsequently receive decreased operational funding.

During the third year, technical assistance is provided to the schools, and the district must make public school choice and supplemental educational services available to the students. This round of sanctions also has financial implications for the failing school. If it continues to fail to meet performance expectations, it must provide the students remaining in the school district with the option to seek supplemental help through an outside service at a cost to the district.

The fourth consecutive year missing AYP, in addition to the above, the school is identified for corrective action, as well as facing further actions. After the fifth year missing AYP, a plan must be prepared for the restructuring of the school. After the final, sixth year, the school may be reopened as a public charter school, with the replacement of some or all of the teachers.

PROBLEMS

One of the biggest issues in American education is the resistance to improve the education system (Carnoy et al., 2001). Some argue that testing used to “improve” schools and student learning does not promote real academic improvement (Carnoy et al., 2001). Facing such sanctions, teachers “teach the test” rather than subject content (Patrick, 2013). Some argue that NCLB does not focus on the learning environment and reduces the students’ opportunities to develop higher-order skills (Stiefel et al., 2007). Others argue that state issued tests will increase the dropout rate in disadvantaged student populations (Muller & Schiller, 2000).
## Consecutive years of missing AYP vs. Sanctions

| First Year          | • Placed on “watch list.”
|                     | • Required to develop a school improvement plan. |
| Second Year         | • Listed as “needs improvement school.”
|                     | • District must provide students attending the “needs improvement school” the option of attending another school that has met annual yearly progress. District pays transportation costs. |
| Third Year          | • Listed as “needs improvement school.”
|                     | • District must provide students the option of attending another school that has met annual yearly progress. District pays transportation costs. |
|                     | • District must offer “supplemental educational services” to any student who qualifies for free or reduced lunch. Option of supplemental services from an outside provider. |
| Fourth Year         | • Listed as “needs improvement school.”
|                     | • District must provide students attending the “needs improvement school” the option of attending another school that has met annual yearly progress. The district pays transportation costs. |
|                     | • The school district must offer “supplemental educational services” to any student who qualifies for free or reduced lunch. One option for supplemental services must be from an outside provider. |
|                     | • The school must change its staffing or make a “fundamental change” such as restructuring the school. |
| Fifth Year          | • Listed as “needs improvement school.”
|                     | • District must provide students attending the “needs improvement school” the option of attending another school that has met annual yearly progress. The district pays transportation costs. |
|                     | • The school district must offer “supplemental educational services” to any student who qualifies for free or reduced lunch. One option for supplemental services must be from an outside provider. |
|                     | • The school must convert into a charter school, turn management over to a private management company, or be taken over by the state. |

### Table 2. NCLB Sanctions (Porter et al., 2005)
State accountability and assessment have not always been related. Assessments were mainly used to divide students into “academic tracks” or for diagnostic purposes, to determine whether student achievement matched state curricula (Stiefel et al., 2007). Typically, academic progress was considered the responsibility of the community and the home (U.S. Department of Education, 2006). Two main concepts, “alignment” and “capacity building,” underlie the standard-based reforms, which define systems of instruction, assessment, grading, and academic reporting (Chatterji, 2002). “Alignment” refers to the school setting clear standards and aligning curriculum and accountability mechanisms with those standards, before focusing on improving the outcomes. “Capacity building” is intended to improve the capacity of teachers and administrators to deliver better education (Carnoy & Loeb, 2002).

**Implementation and Sanctioning Problems**

Other problems have been found in the way NCLB policies were developed and implemented. The states were given some control over how they implemented the details of the federal legislation, but the teachers who worked closely with the students and understood their needs were sometimes removed from the process (Porter et al., 2005). This created an environment in which educators saw their job security tied to students’ performance on standardized exams (Patrick, 2013). This, in turn, created problems in future teacher recruitment.

Subgroup reporting requires school districts to provide evidence that proficiency goals are being met both in the overall student population as well as in vulnerable subgroups. These groups include racial and ethnic minorities, economically disadvantaged students, those with disabilities, and students that speak a limited amount of English (Patrick, 2013). If a school in any district fails to document that these students are meeting performance goals and making progress towards reaching 100% proficiency, that school will then be labeled as “failing” (Patrick, 2013). It is known that students in these subgroups have historically failed on standardized exams; it is therefore challenging for educators to meet 100% proficiency and performance goals.
NCLB did not define who would measure and report the test scores for underrepresented minority subgroups. States had the freedom to determine the lowest mandatory number of enrolled minority students before the school was required to single out the

<table>
<thead>
<tr>
<th>Minimum Number of Enrolled Minority Students to Require Subgroup</th>
<th>Number of States Using this Minimum to Determine Need for Subgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
</tr>
<tr>
<td>52</td>
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</tr>
<tr>
<td>None</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 3. Minimum Number of Underrepresented Students Tested in a School for Subgroup Accountability (Porter et al., 2005).

<table>
<thead>
<tr>
<th>State</th>
<th>NEAP Test Results</th>
<th>State Test Results</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>34%</td>
<td>34%</td>
<td>0%</td>
</tr>
<tr>
<td>Arizona</td>
<td>27.9%</td>
<td>63%</td>
<td>-35.1%</td>
</tr>
<tr>
<td>California</td>
<td>28%</td>
<td>50.8%</td>
<td>-22.8%</td>
</tr>
<tr>
<td>Colorado</td>
<td>38.8%</td>
<td>74%</td>
<td>-35.2%</td>
</tr>
<tr>
<td>Delaware</td>
<td>36.1%</td>
<td>52.8%</td>
<td>-16.7%</td>
</tr>
<tr>
<td>Florida</td>
<td>36.6%</td>
<td>59%</td>
<td>-22.4%</td>
</tr>
<tr>
<td>Georgia</td>
<td>29.5%</td>
<td>68.8%</td>
<td>-39.3%</td>
</tr>
<tr>
<td>State</td>
<td>NEAP Test Results</td>
<td>State Test Results</td>
<td>Difference</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------</td>
<td>-------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Hawaii</td>
<td>26.7%</td>
<td>20.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Idaho</td>
<td>40.4%</td>
<td>68.7%</td>
<td>-28.3%</td>
</tr>
<tr>
<td>Illinois</td>
<td>31.6%</td>
<td>54.3%</td>
<td>-22.7%</td>
</tr>
<tr>
<td>Indiana</td>
<td>38.2%</td>
<td>72%</td>
<td>-33.8%</td>
</tr>
<tr>
<td>Kentucky</td>
<td>26.1%</td>
<td>36%</td>
<td>-9.9%</td>
</tr>
<tr>
<td>Louisiana</td>
<td>23.9%</td>
<td>55.2%</td>
<td>-31.3%</td>
</tr>
<tr>
<td>Maine</td>
<td>38.8%</td>
<td>29%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Maryland</td>
<td>38%</td>
<td>51.7%</td>
<td>-13.7%</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>48.8%</td>
<td>39%</td>
<td>9.8%</td>
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<tr>
<td>Michigan</td>
<td>37.7%</td>
<td>62%</td>
<td>-24.3%</td>
</tr>
<tr>
<td>Mississippi</td>
<td>19.4%</td>
<td>55%</td>
<td>-35.6%</td>
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<tr>
<td>Missouri</td>
<td>31.1%</td>
<td>15.5%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Montana</td>
<td>38.3%</td>
<td>62.4%</td>
<td>-24.1%</td>
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<td>Nebraska</td>
<td>36.1%</td>
<td>81.8%</td>
<td>-45.7%</td>
</tr>
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<td>Nevada</td>
<td>26.1%</td>
<td>49%</td>
<td>-22.9%</td>
</tr>
<tr>
<td>New Jersey</td>
<td>45.4%</td>
<td>62.4%</td>
<td>-17%</td>
</tr>
<tr>
<td>New York</td>
<td>36.1%</td>
<td>55%</td>
<td>-18.9%</td>
</tr>
<tr>
<td>North Carolina</td>
<td>39.9%</td>
<td>84%</td>
<td>-44.1%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>40.4%</td>
<td>65.3%</td>
<td>-24.9%</td>
</tr>
<tr>
<td>Ohio</td>
<td>42.5%</td>
<td>60.1%</td>
<td>-17.6%</td>
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<td>Oregon</td>
<td>37%</td>
<td>63.5%</td>
<td>-26.5%</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>41.5%</td>
<td>62.9%</td>
<td>-21.4%</td>
</tr>
<tr>
<td>South Carolina</td>
<td>35.9%</td>
<td>23.2%</td>
<td>12.7%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>27.7%</td>
<td>87.2%</td>
<td>-59.5%</td>
</tr>
<tr>
<td>Texas</td>
<td>40%</td>
<td>61%</td>
<td>-21%</td>
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<td>Virginia</td>
<td>39.3%</td>
<td>80%</td>
<td>-40.7%</td>
</tr>
<tr>
<td>West Virginia</td>
<td>25.1%</td>
<td>70.6%</td>
<td>-45.5%</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>40.3%</td>
<td>73%</td>
<td>-32.7%</td>
</tr>
<tr>
<td>Wyoming</td>
<td>42.6%</td>
<td>38%</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

minority student test scores and report them (Porter et al., 2005). A Rural School and Community Trust Report encouraged states to set a high minority enrollment requirement to decrease the number of schools required to separate minority test scores from the scores of the total student body. By setting the number high, some rural schools were able to avoid reporting separate scores for their minority students; thus, teachers were not held accountable for addressing the needs of this population (Carnoy et al., 2001). Table 3. provides data on the number of states that have implemented a minimum number of underrepresented students that were tested in a school for subgroup accountability.

The third, and perhaps the most damaging problem, concerned changes in educational quality. NCLB granted states the freedom to create their own examinations to measure student performance. These exams varied in quality and content. Table 4. highlights the differences in test scores between state-developed tests and the National Assessment of Education Progress (NAEP) examination. The spread between the state and national exams is telling: for example, Tennessee experienced a 59.5% difference between the state and national test scores. Similarly, North Carolina, Virginia, and West Virginia all reported more than a 40% difference in student test scores between the state and national examinations. Such differences raise concerns about the reliability of state-developed testing.

CONCLUSION

Despite its intention to improve the quality of education in American public schools, the NCLB Act of 2001 resulted in a number of problems, negative changes, and uncertainty about the future. In addition to doing little to assist poorly performing districts and creating great anxiety through the challenge of reaching adequate yearly progress and performance goals, the use of confidence intervals and trajectory selections have provided little evidence that districts are indeed offering the students most at risk better opportunities to learn. Placing the responsibility of implementing NCLB on the states has proven unsuccessful in bringing the standards of public education to a level equal to the needs of the American people.
REFERENCES


ACCURACY OF DNA REPAIR
DURING REPLICATION IN
SACCHAROMYCES CEREVISIAE

Mikael K. Dunn
Dr. Anne Casper, Mentor

ABSTRACT
DNA repair is a crucial part of organismal survival. The repair process is carried out by DNA polymerases and mismatch repair proteins. Things don’t always go as planned in DNA repair, and sometimes DNA repair is inaccurate. Inaccurate DNA repair can potentially lead to the loss of the genes important for cell division and replication. There has been much research into the efficiency of these DNA polymerases, yet there has been no thorough research into how the accuracy of repair is distributed among all of the different types of homologous recombination. The goal of this article is to review the literature on the accuracy of DNA repair during replication in Saccharomyces cerevisiae.

INTRODUCTION
Replication and DNA Polymerase Proofreading
In order to make or replace cells of damaged tissues, cells must divide. Mitotic cell division specifically occurs when one cell replicates and divides into two identical daughter cells. In order to divide, the chromosomes must be replicated. Eukaryotic DNA replication begins at the opening of the origin of replication. The next steps take place at the 3’ end of RNA-primed DNA. The DNA nucleotides need to be RNA-primed to be synthesized by DNA polymerase α. DNA polymerase α moves quickly, but lacks proofreading activity. Since the genome can be tens of hundreds of thousands of nucleotides long, there is significant room for
error. In order to have the newly synthesized DNA proofread, other DNA polymerases attach to the newly primed ends. For initial replication proofreading, DNA polymerase ε reads first on the leading strand, while similarly, DNA polymerase δ proofreads on the lagging strand (Strathern, Shafer, & McGill, 2006). When mistakes are made there are various ways that DNA can repair itself through a process called homologous recombination.

Damaged DNA can be repaired by using an intact homologous DNA region (**Figure 1**). This occurs when the functional copy of a gene is lost. It begins when the broken or damaged chromosome uses the homologous chromosome next to it to finish replication. This leads to a loss of heterozygosity, as seen when the chromatids reassort. Homologous recombination is important because the cell can lose heterozygosity (LOH) when the functional copy of the gene is lost. A lost gene may render the organism more susceptible to negative consequences; for example, a lost tumor-suppressor gene would make the organism more susceptible to tumor growth.
DNA Repair

DNA damage can happen in many different ways, including double-stranded breaks (DSBs; Strathern et al., 2006). In order to repair damaged DNA, DNA repair genes make proteins to repair the damage (Liefshitz et al., 1995). Many errors made by DNA polymerases are proofread and repaired by DNA polymerases, and all DNA polymerase molecules have different levels of efficiency and proofreading capabilities. Replication and DNA polymerase proofreading activity is crucial in the review of the accuracy of DNA repair in the yeast genome *Saccharomyces cerevisiae*. DNA repair may be inaccurate, which means that the DNA is misread, damaged, or repaired in such a way that a functional copy of a gene is lost. Loss of functions in the repair genes leads to higher levels of mutagenesis (Strathern et al., 2006).

Single-stranded DNA (ssDNA) and Hypermutability

Double-stranded breaks (DSBs) can lead to long single stranded DNA (ssDNA) regions (Yang, Sterling, Storici, Resnick, & Gordenin, 2008). Damaged DNA is prone to mutations under conditions of stress (e.g., UV damage, low levels of DNA polymerase) during replication. Long stretches of ssDNA and multiple lesions of DNA are prone to hypermutability (Yang et al., 2008). Hypermutability occurs when there is a significant increase in the mutation rate of a genome. The variation of the 5’ end resection in DNA repair can contribute to the hypermutability of the DNA.

These long stretches of DNA and hypermutability play an important role in evolution, encompassing both human evolution and health (Yang et al., 2008). This research has shown that cancer formation and progression is due in part to DNA proofreading errors. Since DNA mutation is a necessity for the formation of tumors and cancer development, this is a good place to look for cancer-causing pathways. By studying the hypermutability of ssDNA, we can learn more about the accuracy of DNA repair.

Proofreading

Proofreading is necessary for DNA synthesis during repair. Mutations that happen to different sequences or regions
have different overall effects and changes in the types of mutations that occur (Strathern et al., 2006). In addition, when DNA polymerase δ was removed, or replaced by a defective mutant compared to another DNA polymerase, DNA polymerase ε changed the frameshift mutation back to wild type less frequently. This indicates that the absence of DNA polymerase δ played a larger role in the proofreading and correction of DNA polymerase α errors than ε. It was also found that when both DNA polymerase δ and ε were removed, the mutation rate was significantly higher than when just one of the DNA polymerases was knocked out (Strathern et al., 2006).

**Mismatch repair (MMR)**

Mismatch repair (MMR) machinery is an important part of the cell cycle's machinery (Figure 2.). The MMR machinery is made of the various enzymes and proteins that are used to repair DNA bases. Mismatch repair proteins fix places along the double-stranded DNA and fix sequences or bases that are out of place. Mismatch repair proteins fix replication errors, much like the DNA polymerase repair proteins. These proteins differ from the DNA polymerases because MMR will repair breaks of a different specificity than DNA polymerases. Mismatch repair, in particular, plays an important role in fixing frameshift (potential reversion) mutations (Greene, 1997). Frameshift mutations occur when a DNA base, or a series of DNA bases, that is deleted or inserted, shifts the sequence out of the reading frame. If this happens near important genes, it could potentially lead to mutations and defective genes or damaged protein production. Frameshift mutations only account for 10% of mutations found in this study. Because the system could only account for a small range on the chromosome, there was a restriction to the total types of events that could be detected, or a location specificity for some events. There could have been repair events that could indicate even more clearly what is happening in these DNA repair pathways.

MMR proteins are necessary for the proper removal of frameshift mutations. In the scope of DNA repair accuracy these frameshift mutations can be crucial. If the frameshift mutation is removed, the mutation is effectively stopped. More specifically,
if the mutation is stopped, then the genes that were displaced (potentially tumor-suppressor genes) are restored to wild type. This proves to be a very effective tool for the removal of potentially harmful mutations, but the question still remains: how accurately are these frameshift mutations repaired?

**Figure 2.** The pathway that was used to study MMR enzymes. MutS cuts around the mutated area, and at the final step DNA polymerase $\delta$ synthesizes and proofreads the DNA.
Homologous Recombination and Accuracy of DNA Synthesis During Repair

Stretches of ssDNA are necessary in order for a process called “homologous recombination” to occur (Chung, Zhu, Papusha, Malkova, & Ira, 2010). Homologous recombination occurs when a damaged strand of DNA is mediated by a protein called \textit{Rad51} to invade a homologous template sequence in order to complete replication of the damaged strand of DNA. The 5’ end resection plays an important role in the fidelity of the repair (\textbf{Figure 3.}). The variability of the 5’ end resection could directly contribute to the repair pathways that are used, in addition to the molecular mechanisms of repair for those pathways.

\textbf{Figure 3.} Initiation of DNA repair.
Longer stretches of ssDNA allow for greater fidelity of the repair. This was evidenced by the resection’s longer length in BIR repair pathways than gene conversion pathways. The BIR stretches’ longer length could arise because the resection continued after the strand invasion continued, while during gene conversions, the strand invasion did not (Chung et al., 2010).

In spite of the knowledge we have accumulated regarding DNA repair during replication, there are still knowledge gaps regarding the accuracy of DNA repair during replication. In particular, we know very little about the accuracy of gene conversion mutations. The purpose of Chung’s study is to take a critical look at cancer and its relation to DNA proofreading errors. Chung et al. (2010) showed that break-induced replication is a result of the inaccuracy of DNA synthesis during repair. DNA synthesis is inaccurate according to the lower amount of overhang that was created during the 5’ resection step of DNA repair (Chung et al., 2010). It was also discovered that the fidelity of the resection allowed monitoring of ssDNA size and preference for repair pathways. There are different preferred repair pathways, depending on the size of the ssDNA stretch. The size of the ssDNA varies the hypermutability of the damaged DNA and could cause a preference of the pathway, depending on the size and the hypermutability of the ssDNA. These comparisons have been made in the case of BIR; however, there are many different types of homologous recombination in which we can test the accuracy of DNA synthesis during repair.

**DNA Polymerase δ and ε Proofreading Efficiency in DNA Repair**

**DNA Polymerase ε**

Human colorectal and endometrial cells can lose the proofreading of DNA polymerase ε by mismatch repair of the protein’s amino acid substitutions, mutating the protein’s function (Kane & Shcherbakova, 2014). DNA polymerase ε is essential for initially reading the DNA on the leading strand. This makes DNA synthesis and repair less accurate. Kane et al. (2014) also used a strong mutator and got a phenotype comparable to complete
mismatch repair protein deficiency in a yeast model system. This showed the possibility that DNA polymerase ε plays a crucial role in mutations that are repaired by using MMR proteins.

It was observed that LOH doesn’t necessarily occur for DNA polymerase ε mutant human tumors (Kane & Shcherbakova 2014), because tumorigenesis can be caused by mismatch repair protein malfunction (Kane & Shcherbakova 2014). This study did find that mutations occurred that affected mutant yeast diploids with defective DNA polymerase δ and DNA polymerase ε. This finding corresponded to other findings of DNA polymerase δ and ε in the field (Strathern et al., 2006; Kennedy et al., 2015; St. Charles, Liberti, Williams, Lujan, & Kunkel, 2015).

In a similar study, a sensitive mutant was used in order to check error corrections by DNA polymerase δ (Flood et al., 2015). Data showed that DNA polymerase δ was as active as DNA polymerase ε in repair of short homonucleotide runs, and DNA polymerase ε was necessary for longer runs (Flood et al., 2015). The authors found further evidence that the DNA polymerases that repair the leading and lagging strain are different, as was suggested above. To further support this, it has been found that under circumstances when DNA polymerase ε or DNA
polymerase $\delta$ is mutant or defective, its proofreading errors are corrected by DNA polymerase $\delta$; while DNA polymerase $\epsilon$ cannot correct mistakes by a mutant or defective DNA polymerase $\epsilon$ (Flood et al., 2015). These findings were inconsistent with the current model of DNA synthesis during repair, which suggests that DNA polymerase $\epsilon$ and DNA polymerase $\delta$ fix synthesis errors at different rates. The model shows DNA polymerase $\epsilon$ and $\delta$ working on their strands, respectively, but upon error caused by DNA polymerase $\epsilon$, the strand is repaired by DNA polymerase $\delta$. This model differs from the current model because it indicates that we can have DNA polymerase $\delta$ accompanying DNA polymerase $\epsilon$, which allowing the lower mutation rates, shows that leading strand synthesis is inaccurate. This model does a better job of describing the higher mutation rates that are observed in defective DNA polymerase $\delta$ and $\epsilon$ when defective mutants halt the activity of each, respectively. It follows that higher mutation rates occur in proofreading defective DNA polymerase $\delta$ mutants.

In another study, enriched mutations in the first half of the replicon and termination zones were found. This shows that genome replication events may be more volatile than thought and can give us much more to learn about mutations and their evolution with the genome (Kennedy et al., 2015), by showing that mutations happen most often at termination zones and at the first half of the replicon. This furthers the evidence of the importance of 5' end resection. The 5' end resection makes repair in higher fidelity than if repair was done with no resection. In addition to the higher fidelity of repair, ssDNA is known to have increase hypermutativity. The researchers found that volatility of the mutator leads to different phenotypes. This means that depending on how aggressively the mutator that is used mutates the genes observed, we can view different phenotypes arise.

**Mismatch Repair Proteins and Proofreading Activity**

Greene et al. (1997) used a reversion assay where the reversion spectra of the types of insertions and deletions that are generated during replication were analyzed. They found that the mismatch repair proteins (MMR) preferentially correct
Frameshift mutations. Frameshift mutations move the open reading frame (ORF) from what is supposed to be read, to make potentially nonsensical nucleotide sequences (Figure 5). Figure 5 shows an example of a +1 frameshift mutation. This is indicated by the nucleotide “C” highlighted in red, being added and shifting the reading frame of the sequence downstream from the mutation. This makes a non-homologous sequence, which is caused by the +1 frameshift mutation. Note that the three letter code for the amino acids on the changed strand are different from the top non-mutated blue row of amino acids. The study also found that the MMR machinery tracked the progression of DNA replication and repairs along the way. Upon varying the sizes of insertions and deletions, it was found that MMR effectively removed the frameshift mutations.

It was observed that a mutation in DNA polymerase ε caused there to be an increase in frameshift mutations (Kirchner, Tran, & Resnick, 2000). This increase in frameshift mutations means that they can be corrected by functioning MMR machinery. The relation of DNA polymerase ε and MMR enzymes show that there is a relationship between the connectedness of most of the DNA repair proteins and enzymes.

It appears that replication of the two DNA strands results in a variable balance between error prevention, proofreading, and mismatch repair proteins (St. Charles et al., 2015). It was also observed that base selectivity is 10 times higher in vivo than in vitro (St. Charles et al., 2015). Since there was a tenfold increase in base selectivity in vivo, this shows we cannot completely know the action of these DNA polymerases and repair machinery in vitro with equal clarity. This also indicates how particular these repair proteins and enzymes are. The selectivity suggests the very intricate nature of our DNA repair. The study also found that the mutations that occur in the DNA polymerases

![Figure 5. Example of a +1 Frameshift mutation](image)
are much more crucial in the fidelity of the overall process of DNA repair than does the MMR machinery.

**CONCLUSIONS**

The problem remains that we lack data on the accuracy of genetic instability caused by homologous recombination in cells under replication stress. Homologous recombination, even break-induced replication, is 1,000 times higher in cells under replication stress than cells under normal replication conditions (Chung et al., 2010). These homologous recombination events can result in LOH, which have great consequences affecting human health, such as cancer. Altering levels of DNA polymerase will allow us to investigate other forms of homologous recombination. This would allow for better measurements and a full range of activity of DNA polymerases.

SsDNA is highly prone to mutations. Moreover, ssDNA is so prone to mutations that it is considered hypermutable (Yang et al., 2008). This hypermutability has steep consequences; one of them is frameshift mutations and inaccurate repair of damaged DNA (Chung et al., 2010).

Expanding on the work detailed in this review, we can further examine the gaps of DNA replication that we can fill, including whether we can get a better understanding of the accuracy of these reversions by homologous recombination. Investigating homologous recombination events through selectable markers and altering levels of DNA polymerase would also shed more light on the variation of cell repair pathways and allow us to develop a whole picture of the accuracy reversions of homologous recombination events.

**REFERENCES**


A STUDY OF HOW CSR RANKINGS ARE AFFECTED IN A GLOBALIZED ECONOMY

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Dr. Lois Mahoney, Mentor
Dr. Joseph Scazzero, Mentor

ABSTRACT

We are in a time of globalization, and as a result there is a “rapid growth in trade, financial transactions, and cross country ownership” of assets (Tengblad & Ohlsson, 2010, p. 653). As globalization has increased, the number of companies in different industries using corporate social responsibility (CSR) activities has grown. Increasingly, companies are communicating their activities through CSR reports that outline corporate initiatives to access and take responsibility for the company’s effect on the global environment and its impact on social welfare. In this paper, we examined how a globalized economy affects Environmental, Social, Governance, and Total CSR rankings in six regions: (1) North America, (2) South America, (3) Latin America, (4) Asia-Pacific, (5) Africa, and (6) Europe. We collected CSR scores using Sustainalytics Global Platform (SGP) data for each region. Then we compared differences in Environmental, Social, Governance, and Total CSR scores between the regions. The results of the statistical analysis show that Africa and Europe consistently had the highest CSR scores, while Latin America and Asia-Pacific had the lowest.

Keywords: [Corporate social responsibility, globalization]
INTRODUCTION

The increasing globalization movement in recent decades has meant rapid growth in trade, financial institutions, and cross-country ownership of economic assets (Tengblad & Ohlsson, 2010). Globalization of business during the last three decades has led to escalating stakeholder pressures and expectations that corporations will participate in corporate social responsibility (CSR) activities (Mohan, 2006). CSR, also referred to as “corporate citizenship” or “corporate social performance,” can be defined as “the economic, legal, ethical, and discretionary expectations that stakeholders have for firms at any given time” (Carroll et al., 2012; Carroll, 1979). By 2009, most stakeholders perceived that firms have “ethical and philanthropic obligations toward society” (Jamali & Keshishian, 2009; Carroll & Shabanna, 2010).

As stakeholders increasingly pressure firms to act as socially responsible corporate citizens, firms must evaluate how to best communicate their commitment to CSR. Due to the inevitable information asymmetry between firms and stakeholders regarding companies’ CSR activities, firms may provide signals to stakeholders to demonstrate their commitment to CSR (Clarkson et al., 2011). As of 2015, 92% of the largest 250 companies worldwide had some method of reporting CSR information, which is a 5% increase over the levels of CSR reporting in 2008 (KPMG, 2015). Additionally, according to KPMG 2015 International Survey of Corporate Responsibility, in 2011, just 68% of the 100 largest firms included CSR information in their annual reports, but in 2015 the rate grew to 75%. However, due to the lack of regulatory requirements, and the varied and sometimes self-serving nature of CSR reporting, (Gugerty, 2009), other methods, such as company’s web sites and CSR reports, may also be used to supplement voluntary disclosures of social and environmental information to formulate a comprehensive picture of a firm’s CSR commitment.

Before Sustainalytics Global Platform (SGP) data was made available, there was no single reliable database of CSR information that consistently calculated CSR scores for all the companies across the world, making it difficult to compare CSR
performance between companies across international regions and countries. The database evaluates CSR scores for firms in over 46 countries, employing the same evaluation criteria for each firm, including using a consistent statistical approach and methodology. The SGP performs an identical calculation of CSR for firms in many countries throughout the world. This is one of the first known research papers that makes a comparison of CSR scores between international geographical regions and countries.

Our study specifically compares CSR scores between firms located in the regions of (1) Africa, (2) Asia-Pacific, (3) Europe, (4) Latin America, (5) North America, and (6) South America. By comparing CSR scores across international companies in different geographical regions, we gain further understanding of how social and environmental activities are influenced across different national institutional contexts. An examination of cross-national differences in CSR may lead to further understanding of CSR in various countries, and identify the best way to promote the adoption of additional CSR activities in corporate practices.

**LITERATURE REVIEW**

**Corporate Social Responsibility**

CSR is a corporate initiative to access and take responsibility for a company’s effect on the environment and its impact on social welfare. CSR implies that firms voluntarily integrate social, governance, and environmental concerns in their operations and interactions with stakeholders (Branco & Rodrigues, 2006). Companies that are committed to practicing CSR are committed to sustainable economic development through working with employees, their families, local communities and society at large to improve the general quality of life (Holme & Watts, 2000, p.10). CSR encompasses every possible obligation, concern, effect, or responsibility that an organization might encounter, including externalities resulting from corporate behavior or neglect (Werhane, 2008). CSR practices vary between countries; factors such as industrial and cultural practices can affect how important socially responsible activity is in a country. CSR should be strongly influenced by relevant cultural, social, political, and economic
factors specific to a particular nation, and thus are also subject to cultural adaptation (Robertson, 2009).

According to Porter and Kramer (2006), CSR is usually separated into four dimensions: (1) moral obligations, (2) sustainability, (3) license to operate, and (4) reputation. Moral obligations are based on a corporation's willingness to act as a good citizen and make ethical decisions. Companies often are faced with moral dilemmas, but companies that practice CSR are expected to achieve success by implementing moral and ethical business practices. Thus, an issue may arise when determining whether a business venture is seen as “moral,” and the “moral compass” of a company may be different, depending on the values and practices of the country in which it conducts business. The definition of what is “moral” depends on the culture and customs of the country where the business is located. For example, in some countries, bribery is a normal part of conducting business, but in the United States it is seen as immoral and unethical.

Sustainability draws on the concept of citizenship. This definition was developed in the 1980s by Norwegian Prime Minister Gro Harlem Brundtland, and is used by the World Business Council for Sustainable Development: “Meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987). A “sustainable” company aims to carry out value chain activities in ways that protect and preserve economic, social, and natural environments. Companies that are considered “sustainable” pay fair wages, ensure worker safety, and avoid emitting toxic waste (Porter & Kramer, 2006). Companies that improve their environmental performance may also have savings associated with a reduction in the energy and materials used and lower pollution costs in the form of charges for waste handling and disposal and the fees, licenses, and fines for breaking environmental regulations (Branco & Rodrigues, 2006). A license to operate is based on the need for every company to have the “tacit or explicit permission from the governments, communities, and numerous other shareholders to do business” (Porter & Kramer, 2006).

Reputation is viewed as very important. CSR may improve a company’s image and brand, invigorate morale, and even improve
its share price (Porter & Kramer, 2006). Companies with a good social responsibility reputation may improve relations with external factors, including customers, investors, bankers, suppliers, and competitors (Branco & Rodrigues, 2006). A company’s reputation is a crucial and intangible resource that can be created or depleted as a consequence of the decision to participate in social responsibility activities and disclosure. According to Orlitzky, Schmidt, and Rynes (2003), CSR provides internal or external benefits, or both, and social responsibility disclosure may have different values if the analyses focus on one benefit or the other. Developing a good reputation takes time, and companies have to be patient and persistent. There is a positive relationship between a firm’s reputation and its financial performance; this is why developing a good reputation is crucial, and companies must build a reputation over time (Fombrun & Shanley, 1990; Roberts & Dowling, 2002). Because consumers are attracted to companies that present a good reputation in socially responsible issues, companies also face consumer pressures (Branco & Rodrigues, 2006). Disclosure of information about a company’s behaviors and outcomes regarding social responsibility may help build a positive image with stakeholders (Orlitzky et al., 2003). However, companies can only benefit from building a reputation for social responsibility if the community also considers social responsibilities important (Branco & Rodrigues, 2006).

Practicing socially responsible employment practices such as offering fair wages, health and education benefits for employees, a clean and safe working environment, training opportunities, flexible work hours, and job sharing can bring direct benefits to the company while increasing morale and productivity, as well as reducing staff turnover. Companies that are seen as having a strong commitment to social responsibility attract better job applicants and maintain higher employee morale (Branco & Rodrigues, 2006).

KPMG conducted a survey examining the rate of corporate responsibility (CR) reporting across the top 100 firms in 41 countries between 2013 and 2015. They found that CSR reporting has seen marked growth within emerging markets, and that CSR rates between countries differ. KPMG also discovered that the Asia-Pacific region has risen to become one of the leading regions for CR reporting.
within the last four years. In the Asia-Pacific region, 79% of firms report on CSR, which puts them ahead of the Americas, followed by Europe and the Middle East Africa regions. The growth of the Asia-Pacific region has been driven by a surge in reporting in countries where mandatory and voluntary reporting requirements have been introduced. The Americas have the second highest CSR reporting region, with 77% of the countries reporting in 2015. Europe ranked third, with 74% of firms reporting CSR. KPMG found that Europe had a lower reporting rate because of the significant differences between Eastern and Western European countries. Middle East Africa reports decreased 8% between 2013 and 2015, with a CSR reporting percentage of 53%.

The KPMG survey demonstrated that CSR reporting rates have been steadily increasing in numerous regions, and that the reporting varies between those regions. The survey does not address why the level of reporting is higher or lower in different regions. There may be many reasons why the level of reporting is different, including the stability of a country’s government, business customs, national culture, and the wealth of the country. All serve as factors in the increase or decrease of CSR reporting.

Perego and Kolk (2012) found that country level factors are significant drivers of sustainability assurance. By using a panel of the Fortune Global 250, Perego and Kolk (2012) showed that the publication of more stringent legislation on social and environmental reporting increased regulatory pressure and acted as a powerful coercive mechanism, which in turn lent support to the adoption of international reporting and assurance standards. DiMaggio and Powell (1983) and Boiral and Gendron (2011) described CSR reporting and assurance as “a process of normative isomorphism,” since it is largely characterized by adapting professional practices in both financial and non-financial forms of auditing. The pressures are evident in the early stages of diffusion, when the institutionalization process is prompted by the powerful role of professional auditing entities (Simnett, Vanstraelen, & Chua, 2009; Kolk & Perego, 2010).

Institutional forces seem to affect firms’ initiatives in CSR reporting and assurance. Perego and Kolk (2012) indicated that organizational and firm level factors play a potential role in indicating why firms adopt heterogeneous management practices when facing
isomorphic pressures. Based on the biased view of the firm, the adoption of advanced CSR management practices is also related to the availability of sufficient organizational resources capabilities (Delmas & Toffell, 2011). Therefore, corporations with more environmental resources and capabilities seem more likely to demand higher levels of accountability standards and assurance quality, while the lack of firm capabilities can be an obstacle to the diffusion of CSR reporting and assurance (Thorne, Mahoney, & Manetti, 2014).

The literature indicates that the country in which the organization is reporting and the country of the ultimate ownership have a significant effect on CSR reporting and assurance practices (Thorne et al., 2014). Thorne and colleagues (2014) also showed that the data reveal a number of characteristics related to a company's predisposition to make social disclosures, which include capital intensity and availability (Belkaoui & Karpick, 1989), the age of the corporation (Roberts, 1992), planned strategies, the attitudes of senior executives, and the presence of a CSR committee (Cowen, Ferreri, & Parker, 1987; Roberts, 1992; Trotman & Bradley, 1981).

Since CSR is influenced by relevant cultural, social, political, and economic factors specific to a particular country, and as firms face increasing pressure to be more socially responsible, we propose the following research question: Is there a difference in CSR scores across international geographic regions?

**METHODOLOGY**

**Sample Selection**


**CSR Performance**

Building of the work of (Thorne, Mahoney, Gregory, & Convery, 2015), we analyzed CSR performance through a firm’s CSR scores obtained from the Sustainalytics Global Platform (SGP) database. The SGP database measures the CSR performance
of over 4,700 firms worldwide. To calculate the CSR scores, the database collects both internal and external data from many sources, including annual reports, environmental and safety policies, internal codes of ethics from the firms themselves, as well as from various industry and government publications, and interviews with key stakeholders. As shown in Figure 1., below, Total CSR scores are based on a weighted average of scores of three dimensions of CSR: Environmental, Social, and Governance. Sustainalytics assigns each firm a score from 0 to 100 on a Likert-type scale, weighted according to its significance, as determined by Sustainalytics analysts.

Environmental factors include the areas of operation: supply chain, products, and services. Sustainalytics scoring for operations takes into account formal environmental policies, environmental and social impact assessments, and programs to reduce waste, emissions, and water usage. Supply chain scores are based on external environmental certification for suppliers and on various programs to stimulate sustainability (Thorne et al., 2015). Finally, to calculate products and services scores, Sustainalytics consider sustainability-related products and services, revenue from clean technology, organic products, and controversial

![Figure 1. Dimensions of Total CSR Scores (Thorne et al., 2015).](image-url)
practices, such as the use of genetically modified organisms in products (Thorne et al., 2015).

The second measure of CSR performance is the Social dimension, which includes the areas of employees, supply chain, customers, community, and philanthropy. For the employees’ area, Sustainalytics considers employment policies on bargaining and discrimination, employee work conditions, turnover, training, fatalities, and other employee-related controversies. Supply chain scores contain standards for supply chain fair trade, external social certification of suppliers, and any supply chain controversies (Thorne et al., 2015). The customers’ score represents the existence of and content within statements of public policies in areas such as advertising ethics and data privacy. Community and philanthropy areas include human rights policies, community engagement, development programs, and internal guidelines for philanthropic activities, such as whether cash donations equal 1% of net earnings before taxes and whether the firm has a corporate foundation (Thorne et al., 2015).

The Governance score is determined by a firm’s business ethics, corporate governance, and public policy. A firm’s business ethics score reflects its policies and incidents concerning bribery, whistleblower programs, policies on animal welfare and clinical trials, and any other ethical controversies (Thorne et al., 2015). The corporate governance section evaluates CSR reporting issues, board diversity and independence, audit-related issues, and other cases involving corporate governance. The public policy sub-category scores reflect political involvement and contributions, transparency of government payments, and any public policy related issues (Thorne et al., 2015).

RESULTS

Total CSR

To test our research question of whether there would be differences in CSR across international geographical regions, we compared various CSR scores in six regions. First, we examined Total CSR scores for all regions. Table 1a. and Figure 2. show the mean Total CSR scores by region. Africa has the highest mean Total CSR score of 61.8, followed by Europe, with 61.4; South America,
with 60.3; North America, with 57.3; Asia-Pacific, with 54.9; and Latin America, with 54.7. **Table 1b.** illustrates the one-way analysis of variance (ANOVA) table, showing that there are significant differences in Total CSR scores by region (F = 79.0, p = .000). Using a 95% family-wide confidence level, the Tukey Pairwise Comparisons test was then used to determine significant differences among regions for Total CSR scores. The results showed that there were no significant differences in Total CSR scores between Africa, Europe, and South America, but all three regions had significantly higher Total CSR scores than the other regions. Further, North America has a significantly higher CSR score than the Asia-Pacific regions, but there was no significant difference found between North America and Latin America. Latin America has significantly lower Total CSR scores than all the other regions, except the Asia-Pacific, whose scores were not significantly different.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Region</th>
<th>n</th>
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<th>Std. Dev</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
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<td>11.6</td>
<td>38.1</td>
<td>88.8</td>
</tr>
<tr>
<td></td>
<td>Asia-Pacific</td>
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<td>54.9</td>
<td>9.0</td>
<td>30.1</td>
<td>89.1</td>
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<td></td>
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<td>10.5</td>
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<td>86.7</td>
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<tr>
<td></td>
<td>South America</td>
<td>138</td>
<td>60.3</td>
<td>10</td>
<td>35.4</td>
<td>81.4</td>
</tr>
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</table>

**Table 1a.** Total CSR Score by Region.

**Figure 2.** Total CSR Mean Scores by Region.
Environmental CSR

Table 2a. and Figure 3 illustrate the mean Environmental CSR scores by region. Europe has the highest mean score of 58.4, followed by Africa, with 57.3; and South America, with 54.3. Furthermore, North America and the Asia-Pacific regions share the mean score of 52.2, while Latin America has the lowest, at 49.7. Overall, the rankings of the Environmental CSR scores are lower than the Social, Governance, and Total CSR scores for all regions. Table 2b. shows the ANOVA results, indicating significant differences in Environmental CSR scores by region (F = 40.2, p = .000). Using a 95% family-wide confidence level, the Tukey Pairwise Comparisons test was then used to determine the significant differences in regions for Environmental CSR scores. These results show no significant differences in Environmental CSR scores between Europe and Africa, and both regions had significantly higher Environmental CSR scores than North America, Asia-Pacific, and Latin America. South America’s Environmental CSR scores were significantly lower than those of Europe, but not Africa. We found no significant difference in the Environmental CSR scores of South America, North America, Asia-Pacific and Latin America.

<table>
<thead>
<tr>
<th>Variable</th>
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</tr>
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<td>19.9</td>
<td>95.9</td>
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<td></td>
<td>Europe</td>
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<td>27.5</td>
<td>93.7</td>
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<tr>
<td></td>
<td>Latin America</td>
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<td>31.7</td>
<td>84.6</td>
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<td>North America</td>
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<tr>
<td></td>
<td>South America</td>
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<td>54.3</td>
<td>13.4</td>
<td>22.9</td>
<td>91.4</td>
</tr>
</tbody>
</table>

Table 2a. Environmental Score by Region.
Table 3a and Figure 4 illustrate the mean Social CSR score by region. Again, Africa has the highest mean score of 63.0. Europe and South America both have the second highest mean score of 62.6; followed by North America, with 57.2; Asia-Pacific, with 56.1; and Latin America, with 55.7. Overall, the Social CSR mean scores are lower than the scores for Governance CSR and higher than the Total CSR scores, except for North America, where the scores are approximately the same. Table 3b is a one-way (ANOVA) table showing that there are significant differences in Social CSR scores by region at (F = 75.4, p = .000). Using a 95% family-wide confidence level, the Tukey Pairwise Comparisons test was used to examine the differences in regions in Social CSR scores. These results show no significant difference among scores in Africa, Europe, and South America; these regions had significantly higher Social CSR scores than all other regions.
Again, North America had the next highest Social CSR score, while Asia-Pacific and Latin America had the lowest. We found no statistical difference between the Social CSR scores for Asia-Pacific and Latin America and found none between North America and Latin America. North America had a significantly higher Social CSR score than Asia-Pacific.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Region</th>
<th>n</th>
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<th>Std. Dev</th>
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<td>20.2</td>
<td>90.6</td>
</tr>
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<td>11.3</td>
<td>35.0</td>
<td>94.4</td>
</tr>
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<td></td>
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<td>8.9</td>
<td>40.0</td>
<td>72.9</td>
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<td></td>
<td>North America</td>
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<td>57.2</td>
<td>10.1</td>
<td>31.7</td>
<td>94.6</td>
</tr>
<tr>
<td></td>
<td>South America</td>
<td>138</td>
<td>62.6</td>
<td>10.1</td>
<td>35.8</td>
<td>89.6</td>
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</table>

Table 3a. Social Score by Region.

![Social Mean Scores](image)

Figure 4. Social Mean Scores by Region.

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<th>Adj. MS</th>
<th>F-value</th>
<th>P-value</th>
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<td>7,996.8</td>
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<td>Error</td>
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<td>491,516</td>
<td>106</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>4,642</td>
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<td></td>
<td></td>
<td></td>
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</table>

Table 2c. One-way ANOVA Social Score by Region.
Governance CSR

Table 4a. and Figure 5. illustrate the mean Governance CSR scores by region. Africa has the highest Governance CSR score of 67.0, followed by South America, with 66.3; North America, with 64.9; Europe, with 64.3; Latin America, with 60.5; and Asia-Pacific, with 57.5. The Governance CSR scores for all regions are higher than the Total CSR scores, and the rankings by regions are similar. Table 4b., the one-way ANOVA table, shows that there are significant differences in CSR Governance scores by region (F = 99.8, p = .000). Using a 95% family-wide confidence level, the Tukey Pairwise Comparisons test showed no significant difference between Governance CSR scores in Africa, South America, North America, and Europe, and all four regions had significantly higher Governance CSR scores than Latin America and the Asia-Pacific regions. We found no significant difference in the Governance CSR scores between Europe and Latin America or between Latin America and the Asia-Pacific regions.

The results of the statistical analysis of the CSR scores showed that Africa and Europe had consistently higher CSR scores than other regions. Latin America and Asia-Pacific regions had lower CSR scores.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Region</th>
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<th>Std. Dev</th>
<th>Minimum</th>
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<td>Governance</td>
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<td>97.3</td>
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<tr>
<td>Score</td>
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<td>31.6</td>
<td>98.0</td>
</tr>
<tr>
<td></td>
<td>Latin America</td>
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<td>60.5</td>
<td>12.8</td>
<td>37.9</td>
<td>90.1</td>
</tr>
<tr>
<td></td>
<td>North America</td>
<td>1,262</td>
<td>64.9</td>
<td>9.4</td>
<td>38.1</td>
<td>92.5</td>
</tr>
<tr>
<td></td>
<td>South America</td>
<td>138</td>
<td>66.3</td>
<td>12.9</td>
<td>37.9</td>
<td>93.8</td>
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</table>

Table 4a. Governance Score by Region.

<table>
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<th>Source</th>
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<th>Adj. MS</th>
<th>F-value</th>
<th>P-value</th>
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<tbody>
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<td>Region</td>
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<td>0.000</td>
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<td>Error</td>
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<tr>
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<td></td>
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</tbody>
</table>

Table 4b. One-way ANOVA Governance Score by Region.
A Study of How CSR Rankings Are Affected in a Globalized Economy

Figure 5. Governance Mean Scores by Region

than those for other regions in all categories. North and South America were usually between the highest and lowest regions, depending on the type of CSR score. The statistical results support our research question, which stated that there are significant differences in CSR scores across international geographic regions.

DISCUSSION AND CONCLUSION

The purpose of our research is to provide insight on the differences in CSR rankings between regions. Globalization has heightened foreign trade, and firms are more likely to conduct business in multiple countries or regions. For this reason, it is important to evaluate and understand all firms’ CSR practices. To better investigate the association between corporate CSR scores across geographical regions, we examined 2014 CSR scores as reported by the SGP database.

We compared Environmental, Social, and Governance, and Total CSR scores for 4,643 firms, across six international regions, using one-way ANOVA analyses. The purpose of the study was to determine if any difference exists in mean CSR scores among firms located in different international regions. Consistent with our research question, our findings show that CSR scores differ between six regions.
The results for the Total CSR scores showed that overall, Africa had the highest mean Total CSR scores, followed by Europe, South and North America, whose scores were between the highest and lowest. The Asia-Pacific region and Latin America had the lowest CSR score, which was consistent with the results of Environmental, Social, and Governance CSR scores.

The results for the mean Environmental CSR scores showed that Europe and Africa had the highest CSR scores, followed by South and North America, Asia-Pacific and Latin America, with no significant differences among the latter four regions. Overall, the Environmental CSR scores are lower than the Social, Governance, and Total CSR scores for all regions.

We found for the Social CSR scores, Africa, again, had the highest mean score. Africa was followed by Europe and South America, which had the same mean Social CSR score, and North America, again, had both the highest and lowest mean scores. Latin America and the Asia-Pacific region had the lowest Social CSR scores. Overall, the Social CSR mean scores are lower than the Governance mean CSR scores, and higher than the Total CSR scores, except in North America, whose score was consistent across all categories.

The results for the Governance CSR scores showed that Africa had the highest Governance score. South America and North America were between the highest and lowest, followed by Europe. Latin America and Asia-Pacific had the lowest Governance CSR scores, as well as the lowest Total, Environmental, and Social CSR scores.

Overall, we found that Africa and Europe had consistently higher CSR scores than other regions, with Latin America and Asia-Pacific having the lowest CSR scores. North and South America were usually between the highest and lowest regions, depending on the type of CSR score. These results contradict the KPMG (2015) assertion that the Asia-Pacific region has the highest reporting rate, followed by the Americas; our data suggest that there is no relationship between CSR reporting and actual CSR scores. Furthermore, our results do not provide explanations for the differences between the six regions.

The results of our paper can be further expanded to explore possible explanations for the differences between regions. An
expansion of our research could examine national cultures and perform a statistical regression analysis to find similarities or differences. The data on national cultures can be collected from sources such as Geert Hofstede’s book, *Culture’s Consequence: Comparing Values, Behaviors, Institutions and Organizations across Nations* (Hofstede, Hofstede, & Minkov, 2010). Hofstede et al. (2010) divide national cultures into five dimensions: Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty Avoidance, and Long-Term Orientation.

**LIMITATIONS**

This paper is a brief analysis of the current state of CSR reporting within Africa, Asia-Pacific, Europe, Latin America, North America, and South America. The data collected in this study is a broad overview of each region, and this paper does not explore the reasons why these differences arise between these six regions. We also acknowledge that our research has limitations associated with both the research method and measurement. Metrics for Total, Environmental, Social, and Governance CSR performance score measurements were developed by Sustainalytics, and therefore, the validity of CSR scores, depend on the definitions and judgment of the database researchers.

**REFERENCES**


THE INTERSECTION OF AMERICAN INDIANS/ ALASKAN NATIVES AND THE CHILD WELFARE SYSTEM: A REVIEW OF THE LITERATURE

Rebecca J. Luth
Dr. Angie Mann-Williams, Mentor

ABSTRACT
American Indians/Alaskan Natives (AI/AN) have historically been forcefully integrated into the child welfare system. Their relationship began before a formal child welfare system was established in the United States and continues to the present. It is critical to examine AI/AN history and the child welfare system in the United States to fully understand their difficult and often damaging interactions. This paper will review the literature on this topic in an effort to highlight the intersectionality of AI/AN children and families, and the policies and practices of the American child welfare system.

LITERATURE REVIEW
I. Early American Indian/Alaskan Native History
Colonialism
Historically, American Indian/Alaskan Native (AI/AN) peoples in the United States have experienced significant trauma, genocide, and various other preventable tragedies. In 1492, there were an estimated 50–100 million Indigenous people living in North, Central, and South Americas (Taylor & Foner, 2001), yet by 1900, there were only 300,000 survivors (United to End Genocide, 2016). Almost 90% of the AI/AN population was wiped out by disease (Olsen, 2010 as cited in 2013, p. 22), and after 1775, a
bounty was created to pay colonists fifty pounds for every male AI/AN scalp handed over to white authorities (Zinn, 2011). In 2016 U.S. dollars, this is estimated to be about $7,300 per murdered person (Officer & Williamson, 2016).

Ann Laura Stoler (2002) describes how important this genocide was to colonialism. Dividing people into categories such as by sex, class, or race makes it easier to conquer them and acquire their land (Watkins, 2013). The very basic, but effective, rule was that domination over bodies equaled domination over land. Elizabeth Watkins (2013) writes, “Colonialism was not merely an economic venture. It was also a cultural venture” (p. 18).

The rape and sexual assault of women was another way of controlling AI/AN people. In order to justify these acts, the Spaniards asked permission from the Catholic Church to punish the Natives for their “sins.” This domination over women’s bodies was a way of deliberately destroying matrilineal norms. Sexual assault took away the humanity of women and turned them into property for the taking—objects to manipulate at will. Because AI/AN people were viewed as “savage,” “evil,” and “rebellious,” they were considered “deserving” of rape (Watkins, 2013).

**Land Grabs, Ownership, and Forced Removal**

In 1887 the Dawes Act, or the General Allotment Act, was passed (Encyclopedia Britannica, 2013, as cited in Watkins, 2013, p. 18; Lee, 2015; Otis, 2014). The Dawes Act enforced Eurocentric patriarchal ideas by making men the head of the household (Watkins, 2013). The concepts of individual land ownership or private property did not exist in AI/AN communities; under the Dawes Act it is estimated that two-thirds of AI/AN land was lost to White settlers (Aboukhadieje, 2009). The stolen land was resold to newly established White corporations that later imposed a social class hierarchy on the Natives. The plots became more and more scattered, resulting in a physical lack of unity within AI/AN peoples, groups, and communities. The law of the land was created through the imposition of new social values of the Western White Euro-Americans: individualism, social class divisions, and economic self-interest (Watkins, 2013). These values were in stark
contrast to the collectivist culture of AI/AN peoples.

AI/AN people were considered a problem—a nuisance—to be removed to the farthest and least desirable regions of the country. With the approval of President Andrew Jackson and the Bureau of Indian Affairs (BIA), the Indian Removal Act of 1830 led to thousands of deaths. The Cherokee Trail of Tears caused an estimated four thousand deaths among the 16,000 people subjected to removal (“A Brief History,” 2015). Like the Cherokee, the Choctaw, Chickasaw, Creek, Seminole, and many other tribes were subjected to the loss of their homeland (Constitutional Rights Foundation, 2004). From 1830–1838, nearly 100,000 Indians were marched from their land in the South at the request of white cotton growers or new corporations (United to End Genocide, 2016); the land had been their source of food, families, and faith for generations. Theirs was a symbiotic, spiritual relationship with the land, based on respect and love with all life, including plants and animals.

**The Boarding School Era**

The boarding school era began in the late nineteenth century. The emergence of the boarding schools historically marked the time when the U.S. began to interfere with the internal welfare of AI/AN communities. After the U.S. and the BIA realized they could not remove AI/ANs from the country, they adopted a new policy of assimilation, modeled on the ideas of General Samuel C. Armstrong, who had well-meaning intentions. General Armstrong founded the Hampton Institute in 1868 in the hope of educating the newly freed slaves. Armstrong’s definition of “civilized” was based on the Christian values and the Protestant work ethic of the Western White American. The first group of AI/AN students was accepted in the Hampton Institute in 1878 (Ahern, 1997). In 1879, Captain Richard Henry Pratt founded his own school, the Carlisle Indian Boarding School (Lee, 2015; Wuollet, 2010), which became a mechanism of oppression.

Pratt believed in changing a society through their most valuable resource: their children and youth. His vision of “kill the Indian, save the man,” began with sending children to non-reservation boarding schools away from everything they knew.
He thought “savage” people must be subjected to “proper” religion and the Puritan/Protestant ethics of the developing Industrial Age, placing a high value on Christianity, individualism, and land ownership. Children were taught how to read and write in English (Wuollet, 2010); anything that was not part of these values was forbidden (Ahern, 1997; Lee, 2015). AI/AN children were physically punished for practicing their religion, speaking languages specific to their tribe, using their birth names, and wearing long hair (Lee, 2015). Traditional indigenous clothing was burned and AI/AN children were given European names (Wuollet, 2010). It was only a century later that the American Indian Religious Freedom Act ended the prohibition against AI/AN people practicing their religious traditions.

Many Indian cultures did not employ corporal or physical punishment as a parenting technique. Indirectly and directly, children were taught how to parent through non-physical punishments such as being given tasks to complete (Wuollet, 2010). Ahern (1997) writes that, “By 1900 [boarding school] appropriations had grown from $20,000 in 1877 to $2,936,080, the number of schools from 150 to 307, and the number of children in [boarding] schools from 3,598 to 21,568.” This demonstrates the U.S. government’s support for these schools. Children were sent to the schools for many different reasons, and most did not go voluntarily. Some parents were unaware of the conditions of the schools, were not told the truth, and saw education as a way to better survive the threat of American culture. Other parents were coerced into putting their children into the schools by the withholding of annuities and food rations (Archuleta, Child, & Lomawaima, 2000). Often, parents were threatened with imprisonment (Lee, 2015), and family visitation was not allowed (Wuollet, 2010). Some children were sent to these schools due to a documented referral from a social worker, probation officer, agent, or judge (Churchill, 2004). The child welfare system broke families apart, which further perpetuated the ongoing trauma experienced by AI/AN families. The implications of these repeated traumatic experiences continue to the present (Walls & Whitbeck, 2012).
Although many people were speaking out about the mistreatment of AI/AN children, it was not until 1928 that the Meriam Report, which accurately described the treatment of AI/AN children, was released (Lee, 2015). In 1926, the U.S. Secretary of the Interior tasked a non-partisan group of researchers with surveying the economic and social conditions of American Indian life. The group spent seven months visiting 64 of the 78 boarding schools and compiled detailed accounts of abuse and neglect. The resulting Meriam Report described the overcrowding of the dormitories, the low-quality teachers, lack of healthcare and medical attention in the schools, the poor quality of food, and the rigorous labor required of each student (Meriam, 1928). This document resulted in policy changes in education, health care, and land rights for AI/AN people (United to End Genocide, 2016).

The Johnson-O’Malley Act of 1934 was created in response to the poor conditions in boarding schools. The U.S. wanted to integrate, rather than assimilate AI/AN children into White American society, but this time through state schools. The act provided funds for education, medical attention, financial relief, and social welfare for each enrolled child, but it did not address the culturally specific needs of the students (Bureau of Indian Education, 2016). The act also gave AI/AN people the right to choose where their children went to school. There was great emphasis placed on reservation day schools, in more centralized locations for communities (Wuollet, 2010).

**The Termination Era**

The 1940s to 1960s were considered the “Termination Era” (Indian Country Wisconsin, n.d.). Tribal recognition, or sovereignty, was terminated; the United States government reasoned that tribes no longer needed government protection (American Indian Relief Council, n.d.-b). This, of course, allowed the American government to negate all responsibility for AI/AN living conditions. The United States stripped tribes of financial resources, again relocated them to remote reservations, and then criticized them for being “dependent” on government resources (American Indian Relief Council, n.d.-a.; Allan, 1988). Tribes were
suddenly expected to be self-reliant. During this period, policies diminished government assistance and federal recognition of tribes; “victim blaming” was used as a tactic to further oppress an already marginalized group, and the historical trauma experienced by AI/AN people went unaddressed.

From 1953–1964, 109 tribes were “terminated,” and federal responsibility and jurisdiction for the members’ welfare was turned over to states. This era has contributed to a number of tribes being recognized only by states, rather than at the federal level, today. The loss of federal recognition resulted in the withdrawal of funding, which was devastating to tribal communities; those who are not federally recognized do not receive federal funding for different programs and are not protected under some federal laws (National Conference of State Legislatures, 2016). Lacking federal recognition, AI/AN people had nearly 2.5 million acres of land taken from them, and over 12,000 AI/AN people were removed from official tribal membership (American Indian Relief Council, n.d.-a). The impact of losing tribal membership has been longstanding and continues to impact children entering the child welfare system today.

**Civil Rights, Self-Determination, and Sovereignty**

When the Bill of Rights was passed in 1791, the legal protections it contains were not extended to AI/AN people. The Indian Civil Rights Act (ICRA) was passed only in 1968. Self-governing tribes are now responsible for upholding the freedom of religion, speech, press, to peacefully assemble, and to petition a redress of grievances. The ICRA gives members of the tribe the right to a jury trial and freedom from prosecution for unreasonable search and seizure (Tribal Court Clearinghouse, n.d.). Unlike the United States government, tribal governments do not have the power to prosecute severe crimes, such as murder, rape, arson, and burglary, due to the outdated Major Crimes Act of 1885 (Federal Bureau of Investigation, 2012; Major Crimes Act-18 U.S.C. § 1153, n.d.). The ICRA sets restrictions on the fine limit and length of imprisonment for those who are found guilty of a crime. Today, these prosecuting restrictions include no more than three years of imprisonment and a fine of $15,000 (Cornell University Law School, n.d.; Watkins, 2013). The relationship of the United States
and tribal governments is supposed to be that of equals, but it more closely resembles a parent/child relationship. Tribes are responsible for protecting members, but they are not given the power to take legal action against lawbreakers. This leaves a crucial gap in their governmental system in terms of community sovereignty.

Many different laws have been passed in an attempt to restore power to tribal governments. The Indian Self-Determination and Education Assistance Act of 1975 (ISDEAA) gave tribes the power to implement programs created by the federal government, such as Indian Health Services (American Indian Relief Council, n.d.-a). The Indian Self Governance Act of 1994 authorizes tribes to manage trust resources and their own wealth (Cornell University Law School, n.d.). While these acts give tribal government more power than before, they do not represent true sovereignty, for the programs administered by the ISDEAA were created by the federal government, not the native people.

**AI/AN Culture**

Throughout the United States, many diverse AI/AN cultural values and traditions continue to exist, yet many traditional values have been lost. While Eurocentric culture values the individual, many AI/ANs value the community and family over self (Wuollet, 2010). More emphasis is put on how one’s actions will affect generations to come. For some tribes, this mindfulness extends seven generations into the past and the future. Holding previous family and communities in high regard demonstrates the love and admiration for elders. In the same way, looking to future generations exhibits love for the children to come. The National Indian Child Welfare Association (2016) expresses this way of life by stating that, “Preservation of American Indian culture starts with protection of our most precious resources—American Indian children and families. Only when our children and families are healthy and happy can there be harmony in our world.”

**II. AI/AN Child Welfare in the United States**

Historically, the origin of child welfare for all children in the United States can be traced to the early seventeenth century.
Later, formalized efforts to address the welfare of children were initiated. In 1853, the Children’s Aid Society of New York was founded to care for poor and delinquent children (Children’s Aid to Society, n.d.). Based on this model, aid societies and free foster families became more prominent across the U.S. (McGowan, 2005). Prior to 1974, there were no formal federal or state policies that addressed the abuse or neglect of children. In 1974, the Child Abuse Prevention and Treatment Act (CAPT) was enacted. CAPT was the first major federal statute that addressed child abuse and neglect. This policy required states to create systems for reporting and investigating allegations of neglect in order to receive funding. Reports of abuse and neglect increased, and more children were put under the protection of states.

While the federal government recognized the need to address the abuse and neglect of children across the U.S., CAPT did not specifically address the needs of AI/AN children and families. Given the domination the U.S. imposed on AI/AN families, and their historical trauma, recognition gradually grew that AI/AN families required more culturally sensitive legislation specific to child welfare requirements. In 1978 the Indian Child Welfare Act (ICWA) was passed. Although the Meriam Report had documented challenges faced by AI/AN children in 1928, it was not until 1978 that the federal government addressed their problems. ICWA restored to tribal governments the power to determine the placement of children. Unfortunately, this only included federally-recognized AI/AN tribes, not state recognized groups. Tribes that could not provide the rigorous documentation of their identity were not given federal assistance or recognition of their status as native people. AI/AN people are the only community required to provide documentation of ancestry in order to gain legal recognition of their ethnicity (Indian Child Welfare Act, 1978).

In 1994 the Multiethnic Placement Act (MEPA) was passed to address the disparity of ethnic groups in the child welfare system. While ICWA emphasizes the importance of the tribe and the child, the MEPA focused on the length of time spent in foster care. The push for a more culturally sensitive placement,
and the preservation of the child’s culture, was coupled with the equal opposition of empowering every family to provide a loving home, regardless of their ethnicity. While these social reforms shared the goal of creating a healthy and loving environment for the child, each manifested this belief in opposite legal reforms (Administration for Children and Families, n.d.). In 2008, the Fostering Connections to Success and Increasing Adoptions Act was enacted. This act “…enabled federally recognized Indian Tribes to directly operate title IV-E programs for the first time” (Administration for Children and Families, n.d.). Funds were also used to create the National Resource Center for Tribes, and grants were available to develop self-sufficient child welfare agencies. The aim of this act was to improve outcomes for those in foster care and connect children with extended relatives (Indian Child Welfare Act, 1978).

Overview of Child Welfare in the United States

There are many different definitions of child abuse and neglect, but the federal definition, which all states have to follow, is, “Any recent act or failure to act on the part of a parent or caretaker, which results in death, serious physical or emotional harm, sexual abuse, or exploitation, or an act or failure to act which presents an imminent risk of serious harm” (Child Welfare Information Gateway, 2014, p. 1). There are several recognized types of abuse: physical, sexual, and emotional. The child welfare system was created in response to abuse and neglect by offering a number of services with the goal of ensuring the safety of children. The Annie E. Casey Foundation (2015) estimates that there are more than 400,000 children in the child welfare system on an average day in the United States. Child welfare programs include Child Protective Services (CPS), family preservation services, and foster care and adoption.

The preservation of the family is the highest priority of all child welfare services. The goal is for all children to remain with their parents or guardians. Family preservation programs may offer family counseling, substance use recovery, mental health services, domestic violence, sexual assault therapy, and food
assistance. These programs include the Supplemental Nutrition Assistance Program (SNAP), food stamps, the Women, Infants and Children (WIC) program, the Temporary Assistance for Needy Families (TANF) program, housing assistance (Section 8 Housing Choice Voucher and Project-Based Rental Assistance), among others (Office of Family Assistance, n.d.). Foster care is recommended when children are temporarily taken away from their legal guardians. Their family may be in unsafe living conditions (physically, mentally, and/or emotionally), and the children need time for the home situation to be improved. American Indian children are three times more likely to be placed in foster care than the general population (Center for the Study of Social Policy, Annie E. Casey Foundation, & Alliance for Racial Equity in Child Welfare, 2011). Adoption services may step in when parental rights are terminated or the parents are deceased and a child needs to be placed up for legal adoption. The first priority for adoption is always with the extended family; if extended family members are not available, a similar ethnic culture is sought.

**Intersection of Child Welfare and AI/AN Children and Families**

**Risk Factors that Contribute to Child Welfare Involvement**

Professionals in the child welfare field have identified several risk factors that increase the likelihood of involvement with the child welfare system. These include substance abuse, poverty, unemployment, educational attainment level, domestic violence, and single-parent households (Goldman, Salus, Wolcott, & Kennedy, 2003). AI/AN communities have a 25% poverty rate, the highest in the nation (Wuollet, 2010). AI/AN women have a one-in-three chance of being raped during their lifetime (Rape, Abuse & Incest National Network, 2009); eighty-six percent (86%) of the perpetrators are non-Indian men (Watkins, 2013). Additionally, AI/ANs have a nearly 1.7 times greater chance of committing suicide than the general U.S. population (Olson & Wahab, 2006).
Disproportionality and Disparity

There are several definitions used to describe the representation of children in the welfare system. *Disparities and Disproportionalities in the Child Welfare System*, by the Center for the Study of Social Policy and the Annie E. Casey Foundation, with the help of The Alliance for Racial Equity in Child Welfare, defines “disproportionality” as “the ratio of the percent of persons of a certain race or ethnicity in a target population (e.g., children who are substantiated for maltreatment) to the percentage of persons of the same group in a reference (or base) population.” “Disparity” is defined as, “the comparison of the ratio of one race or ethnic group in an event to the representation of another race or ethnic group who experienced the same event” (Meyers, 2010, as cited in Center for the Study of Social Policy et al., 2011, p. 8).

“Substantiation” is the process of finding (or not finding) the above types of abuse or neglect. “Unsubstantiated” (unfounded) cases usually close because there is an insufficient amount of evidence (Child Welfare Information Gateway, 2014). Substantiated (founded) cases remain open and continue to be investigated. Section 1911 of ICWA explains that if a child is domiciled (residing) on a tribal reservation, then the tribe has exclusive jurisdiction over the court case. If the child does not reside on tribal land but is member of a tribe (or eligible for membership), then all affiliated tribes should be notified by mail with a return receipt, and the tribe has the option to decline the transfer (Indian Child Welfare Act, 1978). If the transfer is accepted and successful (neither parents nor the state prosecutor objects to the transfer) by an affiliated tribal court, the tribe takes over the child’s case. If the case is not successfully transferred, but the child is still a member or is eligible for tribal membership, then ICWA still applies, regardless of what court processes the case. According to an analysis by the Center for the Study of Social Policy et al. (2011), Black and American Indian cases are twice as likely to be investigated and substantiated.
Risk Factors in the Child Welfare System

Children in the welfare system are at high risk for developmental, behavioral, and emotional problems due to being removed from their biological relatives, and from the previous neglect and abuse that led to their separation from their family (Casey Family Programs, 2015). Despite high rates of mental health disorders, three-fourths of the children involved in the child welfare system who displayed obvious signs of clinical impairment did not receive mental health services within twelve months after investigation (Pecora, Jeneson, Romanelli, Jackson, & Ortiz, 2009; Stahmer et al., 2005). Given the historical trauma and traditions of removing children/families from their homes and homeland, one can imagine the negative effects on the AI/AN population. This can manifest itself through anxiety, depression, addiction, rage, and suicide. When parents are not able to parent, the next generation suffers; many AI/AN children were not taught by their parents or caregivers how to cope with the trauma they and their ancestors experienced (Heart, 2007).

III. The Indian Child Welfare Act

Factors Leading up to the Passage of ICWA

Prior to 1978, the high rates of overrepresentation of AI/AN children in the child welfare system, the placement of AI/AN children into non-native households, and the breakup of AI/AN families were alarming (Bureau of Indian Affairs, 2015). Lee (2015) noted that, “…over 25% of all Indian children were living in foster homes, adoptive homes, and/or boarding schools” (p. 1). Hence, the Indian Child Welfare Act was passed (also referred to as P.L. 95-608; Tribal Court Clearinghouse, 2016).

AI/AN children have been taken away from their families for many reasons. Often, neglect claims were based on the basis White, middle class standards. Factors of “poverty, poor housing, lack of modern plumbing, and overcrowding” were considered “neglect” and could have been corrected with proper assistance (Lee, 2015, p. 19). Parents were not given due process and children were taken without notice or a hearing. Women were afraid that if they protested the removals, they would be incarcerated (Lee, 2015).
social workers would often remove children from families if they were being cared for by grandparents. Finally, there was an economic incentive for adopting AI/AN children: if a child is adopted, the adoptive family received state subsidies. Cases such as Wyoming’s “baby farms” used the children for child labor and were paid by the state in addition (Lee, 2015, p. 20–21).

The Drafting Process of ICWA

During the drafting process of ICWA, a federal branch dedicated to the oversight and compliance of the act was proposed. Oversight would entail thorough documentation and reporting both by state and tribal social service agencies to the federal branch to ensure that AI/AN children were not overrepresented in the child welfare system, or that AI/AN children were not disproportionately represented. It is unclear why these recommendations were not adopted (Limb, Chance, & Brown, 2004). Lee (2015) wrote that the “ICWA does not compel the states to act, nor require documentation of effectiveness, nor does it convey authority to level penalties on states for non-compliance” (p. 12).

In 2005, the Government Accountability Office (GAO) was tasked with the investigation of ICWA compliance. After sending an online survey to all fifty states, only five could provide data on children served under the ICWA (GAO, 2005 as cited in Lee, 2015). The GAO provided suggestions to correct the lack of regulation, but the changes were not put into place.

State and Tribal Collaboration

ICWA requires that federal, state, and tribal governments work together to protect AI/AN children. This is one of the only policies of its kind. When an AI/AN child is identified in the state child welfare system, the agency has to communicate with tribal child welfare workers. Identification during the intake process is one of the biggest problems with identifying AI/AN children in need of assistance. The agency must get handwritten documentation that the child is affiliated with tribe(s) through membership, or is eligible for membership. The Bureau of Indian Affairs publishes a list of agents to contact for each tribe’s child welfare workers (Indian Child Welfare Act, 1978).
The goal of ICWA is to protect tribal children and their families by establishing basic federal guidelines for the process of AI/AN child removal, foster care placement, adoption, and the termination of parental rights while adhering to tribal-specific traditions and values (Bureau of Indian Affairs, 2015; Indian Child Welfare Act, 1978; Bussey & Lucero, 2013). However, ICWA states that if state or federal law, under a court proceeding, provide higher protection for the AI/AN child or parent than what is outlined, the higher standard should be applied (Public Law 95-608, 1978). This is an attempt is to reduce disproportionality of AI/AN children in the child welfare system.

Since child welfare begins with a report and the first responders to these reports are state workers, it is important to grasp how state, federal, and tribal jurisdictions cooperate. ICWA is a federal social policy that guides state human service agencies’ response when an AI/AN child has been identified in the child welfare system. In terms of governmental power, the hierarchy is supposed to function as if the United States and tribal government were equals, and the state’s power falls under federal/tribal regulations (National Congress of American Indians, 2016; Child Welfare Information Gateway, 2012). As federal policy, ICWA takes precedent over any other state policy, unless the child’s well-being is in danger.

**Guidelines of ICWA**

Guidelines have been established to govern the placement process of AI/AN children in the child welfare system. When a child is identified, any tribes and/or birth parents affiliated with the child are identified, via mail with a return receipt, and provided with notification of the proceedings and their rights to intervene. If the identified tribe confirms the child’s Indian ancestry, the custody proceedings will take place under the exclusive jurisdiction of a tribal court (section 1911 and 1912). Specific time frames and required information about the proceedings are also provided (Indian Child Welfare Act, 1978).

Section 1915 outlines the specific order of placement of an Indian child. Priority is always given in the following order: first to a member of a child’s immediate family, followed by the extended
family, other members of the child’s tribe, and finally, to other Indian families. ICWA prioritizes the best interests of the child and tribe. Section 1921 states that if there is a higher standard of state or federal law that protects the rights of parents or Indian custodians, the higher standard should be applied.

Due to the lack of clarity of terms used in ICWA, new guidelines were published in March 2015. These guidelines include added or revised definitions for the following terms: “active efforts,” “child custody proceeding,” “custody,” “domicile,” “imminent physical danger or harm,” “parent,” “reservation,” “tribal court,” and “voluntary placement.” In addition to definitions, common questions and answers are included. Perhaps the most important question is “Who determines whether a child is a member of a tribe?” The affiliated tribes always determine membership. No other entity is allowed to do this, including members and branches of the federal government (Bureau of Indian Affairs & Bureau of Interior, 2015).

**CURRENT RESEARCH**

This literature review highlights the intersectionality of AI/AN children and families and the child welfare system. While ICWA was passed in 1978 to address the culturally unique needs of AI/AN children, research systematically evaluating the effectiveness of ICWA at a policy level or within the child welfare system, post-implementation, is scant. Much of the published research focuses on a specific dimension of the policy, prominent case decisions guided by ICWA (Ross-Mulkey, 2015; Zug, 2014), policy analysis of ICWA, or state-level decisions with ICWA (Jervis, 2004; Kendall-Miller, 2011). Terry Cross (2014), a native scholar, highlights the need to engage in and focus on the cultural and policy impact of ICWA: “Today, with the international adoption industry suffering from tighter restrictions imposed by countries such as Russia and China, pressure to keep up with the demand for children has returned stateside. There is evidence of corrupt adoption practices caused by those whose motive is to prey upon the legitimate desire of childless couples to parent, specifically AI/AN children” (p. 23).
REFERENCES


ABSTRACT

Saccharomyces cerevisiae (S. cerevisiae) was the first eukaryote to have its full genome sequenced, which makes it one of the longest studied genomes. The scientific community has established that S. cerevisiae is a useful model in the study of human diseases due to the homology that exists in numerous human and yeast genes. Yeast artificial chromosomes (YACs) have been developed that contain inserts of human DNA. These YACs can be used to study the mechanisms that cause DNA fragility in humans by placing a known human fragile site within a YAC. Though it is useful to study human DNA inserted into yeast to monitor the inherent fragility of the sequence, studying the nature of native yeast fragile sites may have benefits as well. The types of native fragile sites in Saccharomyces cerevisiae include Mec1 mutant, hydroxyurea, palindromic, ty-element, and Pol1 mutant induced fragile sites. Many of the mechanisms of yeast DNA fragility are similar to those of human DNA. The purpose of this review is to compare and contrast the mechanisms of fragility in S. cerevisiae and human DNA. Though human and yeast fragile sites are not always caused by similar means, with further study of the native fragile sites in S. cerevisiae, more similarities may be found that can give further insight into the human fragile sites and diseases caused by them.
INTRODUCTION

Saccharomyces cerevisiae

*Saccharomyces cerevisiae* (*S. cerevisiae*), often referred to as baker's or budding yeast, is a type of fungi found naturally on the outside of grapes and figs (Goffeau et al., 1996). The names “baker's” and “brewer's” yeast reflect the ways that *S. cerevisiae* has been used for centuries. *S. cerevisiae* was used to leaven dough and to produce ethanol through fermentation in brewing. In addition to being used to make beer and bread, *S. cerevisiae* has become common in many research labs due in part to its having been the first eukaryote to have its full genome sequenced (Goffeau et al., 1996). As a result, much has been learned about budding yeast, which coupled with it being an easy organism to grow and work with, makes it a prevalent model organism (Botstein, Chervitz, & Cherry, 1997).

Moreover, *S. cerevisiae* is a unicellular organism, unlike humans, which are multicellular. However, both organisms are eukaryotes and as a result many homologous genes, genes that code for similar traits, have been found, making *S. cerevisiae* important in research pertaining to human genetic disease (Botstein et al., 1997). The existence of homologous genes in a unicellular organism affords researchers the ability to study the genes in a less complex organism. These results can then be applied to better understand the homologous gene in the more complex organism. Due to varying similarities to mammals, yeast has been used as models in the study of the effects of pharmacological molecules (Mattiazzi, Petrovic, & Krizaj, 2012), neurological diseases (Sarto-Jackson & Tomaska, 2016), energy metabolism (Zhang, Vermuri, & Nielsen, 2010), and fragile sites (Lemoine, Degtyareva, Lobachev, & Petes, 2005).

Fragile Sites

A fragile site is an area of a gene that experiences frequent breaks for any number of reasons. While fragile sites occur in many organisms, we will focus on fragility in the *S. cerevisiae* and human genomes. Yeast fragile sites are not separated into specific
categories; they are defined by the mechanism that causes the fragility. Studies have indicated that certain yeast fragile sites behave similarly to human fragile sites. For example, both human and yeast fragile sites are susceptible to replication stress (Raveendranathan et al., 2006). In addition, two kinases in yeast that play direct roles in fragile site stability, Mec1 and Tel1, are homologs of human ATR and ATM proteins, respectively (Cha & Kleckner, 2002). There are instances of breaks due to knock-out of Mec1, which mirrors common fragile sites (CFSs; Cha & Kleckner, 2002).

There are two categories of human fragile sites: “common” fragile sites and “rare” fragile sites (Durkin & Glover, 2007). Common fragile sites may occur in the whole population (Zlotorynski et al., 2003); these fragile sites cluster around areas of replication stress and occur more frequently than rare fragile sites (Durkin & Glover, 2007). Many common fragile sites can be induced by a form of replication stress, including DNA polymerase inhibitors such as aphidicolin (Glover, Berger, Coylr, & Echo, 1984). These are of particular interest because they have been linked to tumorigenesis (Smith, Huang, & Wang, 1998). It has also been suggested that common fragile sites may be used to indicate a predisposition to lung cancer (Karadag et al., 2002). Being linked to such serious diseases warrants further study of fragile sites, which may lead to a more effective understanding and prevention of these diseases.

**Yeast as a Model for the Study of Fragile Sites**

Two methods have been established to study fragile sites in *S. cerevisiae*. First, a yeast artificial chromosome (YAC) containing a fragile human DNA sequence can be placed in the yeast genome (Wilke et al., 1995). Placing human DNA into yeast cells is advantageous because it allows the DNA sequence to be studied out of context. It also allows the human DNA to be studied in a less complex organism, which can be efficient economically and practically. To determine if a sequence of human DNA is inherently fragile, it is vital to remove it from the context of the human chromosome to reduce variables. Outside the context of
human cells, we can examine whether the sequence itself is the cause of fragility, or if it is fragile due to factors that take place within human cells. Studying YACs is economical and practical because yeast are easier to reproduce and sustain than human cells.

Moreover, native yeast fragile sites can also be studied. Due to the similarities, they can provide insights into the causes of human fragile sites. This review will be discussing yeast native fragile sites induced by low DNA polymerase α, mec1Δ, Ty elements, DNA replication defects, and palindromic cruciform structures.

Yeast Native Fragile Sites

**Low DNA Polymerase Alpha Induced Fragile Sites**

DNA polymerase alpha must be present for yeast to undergo DNA replication (Lemoine et al., 2005). Adding a \textit{GAL1} promoter to the \textit{POL1} gene can allow for the control of DNA polymerase alpha production. The \textit{GAL1} promoter causes the \textit{POL1} gene to be replicated only when galactose is present (Lemoine et al., 2005). Therefore, when no galactose is present, the \textit{POL1} gene is not replicated and DNA polymerase alpha is not made (Lemoine et al., 2005). \textbf{Figure 1.} illustrates how media containing different levels of galactose affect yeast containing the \textit{GALPOL1} gene. The results of this experiment showed that DNA replication stress induced by low levels of DNA polymerase alpha caused increased fragility in \textit{S. cerevisiae}. This included duplications, deletions, and translocations between Ty elements (Lemoine et al., 2005).

Similarly, human common fragile sites can be induced by DNA polymerase alpha inhibitors such as aphidicolin (Glover et al., 1984). Comparably, induced DNA fragility at common fragile sites also includes duplications, deletions, and translocation (Zlotorynski et al., 2003; Kurahashi & Emanuel, 2001). However, these translocations occur at AT-rich palindromic repeats (Kurahashi & Emanuel, 2001). Additionally, human CFSs and native yeast fragile sites are late replicating (Le Beau et al., 1998; Lemoine et al., 2005). When DNA polymerase alpha is inhibited in both yeast and human cells it causes sensitivity to DNA damaging molecules, including hydroxyurea (HU; Lemoine et al., 2005; Zeeland et al., 1982).
Bentley: Unlocking Young Minds

Review of Native Fragile Sites in Saccharomyces Cerevisiae:
A Comparison to Human Fragile Sites

Figure 1.
In contrast, fragile sites that occur when DNA polymerase alpha is inhibited cause illegitimate mating in yeast and not humans, because humans are multicellular complex organisms (Lemoine et al., 2005). Moreover, in yeast DNA, polymerase alpha was inhibited using the GAL1 promoter (Lemoine et al., 2005), while it was inhibited with aphidicolin in humans (Zeeland et al., 1982).

**Palindromic Sequence Breaks**

DNA fragility can occur at palindromic sequence in the yeast genome (Nag & Kurst, 1997). A palindromic sequence is one that when read five-prime (5’) to three-prime (3’) on one strand is the same as when reading 5’ to 3’ on the complimenting strand. Because the sequence is a palindrome, when DNA replication begins and the DNA is temporarily single-stranded, it can hydrogen bond to itself, causing secondary structures such as hairpin loops or cruciform (Nag & Kurst, 1997). Figure 2 illustrates a possible cruciform structure. When DNA is formed into these structures the cell can resolve it in a number of ways (Nag & Kurst, 1997). Many resolutions cause double-stranded breaks during meiosis (Nag & Kurst, 1997). Though this particular fragile site is not truly native to yeast, it was inserted via a plasmid vector by which palindromic sequences are thought to occur (Nag & Kurst, 1997). Deletions occur at palindromic areas of the human genome (Kurahashi et al., 2009). Unlike these palindromic sequences in yeast, the palindromic sequences in humans cause problems during mitosis, not meiosis (Kurahashi et al., 2009). The fragility of these human palindromic sequences is induced by replication stress; the sites are not inherently fragile, like the yeast palindromic sequences (Kurahashi et al., 2009).

In other studies, plasmids containing palindromic sequences were introduced into *Saccharomyces cerevisiae* and were shown to be resolved using mechanisms characteristic of Holliday junction resolution (Cote & Lewis, 2008). Figure 2 illustrates a possible cruciform resolution via a Holliday junction resolution. It is proposed that after resolution leading to one or more hairpin loops, nuclease Mre11 can remove the hairpin caps (Cote & Lewis, 2008). Removal of the hairpin caps can allow
Figure 2. Resolution of Palindromic Sequence as a Holliday Junction. The green sections are used to represent sections of DNA, which are inverted repeats. These result in hairpin loops or cruciform structures when single stranded, as they are during replication. After resolution of the cruciform structure, a break can be formed due to the manner in which it has been resolved. If it is resolved as a Holliday junction, the palindromic sequences remain hydrogen bonded. This illustration is only meant to be a visual representation, and is not to scale.
for repair of the double-strand break (Lobacheb, Gordenin, & Resnick, 2002). Mre11 is a nuclease also found in mammalian cells, including humans (Lee & Paull, 2005).

As stated previously, human DNA also contains palindromic regions (Zlotorynski et al., 2003). However, these palindromes are usually AT-rich, and the sequence inserted into the yeast cell is not (Zlotorynski et al. 2003; Nag & Kurst, 1997). Furthermore, the AT-rich sequences in humans form hairpin loops, opposed to cruciform structures (Zlotorynski et al. 2003; Nag & Kurst, 1997).

**Mutant Mec1 Linked Fragile Sites**

Mec1 has been shown to play an important role in the prevention of DNA breaks at replication slow zones (RSZ) in yeast (Cha & Kleckner, 2002). During DNA replication in S-phase, effective replication of DNA requires dNTPs to be present. These dNTPs are synthesized in part by Rnr1 a ribonucleotide reductase. Rnr1 is inhibited by Sml1, which causes lower levels of dNTPs to be present. Lower levels of dNTPs can cause replication problems in RSZs (Cha & Kleckner, 2002). Through its downstream target Rad53, Mec1 inhibits Sml1, which allows Rnr1 to produce dNTPs. Having enough dNTPs lowers the formation of double strand breaks (DSBs) at RSZs. However, when Mec1 is replaced with mec1-ts, a thermosensitive gene, double strand breaks occur at RSZs under restrictive temperatures (Cha & Kleckner, 2002). Under these temperature sensitive conditions, it has been found that knocking out Rrm3 decreases DSBs at RSZs (Hashash, Johnson, & Cha, 2011). This occurs because rr3Δ leads to Sml1 degradation (Hashash et al., 2011). To support the hypothesis that RSZs are fragile because of low dNTP concentration, mec1-ts cells were treated with hydroxyurea (Hashash et al., 2011). Hydroxyurea (HU) inhibits Rnr1, which causes dNTPs to not be up regulated. In mec1-ts cells that were treated with HU, more breaks occurred at RSZs (Hashash et al., 2011). However, when exposed to excessively high concentrations of HU, fewer breaks occurred at RSZs because the replication forks collapsed before the RSZs could be reached (Hashash et al., 2011).
To further understand S-phase checkpoint kinases, Mec1 and Rad53 mutants mec1-1 and rad53-1 were introduced in yeast (Raveendranathan et al., 2006). These mutant genes prevent the Mec1 and Rad53 kinases from being produced (Raveendranathan et al., 2006). Yeast cells that do not produce Mec1 and Rad53 exhibited hindered DNA replication due to replication fork collapse (Raveendranathan et al., 2006). A cascade of events linked to Mec1 causes the production of dNTPs, which are required for DNA replication, and when these are in limited supply due to the mec1-1 or rad53-1 mutation, replication slow zones were the result (Raveendranathan et al., 2006).

In addition, it has been shown that Mec1 and Tel1 activity in response to DNA damage causes phosphorylation of histone H2A, resulting in γ-H2AX (Szilard et al., 2011). Searching for and mapping γ-H2AX allows for the identification of many fragile sites on the yeast genome (Szilard et al., 2011). A homologous pathway occurs in human cells. Mec1 homolog ATR and Tel1 homolog ATM respond to DNA damage, and this leads to the phosphorylation of histone H2A, which results in γ-H2A, as shown in Figure 3. (Szilard et al., 2011).

In addition to the similarities between yeast and human phosphorylation of histones, the human homolog of MEC1, ATR, is also involved in a replication checkpoint (Wan, Kulkami, & Wang, 2010). ATR and MEC1 are both needed in response to DNA polymerase alpha inhibition (Wan et al., 2010; Song, Dominska, Greenwell, & Petes, 2014). ATR and MEC1 are also both involved in a pathway with ribonucleotide reductases (Zhang, Jones, Martin, Caplen, & Pommier, 2009; Cha & Kleckner, 2002).

**Hydroxyurea Induced Fragile Sites**

To study the effects of hydroxyurea (HU) induced replication stress, Feng, Di Rienzi, Raghuraman, and Brewer (2011) subjected yeast DNA to HU and used ssDNA detection to monitor replication fork movement. After HU exposure they were able to map breaks in the chromosome, which clustered around areas containing replication forks (Feng et al., 2011). Additionally,
Figure 3. Flow Chart Highlighting the Pathway from Mec1 to dNTP Production.
single-stranded DNA (ssDNA) was found before chromosome breaks were observed, indicating that ssDNA may be involved in the development of double-strand breaks (Feng et al., 2011). A specialized yeast strain containing mec1-4, which is temperature sensitive and which was not subjected to HU, was also shown to have ssDNA preceding chromosome breaks (Feng et al., 2011). This further supports the hypothesis that ssDNA is involved in chromosome breakage. The proposed cause of ssDNA in this study is uncoupled DNA synthesis or cutting of already synthesized DNA (Feng et al., 2011).

Similarly, HU can cause replication stress in human cells, which leads to ssDNA (Mortusewicz, Evers, & Helleday, 2016). Double-strand DNA breaks in human cells also occur at ssDNA (Mortusewicz et al., 2016). Humans have an ssDNA-binding protein that stabilizes sites of replication that can be stalled due to hydroxyurea (Mortusewicz et al., 2016).

**CONCLUSIONS**

The similarities between the genome of *Saccharomyces cerevisiae* and the human genome allows us to study fragile sites in yeast and apply this knowledge to human fragile sites. Many of the mechanisms that cause native yeast fragile sites also cause human fragile sites. In many cases, homologous genes are involved in similar pathways. These homologous genes are the similarities left over from the common ancestor of yeast and humans. Because the yeast genome is much smaller and yeast are easier to work with than human cells, yeast will continue to be an important model organism for studying fragile sites. Even after we have exhausted the similarities between them, yeast can still be used to study human fragile sites out of context by placing human DNA in the yeast genome. The discoveries to be made by studying fragile sites in yeast are many, and they will likely help to establish treatments for diseases linked to fragile sites, as well as to establish mechanisms for mapping fragile sites on chromosomes.
REFERENCES


SHARE-CROPPING BLACKNESS: WHITE SUPREMACY AND THE HYPER-CONSUMPTION OF BLACK POPULAR CULTURE

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ABSTRACT
This qualitative study will explore the impact of the way that “Blackness” is constructed and commodified for consumption within a White supremacist culture, and examine the effects of this construct on the Black community. According to Leonard and King (2012), in their book Commodified and Criminalized: New Racism and African Americans in Contemporary Sports, “The process of commodification is not simply about selling an essentialized Black culture, but rather a particular construction of Blackness that has proven beneficial to White[s]” (p. 10). This paper will discuss some of the twenty-first century consequences of this phenomenon. The methodology will be conducted through a literature review and a content analysis of various cultural texts including films, interviews, and art that depict Blackness. My belief is that the popular consumption of commodified Black images is related to the maintenance of White supremacy, and thus the systemic oppression of Blacks in the United States.

INTRODUCTION

New racism, although articulating dominant White narrative and stereotypes, is equally defined by the consumption and celebration of commodified Blackness.

– Leonard & King, 2012, p. 8
Color-blind and post-racial rhetoric and ideology underpin the notion that the voracious consumption of Black popular culture is a testament to the acceptance of Black people. This qualitative study will explore the process and the impact of the ways that “Blackness” is constructed and commodified for consumption within a white supremacist culture, and examine the effect of this construct on the Black community. As consumption of Black popular culture remains popular in the United States, Black people lose their lives daily to systematic anti-blackness. These two seemingly unrelated phenomena should be best understood as interconnected facets of contemporary White Supremacy.

GLOSSARY OF KEY TERMS

**Agency:** An individual or social group’s will to be self-defining and self-determining (Hill-Collins, 1990, p. 298).

**Appropriation:** the “use of a [historically subordinate] culture’s symbols, [language], artifacts, genres, rituals, technologies” etc., by members of a historically dominant group (Richard, 2006). Combining three interrelated frameworks, I will also define “appropriation” through bell hooks’ notion of “eating the other” (hooks, 1992), Bill Yousman’s concept of “Blackophilia / Blackophobia” (Yousman, 2003), and Watts and Orbe’s conception of “Spectacular consumption” (Watts & Orbe, 2002).

**Blackness:** the construct of an essentialized Black culture, “or Black cultural identity [that] involves [and relies] on persons and other symbolic and material representations socially and historically constructed as ‘Black’ (e.g. speech and phonetic conventions, folklore, style, fashion, music, use of the body and Black physical form)” (Crocket, 2008).

**Black community:** “A set of institutions, communication networks, and practices that help African Americans respond to social, economic, and political challenges confronting them. Also known as the Black public sphere or Black civil society” (Hill-Collins, 1990, p. 298).

**Blackface/Minstrelsy:** “The first appearance in U.S. history of black culture as property was blackface minstrelsy”; “Minstrelsy
was an established nineteenth-century theatrical practice, principally of the urban North, in which white men caricatured blacks for sport and profit. It has therefore been summed up by one observer as 'half a century of inurement to the uses of white supremacy.' While it organized around the quite explicit 'borrowing' of black cultural materials for white dissemination, a borrowing that ultimately depended on the material relations of slavery, the minstrel show obscured these relations by pretending that slavery was amusing, right, and natural” (Lott, 1993, p. 3).

**Black Lives Matter:** A movement based “on a response to the anti-Black racism that permeates our society and also, unfortunately, our movements. Black Lives Matter is an ideological and political intervention in a world where Black lives are systematically and intentionally targeted for demise. It is an affirmation of Black folks’ contributions to this society, our humanity, and our resilience in the face of deadly oppression” (Garza, Tometi, & Cullors, n.d.)

**Blackophilia:** Used to describe the ambivalent interest in Black culture by non-Blacks as a source of both pleasure and anxiety (Yousman, 2003). Characterized by consumption and simultaneous fascination/disgust, attraction/repulsion, hypervisibility/invisibility of Black pop culture. Equally, **Blackophobia** will refer to irrational fear, dread, and anxiety toward Blacks (Yousman, 2003).

**Colonialism:** “A practice of domination, which involves the subjugation of one people to another. The practice of colonialism usually involved the transfer of population to a new territory. The term colonialism is frequently used to describe the settlement of North America, Australia, New Zealand, Algeria, and Brazil, places that were controlled by a large population of permanent European residents” (Kohn, 2012, para. 1).

**Commodification/Commodity:** For the purpose of this study, “commodification” and “commodifying” will refer to the process of turning unconventional entities into a marketable good that can be bought and sold. For example, referring to the commodification of the Black male body in contemporary sports, Leonard et al. (2012) stated that “Black male bodies are increasingly admired
and commodified in rap, hip hop and certain sports such as basketball” (p. 8). Thus, a “commodity” will refer to anything that has been transformed into a buyable and sellable good. “In capitalist political economies, land, products, services and ideas are assigned economic value and are bought and sold in market places as commodities” (Hill-Collins, 1990, p. 298).

**Cultural imperialism:** Used to describe the phenomenon where around the world “the same kind of knowledge, fashion, music and literature, the same kind of metropolitan mass culture is manufactured, bought and sold. Western ideologies, political beliefs, western science, western laws and social institutions, western moral concepts, sexual symbols and ideals of beauty, western working methods and leisure activities, western foods, western pop idols and the western concept of human existence have become objectives, examples and norms everywhere in the world” (Sarmela, 1977, p. 1).

**Essentialism:** “Belief that individuals or groups have inherent, unchanging characteristics rooted in biology or a self-contained culture that explain their status. When linked to oppressions of race, gender, and sexuality binary thinking constructs ‘essential’ group differences” (Hill-Collins, 1990, p. 299).

**Hip Hop culture:** “Encompass[es] more than just rap music—hip-hop has created a culture that incorporates ethnicity, art, politics, fashion, technology, and urban life” (Smiley, 2013).

**Ideology:** “A body of ideas reflecting the interests of a particular social group. Scientific racism and sexism constitute ideologies that support domination. Black nationalism and Feminism constitute ideologies that oppose such domination” (Hill-Collins, 1990, p. 299).

**Institutionalized racsim:** “As a system, racism is an institutional arrangement, maintained by policies, practices and procedures—both formal and informal—in which some persons typically have more or less opportunity than others, and in which such persons receive better or worse treatment than others, because of their respective racial identities. Additionally, institutional racism involves denying persons opportunities, rewards, or various
benefits on the basis of race, to which those individuals are otherwise entitled. In short, racism is a system of inequality, based on race” (Wise, 2014).

**Oppression:** “An unjust situation where, systematically and over a long period of time, one group denies another group access to the resources of society. Race, gender, class, sexuality, nation, age, and ethnicity constitute major forms of oppression” (Hill-Collins, 1990, p. 299).

**Rhetoric of color-blindness:** “A view of the world that resists talking of race because to do so is believed to perpetuate racism” (Hill-Collins, 1990, p. 300). Also, *post-racial*: the belief that America has moved beyond racial prejudice or discrimination to create a “color-blind” society.

**Sharecropping/Peonage:** “After the Civil War, former slaves sought jobs, and planters sought laborers. The absence of cash or an independent credit system led to the creation of sharecropping. Sharecropping is a system where the landlord/planter allows a tenant to use the land in exchange for a share of the crop” (Pollard, 2012, para. 1 & 2). The development of the capitalist state is integrally related to the underdevelopment and oppression of Black America. “Development was…the institutionalization of the hegemony of capitalism as a world system. Underdevelopment was the direct consequence of this process: chattel slavery, sharecropping, peonage, industrial labor at low wages, and cultural chaos” (Marable, 2015, p. xi).

**White supremacy:** “White supremacy is an historically based, institutionally perpetuated system of exploitation and oppression of continents, nations and peoples of color by white peoples and nations of the European continent; for the purpose of maintain and defending a system of wealth, power and privilege” (Martinez, n.d., p. 1). “Furthermore, ‘White supremacy’ is a much more useful term for understanding the complicity of people of color in upholding and maintaining racial hierarchies that do not involve force (i.e., slavery, apartheid) than the term ‘internalized racism’” (hooks, 2014, p. 113).
**White/White People:** “WHITE (as in ‘white people’): The term white, referring to people, was created by Virginia slave owners and colonial rulers in the 17th century. It replaced terms like Christian and ‘Englishman’ [sic] to distinguish European colonists from Africans and indigenous peoples. European colonial powers established white as a legal concept after Bacon’s Rebellion in 1676 during which indentured servants of European and African descent had united against the colonial elite. The legal distinction of white separated the servant class on the basis of skin color and continental origin. The creation of ‘white’ meant giving privileges to some, while denying them to others with the justification of biological and social inferiority” (Martinez, n.d.).

**White privilege:** “Refers to any advantage, opportunity, benefit, head start, or general protection from negative societal mistreatment, which persons deemed white will typically enjoy, but which others will generally not enjoy. These benefits can be material (such as greater opportunity in the labor market, or greater net worth, due to a history in which whites had the ability to accumulate wealth to a greater extent than persons of color), social (such as presumptions of competence, creditworthiness, law-abidingness, intelligence, etc.) or psychological (such as not having to worry about triggering negative stereotypes, rarely having to feel out of place, not having to worry about racial profiling, etc.)” (Wise, 2014).

**White supremacist capitalist patriarchy:** Used to describe the interlocking systems of domination that function simultaneously at all times in our social experience (hooks, 2006).

**SHARE-CROPPING BLACKNESS**

*What would America be like if we loved Black people as much as we love Black culture?* – Stenberg, 2014

Africans/African Americans have long played an integral and influential role in the meta-fabric of American culture. However, our unique contributions, especially to popular culture, have been and continue to be regarded as invisible, despite our hyper-visibility within pop culture. Historically and contemporarily, dominant
groups have constructed Black images in simplistic and stereotypical representations (Hill-Collins, 1990). These representations, particularly in the mass media, have a long political history dating back to images popularized from the time of slavery (hooks, 1992) and mirror White ideas of Blackness, or how “Blackness” is imagined through the perspective of “Whiteness” (hooks, 1992). The White male consumer has played an essential role in the shaping of these images; as a consequence, “spectacular consumption is a process through which the relations among cultural forms, the culture industry, and the lived experiences of persons are shaped by public consumption” (Watts & Orbe, 2002, p. 1). For example, bell hooks noted that rap music, an arena of high consumption,

is the perfect paradigm of colonialism. We think of rap music as a little third world country that young White consumers are able to go to and take out of it whatever they want. We would have to acknowledge that what young White consumers, primarily male, often times suburban, most got energized by in rap music was misogyny, obscenity, [and] therefore...rap came to make the largest sum of money. (hooks, 2006)

Here the relationship between the White consumer appetite and the popularization of certain racialized representations is noted. This is part of the process of “eating the other” (hooks, 1992), “or the tendency for cultural difference to be commodified as a source of titillation and pleasure for White consumers” (Yousman, 2003, p. 378). These representations have had adverse social, political, and economic consequences for the Black community; the violence of Jim Crow against Black Americans was partially justified through the dehumanizing Blackface minstrelsy representations that were dominant and popular during the nineteenth and twentieth centuries. White actors donning Blackface and parodying behavior they attributed to Black people propagated some of the most damaging stereotypes of Black Americans in history (Riggs, 1986). These same dehumanizing representations are still dominant and popular. Such representations of “Blackness” allowed ideological
justification for racism and incited the anti-Black violence of Jim Crow segregation. Today, the commodification of Blackness within our mainstream media serves as a kind of pervasive symbolic blackface, acting with the same political motives on minstrelsy. Just as minstrelsy justified and bolstered Jim Crow violence, contemporary symbolic Blackface burgeons and buttresses contemporary anti-Black violence (Yousman, 2003). Hooks writes,

Should we not be suspicious of the way in which white culture’s fascination with black masculinity manifests itself? The very images of phallocentric black masculinity that are glorified and celebrated in rap music, videos and movies are the representations that are evoked when white supremacists seek to gain public acceptance and support for genocidal assaults on black men, particularly youth. (hooks, 1992, p. 9)

From the misrepresentation of Black culture, to the commodified images of Black bodies, Blackness serves as a “sharecrop” that is simultaneously consumed and criminalized. While Blacks are used to sell everything from clothes to detergent to cars and soft drinks, they are also disproportionately represented within the criminal justice system (Leonard & King, 2012). The exploitation and consumption of the “exotic other” for pleasure are linked, and patterns of this exploitation have taken many forms. Often fantasies of the “other” are exploited in a manner that maintains relationships of domination (hooks, 1992). So, why Blackness? Within our contemporary space and time, the conversion of societies from industrial to post-industrial, the explosion of media and cultural institutions, and the persistent challenge to White Supremacy have uniquely altered Black social identity (Yousman, 2003). The dialectical relationship between Black resistance to systemic oppression and the continued maintenance of White privilege have resulted in a crisis within the Western world and White identity (Yousman, 2003). As a consequence, “spectacular consumption arises in part out of the desire for white folk to reconstitute their identities through acts of black consumption” (Watts & Orbe, 2002, p. 7).
Response to this push and pull of the status quo has “led many White youth in two seemingly opposed but actually interconnected directions: retrenchment in White supremacy and voracious consumption of African American popular culture” (Yousman, 2003, p. 375). In our commodity consumer culture, just as one’s body can be bought and sold on the open market (Hill-Collins, 1990), one can purchase “identity.” Most importantly, this identity may be found through “eating the other”:

It is this current trend in producing colorful ethnicity for the White consumer appetite that makes it possible for Blackness to be commodified in unprecedented ways, and for Whites to appropriate Black culture without interrogating Whiteness or showing concern for the displeasure of Blacks. (hooks, 1992, pg. 154)

As spectacular consumption of Blackness runs rampant, Black Lives Matter forced its way to the forefront of popular culture through its critique of White appropriation and consumption of Black culture. Black Lives Matter condemns the lack of genuine engagement or realistic understanding of the Black racial struggle in the creation of Black images consumed by Whites. As noted by the Black female rapper Azealia Banks, amongst others, non-blacks who partake in hip hop culture and perform “Blackness” fail to speak on, or critically acknowledge, the racism that inseparably comes with having a Black identity (Stenberg, 2014). Contrary to popular belief, the consumption of “Blackness” has not resulted in reduced anti-Black attitudes, prejudices, or inequality. The tendency to identify Blacks as “exotic others” is rife with conflict (Yousman, 2003). Just as the “White identification with African American cultural styles has been noted since the first White performer burned a cork and darkened his face, we see the contemporary manifestation of the ambivalent consumption of ‘Blackness’” (Yousman, 2003).

I argue that the essentialized and simplistic construct of “Blackness” that is popularly consumed and applauded by Whites harms the Black community, as it is in fact linked to the
maintenance and perpetuation of White supremacy: “As White cultural imperialism informed and affirmed the adventurous journeys of colonizing Whites into the countries and cultures of ‘dark others,’ it allows White audiences to applaud representations of Black culture, if they are satisfied with the images and habits being presented” (hooks, 1996, p. 287). I posit that the spectacular consumption of “the Other” has not and does not challenge systemic and institutionalized racism, despite providing a shared cultural space with much potential for political intervention.

**Commodifying, Consuming, and Appropriating “Blackness”**

_We should recognize the Blackophobia that lies behind much Blackophilia, and that both may be representative of the continuing ideological and cultural power of White supremacy in the 21st century._ (Yousman, 2003, p. 371)

_There is a direct and abiding connection between the maintenance of White supremacist [capitalist] patriarchy in this society and the institutionalization via mass media of specific images, representations of race, [and] of Blackness that support and maintain the oppression, exploitation, and overall domination of all Black people._ (hooks, 1992, p. 2)

In American popular culture Blackness is both _hypervisible_ and simultaneously _invisible_, and “While Black youth prominently figure in the war on drugs and in prison populations, they are equally prominent in film, music, TV, sports, and advertising. All kinds of commercial industries use their creative expression to remain commercially viable” (Watkins, 2014). From stars such as Elvis, Madonna, Eminem, and Iggy Azalea, to teenagers in distant nations, to powerful corporations, there is a racialized fascination with Black people and Black popular culture. Indeed, we live in a society and culture that believes itself to be “post-racial” and “colorblind,” yet we are seemingly color-struck with “Blackness” (Rose, 2014).
Despite Black people’s hypervisibility within pop culture, and the unprecedented consumption of Black images, our contributions to American society are often ignored, and Black culture is still viewed as deficient. This comes with the disregard of, and refusal to acknowledge Black cultural contributions and enrichment to American culture (Ford, 2003). The notion that consumption of constructed images of “Blackness” will bring about reduced anti-Black feelings, attitudes, and prejudice in a White supremacist culture is spurious; it is telling that slogans such as “Black Lives Matter!” have been appropriated by White culture and, without acknowledging the painful reality that generated the term, altered it to “all lives matter.” The simultaneous fascination and dread, attraction to and repulsion toward Blackness can be described as the “Blackophilia / Blackophobia” conundrum:

Blackophilia (manifested by White consumption of Black popular culture) is linked with Blackophobia (fear and dread of African Americans). Coexistent with White youth fascination with hip-hop culture and African American athletes and celebrities is the continuing manifestation of White youth resistance to programs that challenge institutional racism…[T]hese phenomena may be best understood as interrelated aspects of White supremacy. (Yousman, 2003, p. 366)

These interrelated aspects have been present within the historic blackophilic consumption of Blackface, which was speculated to have assuaged blackophobia. Through the derision of Blacks, simultaneous fear and fascination of Blackness could be mitigated and contained. Consequently,

White youth adoption of Black cultural forms in the 21st century is also a performance, one that allows Whites to contain their fears and animosities towards Blacks through rituals not of ridicule, as in previous eras, but of adoration. Thus, although the motives behind the performance may initially appear to be different, the
act is still a manifestation of White supremacy, albeit a White supremacy that is in crisis and disarray, rife with confusion and contradiction. (Yousman, 2003, p. 369)

As spectacular consumption of Blackness runs rampant, critiques of the adoption of Blackness by non-Blacks without the “burden,” or consideration of a racialized Black experience, have grown. Blackness is rampantly consumed, commodified, and appropriated, while Black people daily lose their lives to police brutality and systemic racism. Being the object of spectacle, “the meaning of ‘authentic’ Black life and culture is partly generative of mediated and mass marketed images” (Watts & Orbe, 2002). Upon its release, the rap song “CoCo” by O.T. Genasis gained quick and widespread commercial support, climbing the top 100 charts in little time. At the time of the Michael Brown killing in August, 2014, and during the November 2014 trial of the police officer responsible for his death, the music video for “CoCo”–released in October of that year–depicted large, dark-skinned Black men in plain white tees wielding guns at the camera while consuming illicit substances. There was a strong similarity between the way these Black men were being represented and the rhetoric that surrounded the Brown murder; they seemed to align and even complement each other. On closer analysis, the connection between the consumption and representation of Blackness and the justification of violence against Black bodies becomes clear:

One could make the argument that the cultural industries’ relentless marketing of black...violence and corruption in television, films, and popular music makes a clear and consistent contribution to a social reality in which black[s] are shot by police without provocation, people of color are jailed at rates far exceeding the incarceration rates of white criminals, and candidates win elections by preaching racially coded law-and-order messages. (Yousman, 2003, p. 382)

I postulate that such widespread and uncomfortably popular anti-Black images of Black men around the time of the murder worked to assuage the cognitive dissonance that surrounded the
case. The same way that Blackface justified Jim Crow discrimination and slavery, modern images of threatening Black men work to justify and normalize violence against Black bodies as “natural” (Hill-Collins, 1990). Representation thus has profound power in our socio-historical-political experience. It is necessary both to critique and analyze constructs of Blackness that dominate mass media and pop culture; becoming conscious of the way cultural productions are framed by, and through, White supremacy (Watts & Orbe, 2002) helps us understand how the mass media serve as a system that maintains White supremacy (hooks, 1996). According to Feagin (2006), “another type of intergenerational reproduction and transmission of cultural understandings that sustains systemic racism involves the perpetuation of critical racial images and stereotypes by such cultural institutions as the mass media, which have mostly been controlled generation after generation by Whites in power” (p. 45).

The Black community has historically had little agency in the way our images are represented, and the very real ways that these images affect the Black community from the macro level (institutional) to the micro level (healthy development of self and identity, self-esteem, etc.); (hooks, 1992; Hill-Collins, 1990; Yousman, 2003). Dominant images of Blackness have long been in the control of White elites who have used images to maintain systems of social, economic, and political domination (Feagin, 2006; hooks, 1992; Hill-Collins, 1990). Long before the arrival of settler colonialists in what we now call “America,” White supremacists constructed racialized representations of Blackness and Black people to assert their superiority (hooks, 1992).

“Blackness” is reliant upon essentialized and stereotypical notions that were constructed to affirm White domination over Africans. These notions are both deeply embedded and in the American psyche, institutions, and culture and are continuously exploited to maintain the status quo (Feagin, 2006; hooks, 1992; Youman, 2003). These centuries-old images are propagated contemporarily through mass media, commodification of culture, and spectacular consumption of the “other” (hooks, 1992; Watts & Orbe, 2002). On the surface this may seem innocuous, even
flattering, to the communities being consumed. The spectacular consumption of commodified Black cultural expression appears harmless when one does not understand the deeply embedded politics of representation and how these images are multifariously linked to the systemic oppression that Black American’s experience (Yousman, 2003).

Because these images are in fact meant to perpetuate White supremacy, it is no wonder that the consumption of “Blackness” has not resulted in reduced anti-Black prejudice, discrimination, attitudes, habits, feelings, or actions, but in fact it has worked to perpetuate them (Feagin, 2006). While the Black body continues to invoke feelings of fear and danger, this same body is admired and commodified in the music and sports industries (Leonard & King, 2012). As hooks (2006) writes,

One could talk about American mainstream culture as being obsessed with Blackness but it is Blackness primarily in a commodified form that can then be possessed, owned, controlled, and shaped by the consumer...and not with an engagement in Black culture that might require the want to be a participant and therefore to be transformed in some way by what you are consuming. (hooks, Cultural Criticism)

Engagement in these images often equates to participation in the negation of “authentic” Black experience (hooks, 1996). These mass-produced images are decontextualized and stripped of authenticity in the process of distribution for mass consumption. Further, these images rely on centuries old racist stereotypes that are still used to justify Black oppression as “U.S. institutions [and culture] have been thoroughly pervaded by enduring racial stereotypes, ideas, images, emotions, proclivities, and practices” (Feagin, 2006, p. 8). Feagin (2006) notes that most White Americans’ ideas about race include collections of negative stereotypes concerning African Americans. Racist images such as Blackface are transmitted inter-generationally and become embedded in individual and
collective White consciousness, thus leading to the persistence of systemic racism:

Often, and importantly, the images that White youth consume most voraciously are images of Black violence, Black aggression, and Black misogyny and sexism. These are the very same images that both mainstream conservative politicians and far-right White supremacists invoke to justify regressive social policies or violent reprisals. (Youman, 2003, p. 379)

The racist images do not disappear; Feagin (2006) writes that, “negative stereotypes and images of African Americans and other Americans of color are constantly used, refurbished, played with, amended and passed along millions of White kinship and friendship networks, from one community to the next” (p. 44).

**Eating the Other: Performing “Blackness”**

While discussing the globalization of Western cultural imperialism and the appropriation of Blackness in Japan, Graburn, Ertl, and Tierney (2008) notes that the acceptance of Black cultural forms “function decoratively to bestow on the user a certain degree of prestige and fashionability, while insuring that the objects of imitation are excluded.” This appropriation benefits non-Black participants by giving them an added “coolness,” “flavor,” or “spice.” Black culture is used as a performative costume, while Black people are systematically and socially punished for their Blackness (Stenberg, 2014). As Black spoken word performer Moise Morancy (2015) remarks in one of his works: “I got my hat to the back, ears pierced, pants saggin’. To you I’m a thug but for Billy it’s ‘just fashion.’” This phenomenon is what Cornel West calls the “Afro-Americanization of White youth,” stating,

The Afro-Americanization of White youth has been more a male than female affair given the prominence of male athletes and cultural weight of male pop artists. This process results in White youth–male and female–imitating and emulating
Black male styles of walking, talking, dressing and gesticulating in relation to others. The irony in our present moment is that just as young Black men are murdered, maimed and imprisoned in record numbers, their styles have become disproportionately influential in shaping popular culture. (West, as cited in Kitwana, 2002)

When Blackness is reduced to racist essentialist notions it can result in Whites accepting the caricatures as truth, and may play a role in the over 3,000 police murders of Black people in past three years alone (Mapping Police Violence, n.d.). The appropriation and spectacular consumption of Black cultural expression leads to racist generalizations and stereotypes of the people being misrepresented (Stenberg, 2014).

So, while a White man dresses in stereotypical Black clothing styles is “just fashion,” that same Black male whom he imitates has to face the consequences of being seen as a “thug.” This is how consumption, commodification, and appropriation become dangerous for the exploited and oppressed community. While many argue that the spectacular consumption and appropriation of Blackness and Black images is “cultural appreciation,” these images do not engage what may be deemed as a Black “reality” and, in fact, celebrate an imagined version of the Black experience (hooks, 1992). “Blackness” has been reduced to a simplistic and condescendingly anti-Black construct, aligned with the interests of a capitalist consumer culture (hooks, 1992; Hill-Collins, 1990; Watts & Orbe, 2002; Yousman, 2003), and shaped not only by capital and market forces, but also by the maintenance of White supremacist capitalist patriarchy (hooks, 2006). Blackness is capital.

**Taking over the Other: Colonizing Blackness**

Mass media and images have been, and continue to be, a major part of colonialism. It is necessary to create images that affirm the ideology of domination. Thus, the image of the colonized has remained in the control of the colonizer. It is crucial to recognize that Black people have historically had no power in the way that our bodies are represented and that the constructs
of Blackness have evolved in a centuries long, systematic, and continuous process. Importantly, “from slavery on, White supremacists have recognized that control over images is central to the maintenance of any system of racial domination” (hooks, 1992, p. 2). Constructed images of “Blackness” are thus used to propagate and maintain White supremacy (Yousman, 2003).

Images and representation are crucial both to individual and group well-being, self-esteem, and world-view. When the dominating gaze is removed, authentic Black culture can be a point of great transgression and transformation. However, while the dominating, subjugating, and colonizing gaze is present, “Blackness” becomes another object in the perpetuation of domination: “It is conceivable that white youth may become less prejudiced toward individual Blacks because of their appreciation of Black culture, while maintaining a high level of support for the practice and structures of institutional racism, such as unequal education systems, discrimination in housing and employment, repressive policing and criminal sentencing, and so on (Yousman, 2003, p. 387).

Images and representation are a crucial point of political resistance and “unless we transform images of Blackness, of Black people, our ways of looking and our ways of being seen, we cannot make radical interventions that will fundamentally alter our situation” (hooks, 1992, p. 7). It is of utmost importance that we transform the ways we look at and view Blackness if we hope to heal American culture.

**DISCUSSION**

How can we view Blackness in a way that does not empower White supremacy? For Black people, or People of Color, creating their own images is not enough. Some People of Color have been indoctrinated to the extent that they can only conceptualize the world through the lens of White supremacy. People that create Black images and Black texts should deeply and critically interrogate the framework from which they are departing, asking what the text communicates about Blackness, whether it challenges anti-Blackness, or how it supports White supremacy. Hooks challenges us to consider that loving Blackness is a political and dangerous
challenge to White supremacist culture (hooks, 1992). It has been suggested that as a Black community we must develop a pedagogy that would allow Black people to engage in their popular culture in a manner that critically reconnects it with its historical, social, and political origins (Haymes, 1997). Detaching Black culture from its foundational contexts prevents it from serving as a functional dialectic to reevaluate the past, and understand the present. This will continue to have consequences for Black cultural identity, as well as for Black resistance.

I neither advocate separating Black culture from outsiders, nor preventing engagement between Black culture and White, but rather call for displacing the colonialist gaze that seeks to re-inscribe White supremacy through the spectacular consumption of inauthentic images of Blackness. Consumption of commodified Blackness has not managed to challenge racist institutions on a mass level; therefore, this consumption of Blackness has not benefitted the Black community. The shared cultural space that has been forged through the consumption of Black popular culture could be fertile grounds for transgression beyond the appearances and beyond eating the other:

Thus, although it is possible that White youth involvement in Black popular culture might provide at least some impetus for improved relationships between White and Black youth and, eventually, a challenge to some of the foundational elements of institutional racism, an analysis of this phenomenon as one of commodification and consumption points out that it is equally likely that White desire for, and pleasure from, Black culture might lead to the retrenchment and reinforcement of White supremacy rather than resistance and challenge. A dialectical approach to this issue allows us to understand that these seeming contradictors are actually articulated to one another as part of a greater whole—the continually changing nature of White supremacy in contemporary American culture. (Youman, 2003, p. 388)

We must move beyond consumption to action.
CONCLUSION

If the consumption and appropriation of Blackness by non-Blacks truly challenged White supremacy or anti-Blackness, there would logically be no need for movements such as Black Lives Matter. While it is seen as “cool,” “edgy,” transgressive, progressive, and liberal for Whites and non-Black people of color to find enjoyment in Black culture, this enjoyment is not linked to unlearning or interrogating anti-Blackness (hooks, 1992). The images of Blackness that are dominant and popularly consumed are mass-mediated images constructed for consumption and stripped from their original contexts. These images assert White racial superiority and have in consequence not worked to challenge systemic or cultural racism, but instead have historically worked to maintain the status quo. These constructed images work to maintain Blackness as the eternal Other, normalize anti-Blackness, and support institutionalized, systemic, cultural, and individual racism:

By identifying Blacks as others, as eternal outsiders and ultimate strangers, Whites are able to justify the social, political, and economic networks that construct, maintain, and advance White privilege and White power. If Blacks are others, then the insider/outsider structure of American society may be seen as natural and consistent with ideological claims that the U.S. is the home of freedom and equality. If Blacks are others, then they are consigned to outsider status not because of any essential corruption in the structure of our society itself, but because of their natural, eternal, ahistorical status as different. (Yousman, 2003)

The Black community must develop a pedagogy that allows the community to reconnect with our historical, social, and political culture. We must be critical of the images of Blackness that are popularly consumed; it is of utmost importance that we transform the way that Blackness is viewed. Loving Blackness is a political act that can transform the way that we consume Black
images and the way that Blackness, and therefore Black people, are seen. Until then, we will continue to suffer from a collective identity crisis, supported by negative images and representations.

*What would America be like if we loved Black people as much as we love Black culture?* – Stenberg, 2014

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PORNOGRAPHY: 
MASQUERADING AS FANTASY, 
PRODUCING REALITY

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ABSTRACT

Our society believes that the social practices within the pornography industry are not important enough to be addressed. Indeed, as Gail Dine notes in *Pornland: How Porn Has Hijacked Our Sexuality*, “what is surprising is how many people, even those who do not like porn, insist that the carefully constructed images that are formulaically scripted and produced by the multibillion-dollar porn industry belong in the realm of sexual fantasy, not reality” (100). Problems arise from the belief that the social practices intrinsic to porn—racism, creating dirty sexualities associated with women, and popular video searches depicting “forced sex”—exist within a vacuum. This article examines the social practices of pornography, creates a concrete definition of the oppression engendered by pornography, and challenges societal social mores that reflect those within pornography. I limit myself to adult, heterosexual pornography, but I will comment on the taboo of creating “barely legal” porn and the practice of catering to the masculine gaze by the creation of the “willing lesbian” fantasy. This research acts as a literary synthesis of the writing of anti-pornography scholars, experienced actors from the porn industry, and feminist philosophers.

OPPRESSION

“Women today are still not major consumers of hardcore porn; they are, however, whether they know it or not, internalizing porn ideology that often masquerades as advice on how to be hot, rebellious, and cool in order to attract (and hopefully keep) a man.” —Gail Dines, *Pornland: How Porn Has Hijacked Our Sexuality* (100)
The word “oppression,” as Marilyn Frye explains, has been overused: “The word...is being stretched to meaninglessness; it is treated as though its scope includes any and all human experience of limitation or suffering no matter the cause, degree, or consequence” (11). Such careless uses of the word infringe upon the struggle of individuals who experience genuine oppression. The common misconception of this oppression, whether systemic or internalized, does not necessarily change the reality of oppressed peoples. Individuals may be happy but not liberated. For example, the limitations that exist within pornography, specifically for women and people of color, systematically keep the participants within distinct roles that are accepted as true representations of the group. Such limitations do not, however, affect the “happiness” displayed by porn-stars, as their monetary gain is completely dependent upon their acting. And individuals who gain money from such structures may indeed experience happiness through their capitalistic gain. “Oppression” must be defined by the social constructions that have been created, and the reality of privilege.

“Oppression” may be defined as having three specific characteristics: first, individuals experience oppression according to their position in our society (socio-economic level, race or ethnicity, sex, sexuality, etc.). Frye writes that, “one of the most characteristic and ubiquitous features of the world as experienced by oppressed people is the double bind–situations in which options are reduced to a very few, and all of them expose one to penalty, censure, or deprivation” (12). Secondly,

the experience of oppressed people is that the living of one’s life is confined and shaped by forces and barriers which are not accidental or occasional and hence avoidable, but are systematically related to each other in such a way as to catch one between and among them and restrict or penalize motion in any direction. (Frye 12)

Third, “oppression” must be classified as lacking certain privileges that permit people to live with relative ease. Such privileges are distinguished by the characteristics that allow individuals not to be hindered by their social standing. In our
society, heterosexual, cisgendered white men of able body are capable of experiencing monetary gain from most, if not all, capitalistically defined careers and occupations. Those who follow the dominant Christian ideology, and are defined by our current mental health definitions as “sane,” are the most privileged individuals. Therefore, in relation to this definition of privilege, individuals who are not members of these groups are likely experiencing some form of oppression. But, it is important to realize, when discussing oppression that,

Both “women” and “men” are oppressed sexually by the porn industry, but the consequences to their oppressions are not the same, given society’s dominant patriarchal social forces that privilege males over females. At the same time, one cannot assert that all “women” who live in a society where pornography has become commonplace personally experience the same kinds of sexual oppressions, but, we can certainly identify “oppressive” experiences they all share whether consciously recognized or not. (DeKeseredy and Corsianos 82)

**Sexual Expression and Choice**

While most people understand the limitations posed by oppression, the common issue, usually when dealing with questions of sexual expression and sexuality, is choice. If women are being oppressed and do not accept their oppression, then why take a job within pornography?

The image that these men seem to have of women in porn is of a woman accidentally stumbling onto a porn set one day, and realizing that this is what she has been looking for all her life. That these women are acting, and may have come to porn not so much through choice, but due to a lack of alternatives is rarely considered, because this premise threatens to puncture the fantasy world created by both pornographer and user. (Dines 65)
Women who work in the pornography industry are shown as both completely willing and happy to do whatever is asked by a man, for a heterosexual male audience. The audience does not realize that the actors may have limited options. This is illustrated in Sinnamon Love’s account of her life as a performer in pornography in the early 1990s:

I merely wanted to provide for my family and finish college, I wanted to have a kind of financial stability that I didn't see possible as a divorced, single mother of two toddlers working two mall jobs and carrying a full load of classes. That first time, having sex with a complete stranger in his apartment wasn’t about a feminist agenda or some sort of promiscuous sexual itch I sought to scratch. It was about the best option I saw for myself at that time; it was about financial freedom. (Love 98)

It is short-sighted to condemn women in pornography for their choices:

Men's choices to buy or rent pornography are complicated by two facts. First, he can't know the conditions under which women made their choices, and hence cannot know how meaningful the choices are. And second, even if he could make such a determination about specific women in a specific film he watches, the demand for pornography that his purchase helps create ensures that some women will be hurt. (Jensen 88)

Those who purchase pornography reinforce a system that consistently devalues women. According to Jensen, Dines, and other anti-pornographers, whether or not the women are conscious of their position, accepting of that position, and expressing themselves through media, they are still hurting themselves because pornography, as a specific genre, places certain individuals lacking power into positions that devalue them.

I undertook this research to better understand popular female porn stars, their emersion in social media, and their
participation in “gonzo” porn. “Gonzo” porn is characterized by a “wall-to-wall” script where there is little to no plot, and the sexual acts depicted are consistently aggressive. Common practices within gonzo porn include double penetration (various orifices or one orifice [i.e., double anal, double vaginal]) and violence that the video does not explicitly describe as healthy role-playing, bondage, dominance, submission, or sadomasochism (BDSM) but rather hinges on the idea that the female participant is forced into it. I wanted to see if porn stars who were gaining a widespread following on social media sites were still featured in gonzo porn. If, I theorized, they had decreased their gonzo productions, or their gonzo porn was not as popular as it had previously been, then the personalities displayed on their social media sites might have affected by how their customers viewed them. However, there were several problems with this research: First, because of the vastness of the Internet, it would be difficult to determine whether a certain film or video would be considered “more” or “less popular,” as there are various sites that could display a variety of “page views.” And second, the research depended too much upon the idea of the women’s choice to perform in gonzo porn.

Social Norms within Pornography

“Gonzo,” as a genre of pornography, has become increasingly popular. According to the Adult Video Network (AVN), gonzo is “the overwhelming dominant porn genre since it’s less expensive to produce than plot-oriented features...[it is] the fare for the solo stroking consumer who merely wants to cut to the chase, get off on the good stuff” (“The Directors”). When searching pornography on the web, without limiting the search to certain performers or acts, most descriptions of porn contain violent language, specific race and body descriptions of the actors/actresses, and often (but not always) involve multiple men and one woman. Because of these factors, Jensen explains,

To enter into the pornographic world and experience that intense sexual rush, many of us have to turn off some of the emotional reactions that typically are connected to sexual experience
with a real person–a sense of the other’s humanity, an awareness of being present with another person, the recognition of something outside our own bodies. (113)

This disconnect is difficult because it requires the viewer to experience sexual arousal without other emotional factors. It asks the viewer to ignore memories of previously watched porn when participating in actual sexual intercourse. It also suggests that the social practices of our own world do not translate to pornography.

Objectification in Porn

Catharine MacKinnon defines sexual objectification as “having a social meaning imposed on your being that defines you as to be sexually used, according to your desired uses, and then using you that way” (329). This definition is crucial in understanding how women are objectified in pornography and within their everyday lives.

In this paper, the “porn equation” shall be defined as the consistent script displayed in most heterosexually-focused pornography, as “[p]orn, because of its formulaic nature, becomes predictable” (Dines 68). The porn equation follows a loose guide in which the beginning of the film contains either a filmed interview, or a compilation of shots of a woman from various angles as she removes clothing, or remains clothed in a revealing piece of lingerie. Next, the introduction of characters (whoever will be having intercourse) contains brief interaction through kissing or undressing. Afterward, the woman performs fellatio for a significant amount of time (usually comparable in time to the pre-show interview or undressing montage). Finally, various sexual acts proceed until the man ends up ejaculating on or inside the woman, and usually, but not always, on her face. This is defined as an “equation” because of how frequently this structure is used. Dines further explains this by stating,

There are X number of minutes given over to oral sex, often leading to the woman gagging, then anal, then double penetration, and then
ejaculation. And while the next film may have a few more minutes on one particular act, or may have anal before oral, the story unfolds in much the same way as it did in the previous films, and the images begin to look the same. (Dines 68)

This equation does not always exist in porn, but it is the usual format maintained by many non-role playing or BDSM-centered porn films. The two most important factors in this equation are the length of time committed to fellatio, compared to the amount of time, or lack thereof, spent on cunnilingus, and the man’s ejaculation ending the scene. The porn that always depicts fellatio as the central act of foreplay, in the very least, perpetuates a belief that this sex act is *heterosexual normative behavior*. The ideology that male pleasure should be prioritized, and that these men are “entitled” to the sexual act, creates a “common knowledge” of sex. Indeed, the sexual encounter ends when the male actor has reached orgasm.

The women in these films are always shown as willing participants. They are depicted as both willing and available to do anything asked by their partners, and enjoying every moment of it. Dines describes this behavior thus:

[They] never complain, never say no, and have three orifices always available for penetration, irrespective of time or place. They don’t grimace when a man ejaculates in their mouth, and their anuses and vaginas have no limits. They have absolutely no needs outside pleasing men, they ask for nothing. (Dines 75)

In her article “Sexuality, Pornography, and Method,” Catharine MacKinnon writes,

[Porn] shows what men want and gives it to them. From the testimony of the pornography, what men want is: women bound, women battered, women tortured, women humiliated, women degraded and defiled, women killed. Or, to be fair to the soft
core, women sexually accessible, have-able, there for them, wanting to be taken and used, with perhaps just a little light bondage. Each violation of women—rape, battery, prostitution, child sexual abuse, sexual harassment—is made sexuality, made sexy, fun, and liberating of women's true nature in pornography...Women are made into and coupled with anything considered lower than human: animals, objects, children, and (yes) other women. Anything women have claimed as their own—motherhood, athletics, traditional men's jobs, lesbianism, feminism—is made specifically sexy, dangerous, provocative, punished, made men's in pornography. (327)

Women are told, throughout the porn films, that their sexual behavior is “dirty.” Many mainstream and amateur porn includes male porn actors calling their female partner names such as “dirty little slut.” These descriptions ridicule the woman’s sexuality, infantilize her through adjectives such as “little,” “tiny,” or “baby,” insinuating that a woman’s genitalia, and the uses of her genitalia, warrant such comments. Porn actresses are routinely called “honey,” “sweetie,” “darling,” etc., in social media outlets. These women have become the ultimate fantasy, willing to do anything for “love,” including being degraded and objectified. MacKinnon states that, “Women, who are not given a choice, are objectified, or rather the object is allowed to desire, if she desires to be an object” (328).

The Lesbian Fantasy

On February 26, 2016, the pornography Internet site Pornhub released an article exploring the most common porn searches by state (“The United States”). An overwhelming thirty states identified “lesbians” as their most popular porn genre. Lesbian pornography, however, does not represent a progressive attitude toward the lesbian, gay, bisexual, transsexual/transgender, or queer (LGBTQ) community. The “lesbian fantasy,” for the purposes of this paper, shall be defined as a heterosexual viewer
seeking out, minimally, two women performing sexual acts upon each other in the effort to provide sexual stimulation to a male audience. The women can be shown in scenes that include male actors, such as “threesome” porn or “gang-bang” porn. The lesbian fantasy typically includes two stereotypically “attractive” women, performing acts similar to those performed with men, without intimacy or romance.

The Barely Legal Taboo

The aforementioned 2016 Pornhub study identified “teen” pornography as the most popular category in nineteen states (“The United States”). This category, commonly known as “barely legal” pornography, represents fantasies of men having sex with underage participants. Many times, in amateur and professional porn, women are given the appearance of teens, or infantilized in a similar way. They wear their hair in pigtails or dress in clothing that implies that they have only just reached the legal age of consent. They are part of an “undamaged” and “untainted” fantasy; their pubic hair is completely removed in order to maintain the appearance of girlhood. DeKessedy and Corsianos explain:

Many different categories of women today have been targeted by the porn industry: mothers, grandmothers, and even pregnant women, career and college women, younger and older, physically smaller and bigger women, and women of various racial and ethnic groups. The porn industry tries to ensure that no category of woman escapes its wrath in their pursuit to secure the message that any woman desires and/or deserves body-punishing sex and/or brutality. (12)

The Oedipal Fantasy

According to Pornhub, “mothers I would like to fuck” (MILF) and “step-mom” porn, are highly popular in at least six states (“The United States”). Another five states searched “keeping it in the family,” or “step-sister” pornography, most frequently. While these two categories differ and possibly reveal more psychological
differences between the searchers, it is important to recognize that all of these viewers are seeking depiction of sex inside familial groups. Incest is taboo in most cultures and societies; one might conclude that the “keeping it in the family” fantasy hinges upon the ideas of “sexual ownership,” or Oedipal “dominance.” The female objects of desire in MILF and step-mother porn are married, yet they serve as sexual instructors to “naïve” teens partners, often their own step-sons, and in this manner allow the young men to gain sexual dominance over their cuckolded fathers.

**Racism within Pornography**

The social practices within pornography also rely on racial depictions that damage the identity of people of color and reinforce stereotypes. Love comments:

Rarely do you see...intense hardcore, blowbands, rough sex, and/or fetish content featuring all black actors. These types of scenes are more likely to be interracial and feature a submissive white woman paired with a dominant/aggressive black man taking charge and/or advantage of her—or a submissive yet hypersexual black female is paired with an aggressive white male performer. (Love 100)

**Black Porn**


While all porn’s workers are subject to the disciplining force of racialized sexuality,... women of color are specifically devalued within a tiered system of racialized erotic capital. Within this hierarchy black bodies are some of the most degraded, and their degradation mobilizes the very fetishism driving their representations. (Miller-Young 107)
It is fairly rare to find two black individuals having sex in mainstream heterosexual porn. Even “lesbian fantasy” porn rarely shows sex between two women of color. Dines writes, “this belongs to a genre called interracial. According to an article in Adult Video News, this is one of the fastest growing and most bootlegged subgenres in gonzo pornography today” (122). Indeed, interracial porn, especially those films that use African American actors, tend to be gonzo pornography. Black male actors are typically depicted as “savage.” Titles such as Blacks on Blondes, White Pussy-Black Cocks, and White Sluts on Black Snakes (xvideo.com, n.d.), signal the stereotype of racial physiological differences. The black men are generally shown as well endowed, driven by a desire for white women, and hyper-masculinized: “the porn industry would prefer to keep below the surfacethat black men are routinely depicted as monstrous in their uncontrolled desire for white women” (Dines 122).

Black women do not receive better treatment in the industry. Indeed, in his book Money Shot: Wild Days and Lonely Nights inside the Black Porn Industry, Lawrence Ross quotes Lexington Steele, an established black porn actor:

In a boy/girl scene, one girl one guy, no anal sex, the market dictates a minimum of $800 to $900 per scene for the girl...Now a white girl will start at $800 and go up from there, but a black girl will have to start at $500, and then hit a ceiling of about $800. So the black girl hits a ceiling at the white girl’s minimum. (Ross 14)

Black women are narrowed down into two categories, based on whether they are “dark skinned” or “light skinned.” This kind of colorism is displayed in general society as well. Lighter-skinned women are usually able to find work similar to white women. They have to follow many of the same rules as white women do in pornography, but their race still affects their experience. Love writes, “African American women on screen were put into one of two categories: assimilated to appear as close to white as possible (‘they are almost one of us’), or completely ghettoized to reflect debased images of black culture (it doesn’t
matter because ‘they are only one of them’)” (99). Their sexuality is called “dirty,” but their body parts are also described with race-based adjectives (i.e., “little dark pussy”). Dark-skinned women are sub-sectioned even further into “ghetto projects,” which deny their personality, pain, or pleasure. They are never required to look as if they are enjoying the sex, and unlike white and light-skinned women, darker women are never expected to produce an orgasm, real or fake: “there is no attempt to even pretend that these women like the sex, as they are shown close to tears, grimacing, and, in many cases, thoroughly disgusted” (Dines 130).

“Ghetto projects” may, on the other hand, take a dark-skinned woman and, through a series of sexual encounters, teach her to become more “civilized.” The videos can include “before” and “after” shots in which, in the final shot, she is shown with styled hair, more expensive clothing, and jewelry. She is “grateful” to the man who was able to provide her with such luxury. For example, Dines dissects the porn site “Pimp My Black Teen,” “a spoof of the popular ‘Pimp My Ride’ MTV series”:

This site, like many other pimp sites, has pictures of so-called before and after makeovers, in which a teenage black woman is shown in sweatpants and jeans for the “before”–and sexy revealing underwear for the “after.” One caption reads, “We caught up with Reneeka looking like a tattered hood rat. Once we styled her fine brown ass, her wet pussy took a long black cock just fine.” (Dines 127)

Black women in pornography often appear in films that make them appear to be dependent on a white man to “save” them, an ironic reflection of the fact that white men are in control of the porn industry. Indeed, while interracial porn has become significantly popular, it has become more popular in white communities.

**Asian Porn**

Similar to “Black Porn,” in which black men are recognized as the hyper-masculine, Asian women in pornography are consistently hyper-feminized. The Asian woman is seen as the ultimate fantasy:
she is physically small and submissive, while Asian men are almost non-existent in the porn world today. Dines writes,

the image of Asian women is sexually exotic, enticing and submissive in both the text and pictures. Using words such as naive, obedient, petite, cute, and innocent... we are all told [they] will do anything to please a man, since this is what they are bred for. It seems from these websites, however, that Asian women are interested in pleasing only white men, because Asian men are almost completely absent as sex partners. (124)

Asian women are seen both as always available and forever young. They are infantilized and seen as more submissive than white women; however, they too are almost never depicted with Asian men. Miller-Young writes, “Through the prioritization of normative gender and sexual codes, behaviors, and relations we have sought to recuperate ourselves from myths associated with black sexual deviance, and the systematic violence attached to those myths. Pornography offers a site to see how those myths attach to fantasies” (118).

The Undiscovered Exotic

While Asians are hyper-feminized, and blacks are hyper-masculinized, whites are never categorized by their “whiteness” in the same way that other performers are featured by their race. Performers from other racial and ethnic groups, such as Latinos and Arabs, are often depicted as “undiscovered exotics,” or coming from groups of racial mystery. Mia Khalifa, a distinguished porn actress who identifies as Arab-American, has made numerous videos; in 2015, a study conducted by SoTrender and Pornhub revealed her as one of the most followed porn stars on the social media outlets Twitter and Instagram. Some of her most popular videos feature her appearing in hijab, as was shown by the popularity of her films on the sites xvideos.com, xhamster.com, and Pornhub (“Naked Truth”). When searching the term “Arab” on these sites, similar results with other performers were found. Latino women are given similar treatment: their
videos carry markers that define their race, and they are often subjected to harmful stereotypes, such as performing in the role of a “maid.” When searching the most-viewed “Latina” videos on the aforementioned websites, Latinas are most often represented as “house-cleaners.” These women of color are treated very differently from white women. According to Dines,

> In all-white porn, no one ever refers to the man’s penis as a “white cock” or the woman’s vagina as “white pussy,” but introduce a person of color, and suddenly all players have a racialized sexuality, where the race of the performer(s) is described in ways that make women a little “sluttier” and the men more hyper-masculinized. (123)

And Miller-Young summarizes the racist industry by concluding,

> This relentless binary, which is problematic for all women but especially so for women of color whose sexualities have been deployed as primary mechanism of colonization, expropriation, and genocide, exposes the impossibility of rendering an authentic view of black women’s sexualities in any media, let alone pornography. (115)

The pornography industry is, in short, marketed for a white audience. DeKeseredy and Corsianos expand on this in their comment on a study done by Michael Kimmel:

> Almost none of the Asian-American men he spoke with, as well as Chicano men on the West Coast or in the Southwest expressed any significant interest in pornography. Latino men in the Northeast especially Puerto Rican and Dominican men, as well as African American men across the United States indicated some interest but, small in relation to the consumption by white men. One of the most comprehensive studies done of sexual behavior in the United States (Laumann et al., 1994) found that the rates
of masturbation among black men were about half the rates of white men. Kimmel notes that if we assume that one component of porn is to facilitate masturbation, then the lower rates of masturbation among black men may indicate lower rates of porn consumption. (13)

Transcending the Screen

Pornography has historically been discussed as if it exists within a vacuum. Some argue that the fetishism and degradation of pornography, and the gendered and racialized oppression it promotes only exists within the bedroom. The idea that the fantasy does not transcend into everyday reality is a fallacy. However, current legislation and common patriarchal structures reinforce the idea that pornography has no influence on American life. For example, Corsianos comments on how police investigate assault, specifically within pornography:

Detectives often stress the difficulty in determining whether the women in the videos are “performing” or, assume threat they have given “consent” to the violent acts committed against them. But when investigating any assault (stranger or domestic), the job of the police is to determine whether there is “probable cause”: that is, if there’s evidence to suggest that an assault has occurred, then an arrest must be made. Officers do not ask alleged victims if they consented to the assault. Consent to being assaulted/abused is irrelevant….But in violent pornography, for example, detectives appear to view women as “consenting” to the violence. (DeKeseredy and Corsianos 35)

Violence against Women

Pornography is primarily created to offer white male viewers an opportunity to gain sexual satisfaction by, as DeKeseredy and Corsianos write, “creat[ing] the illusion of complete power and control over women without fear of rejection or fear of sexual failure” (12). Furthermore,
While we know that women featured in much of today’s porn suffer from violent and degrading behaviors committed against them primarily by men, they are typically portrayed as enjoying the various degradation ceremonies they are put through during the filming process. As well, gonzo porn and other disturbing sexually explicit media send out a strong message that women’s primary purpose is to satisfy men’s desires. (48)

Pornography centered on female abuse may reinforce the idea that these depictions of degradation mirror everyday life. For example, “in studying battered women who were filing criminal charges against their husbands, [researchers] found that 40 percent of husbands used pornography, and that the use of these materials was significantly associated with the participants being asked or forced to participate in violent acts” (DeKeseredy and Corsianos 63). DeKeseredy and Corsianos report that the Canadian National Survey (CNS) of female abuse in university/college dating found that,

Of the female CNS respondents who reported being physically abused in a dating relationship, 15.4 percent also reported being upset by pornography. Only 4.5 percent of those who were not physically victimized reported being upset. Turning to the men, one third of all those who admitted to upsetting a woman within request to imitate pornography also admitted to physically abusing a woman after high school. Of course those who did not admit to upsetting a woman, 17.2 percent admitted to physical abuse. (62)

**Revenge Porn**

Since the popularization and accessibility of the Internet, people have been able to voice their personal opinions in a virtual setting. While some servers enforce mandates on acceptable behavior (e.g., Instagram and Facebook forbid graphic images, Tumblr requires users to verify that they are above 13 years old), there are few current laws that restrict Internet content (e.g.,
“Revenge Porn” is one of the consequences of this accessibility: “Revenge porn images and videos are made by men with the consent of the woman they were intimately involved with, but then distributed online without their consent, typically following the termination of the relationship” (DeKeseredy and Corsianos 73). Once revenge porn is available on the Internet, anyone can access it, and women in the videos may face negative consequences in their professional and private lives.

The Cosmo Effect

Pornography’s effect on our culture is evident in magazines and other media marketed towards women. “The Cosmo Effect,” a term I have named after Cosmopolitan magazine, is characterized by the media holding women to specific norms taken from pornography, without openly relating these norms to their pornographic origins. Marketed as methods designed to assist young women in attracting and maintaining romantic relationships with heterosexual male partners, women are encouraged to remove their pubic hair, dress in provocative clothing, and learn to perform various acts to enhance male sexual pleasure. Ironically, as Dylan Ryan, a porn star with a Masters in Social Work has noted, many women who are deeply influenced by the material in these magazines “give up on porn after one or more times out of a sense of alienation, revulsion, lack of arousal, shame, or any mix of these emotions” (121). Pornography is more easily condemned than the socially acceptable media that promote the same sexual practices—at women’s expense—as a source of capitalistic gain. Miller-Young comments that,

The porn industry is not simply...an agent of rapacious greed that destroys our health and our environment. Porn is perceived as the cause of our modern cultural decline, the trafficker of thousands of innocent women and girls, and the purveyor of a rampant and misogynist prurience that is infecting the minds of our youth. (p. i-ii)

Women are unable to experience sexual liberation through a structure that is designed to confine them to damaging limitations.
CONCLUSIONS

Sex, as our society has defined it, is oppressive towards women. As Catharine MacKinnon states,

Male dominance is sexual. Meaning: men in particular, if not men alone, sexualize hierarchy; gender is one...Recent feminist work, both interpretive and empirical—on rape, battery, sexual harassment, sexual abuse of children, prostitution, and pornography supports it. These practices, taken together express and actualize the distinctive power of men over women in society; their effective permissibility confirms and extends it. If one believed women’s accounts of sexual use and abuse by men; if the pervasiveness of male sexual violence against women sustained in these studies is not denied, minimized, or expected as deviant or episodic; if the fact that only 7.8 percent of women in the United States are not sexually assaulted or harassed in their lifetimes is considered not ignorable or inconsequential; if the women to whom it happens are not considered expendable; if violation of women is understood as sexualized on some level–then sexuality itself can no longer be regarded as unimplicated. (MacKinnon 316)

Pornography and sex are not the same, and I do not wish to create that fallacy. However, because pornographic practices have transcended the screen to become a part of mainstream American culture, it is critical to examine the forms of oppression contained in pornographic material. Men of color, women of color, and white women are assigned stereotypic behaviors that both appease a white male audience and are incorrectly assumed to be actual minority behavior. Such assumptions may form the basis of both discriminatory practices and are used to justify violence against women. Rape, sexual assaults, and revenge porn are part of the “permissibility” of male dominance that is mirrored
in pornography. Yet perhaps the greatest danger comes, as Gail Dines has written, in our lack of understanding in how deep the messages of pornography are embedded in our behavior:

The reality is that women don’t need to look at porn to be profoundly affected by it because images, representations, and messages of porn are now delivered to women via pop culture. Women today are still not major consumers of hardcore porn; they are, however, whether they know it or not, internalizing porn ideology that often masquerades as advice on how to be hot, rebellious, and cool in order to attract (and hopefully keep) a man. (p. 99-100)

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