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Letter from the Editors

Dear AGEP Science Today Bulletin Readers,

Welcome to the fourth edition of the Michigan State University Alliance for Graduate Education and the Professoriate “Science Today” Bulletin! The purpose of this peer-reviewed scholarly publication is to highlight rigorous, innovative scholarly research conducted by members of the Michigan State University AGEP community. We are proud to present this diverse combination of interdisciplinary scholarship by graduate students. The scholars included within this publication conduct research that contributes to the betterment of our society. We would like to extend our sincerest gratitude to the Michigan State University Graduate School, the MSU AGEP community, and in particular, the graduate students who chose to share their research with us. This project could not have happened without the support that we received from each of you.

Sincerely,

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Regulation of the Antioxidant Glutathione by Enteric Glial Cells in the Gastrointestinal Tract by Isola Brown

Keywords: Gut function, Antioxidants, inflammatory bowel disease

Introduction

Normal functions of the gastrointestinal (GI) tract or gut are controlled by the enteric nervous system (ENS) or "the brain in your gut". The ENS is comprised of two primary cell types: 1) enteric neurons, which directly innervate GI muscles and control gut movement and 2) enteric glial cells, a unique peripheral glial cell type which surrounds and supports enteric neurons. Maintenance of enteric neural circuits is necessary for normal gut function. In fact, a loss of enteric neurons is associated with GI motility dysfunction in functional bowel disorders such as Irritable Bowel Syndrome (IBS) and Inflammatory Bowel Disease (IBD). My project investigates the role of the supporting enteric glial cells in regulating enteric neuron loss and gut dysfunction.

Enteric glial cells are responsible for the production of oxidants and antioxidants in the ENS. This causes them to have a novel dichotomous pathogenic/protective relationship with enteric neurons. Recent work from our lab shows that activation of enteric glial by neuron danger cues drives neuron death via mechanisms that involve oxidative stress (Brown et. al, 2016). Conversely, other data show that the depletion of glia also leads to loss of neurons and altered GI motility patterns (Aubé et. al, 2006; Abdo et. al, 2010). This suggests that glia can contribute to neurodegeneration through several mechanisms including active signaling and a loss of glial neuroprotective factors such as reduced glutathione (GSH). The objective of this work is to test the hypotheses that enteric glia are the primary source of GSH in the ENS and that changes in glial GSH content and/or production contribute to neurodegeneration during inflammation.

Methods

All work was conducted in tissue collected from an animal model of gut disease. Mice were treated *in vivo* with 2,4-dinitrobenzene sulfonic acid (DNBS) to induce inflammation. Tissue was collected 48 hours after treatment. We measured neuronal survival and localized the expression of GSH synthesis proteins using immunohistochemistry, a molecular biology technique that allows for visualization of proteins in tissue and cells. We used the compound Buthionine Sulfoximine (BSO) to inhibit the production of glutathione. All data was analyzed using a Student's t-test or one-way ANOVA as appropriate.

Results

Production of the antioxidant GSH requires two enzymes: 1) glutamyl-cysteine ligase (GCL, the first and rate-limiting enzyme) and 2) glutathione synthetase. We found that both GCL and glutathione synthetase are expressed in enteric glial cells. This supports our hypothesis that enteric glia are the primary source of glutathione in the ENS. The localization of these GSH synthesis proteins was not altered following GI inflammation in our animal model. Inhibition of GSH production in gut tissue caused loss of enteric neurons, supporting our second hypothesis that changes in glial GSH content can contribute to neuron death and gut dysfunction.

Future Work

Future work will involve repeating our experiments in a whole animal to compare with the results obtained from isolated tissue. This will allow us to fully investigate the relationship between glial cell glutathione and intestinal disease.

Broader Implications

My data suggests a role for glial GSH where glia produce neuroprotective GSH in response to increased neuronal oxidative stress during GI pathophysiology. Inhibition of this protective capacity of glia with BSO makes enteric neurons more susceptible to neurodegeneration, and may be a potential mechanism explaining the susceptibility of neuronal populations to neurodegeneration during inflammation and GI distress. It is estimated that 1 in 4 people worldwide is affected by GI motility dysfunction. My work begins to highlight druggable mechanisms that could be targeted by pharmaceuticals to provide symptomatic relief in these populations.

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Racial Disparity at Program Referral in the Juvenile Justice System by Nordia A. Campbell and William S. Davidson, II

Keywords: Disproportionate Minority Contact, Race, Program Referral, Risk Assessment, Recidivism, Juvenile Offenders

Introduction

Studies demonstrate that among those in the juvenile justice system, minorities have historically received harsher dispositions (i.e. punishments) than Whites. For example, when compared to Whites, minorities are less likely to be placed on probation (Puzzanchera & Hockenberry, 2013), but more likely to be transferred to adult court (Moore & Padavic, 2010). At the disposition phase, judges may issue various sanctions or dispositions to youth who are charged with a particular offense. However, one particular sanction that has received less attention is program referral – the process of referral to court-run intervention programs. These programs are often characterized by activities aimed at altering youth's cognitive patterns and reducing truancy in an effort to reduce negative outcomes and promote positive outcomes. However, researchers have uncovered potential negative effects of programs because they aggregate young offenders, providing the opportunity to further learn negative behavior and develop a criminal network (Helmond, Overbeek, & Brugman, 2012). Therefore, it is important that youth are appropriately referred to programs to avoid experiencing negative effects. In an effort to standardize the process by which decisions are made to refer youth to programs, the Office of Juvenile Justice & Delinquency Prevention (OJJDP) recommended risk assessments as a best practice tool (Onifade, Davidson, & Campbell, 2009).

The goal of this study is to (1) determine if biased factors such as race are used along with risk assessment in making decisions to refer young offenders to court programs and to (2) determine whether referral to these programs lead to negative outcomes, especially for minorities. The following research questions were investigated.

(1) Do risk assessment scores predict program referral? Does race predict program referral? Does race moderate the relationship between risk score and program referral?

(2) Does program referral predict recidivism when accounting for risk assessment scores? Does race predict recidivism? Does race moderate the relationship between program referral and recidivism?

Methods

The current study used a sample (N = 2,739) of youth from a Midwestern juvenile court, who were either solely on probation or on probation but also referred to a court program. The Youth Level of Service/Case Management Inventory (YLS/CMI) established risk assessment score, while the court's data management system produced race, recidivism, and program referral data. Moderated logistic regression analyses addressed the research questions.

Findings

In the first model, risk score and race were significant predictors of program referral, but the moderation did not reach significance. For every one-unit increase in risk score, juvenile offenders were 1.07 times more likely to be placed in a court program (OR = 1.07, CI [1.06, 1.08]). In regards to race, minorities were more likely to be involved in programs than Whites (OR = .91, CI [.83, .99]). These findings suggest that risk assessment is being used to standardize the decision making process as the OJJDP intended; however, biased factors such as race are also involved in the process.

In the second model, program referral and race were significant predictors of recidivism, but the moderation did not reach significance. Youth who were referred to programs, were more likely to recidivate at the two-year mark than those who were not referred to programs (OR = 1.98, CI [1.54, 2.58]). Further, among those referred to programs, minorities were significantly more likely than Whites to recidivate (OR = 1.22, CI [1.06, 1.41]). These findings indicate that program referral increases the likelihood of negative outcomes (i.e. recidivism), and that minorities are more likely than Whites to experience these negative outcomes.

Future Work

This study enhances our understanding of the role of race in program referral by uncovering the reality that although risk assessment is being used to standardize the decision-making process and thus, reduce bias, discriminatory factors such as race still plague the juvenile justice system. This suggests that there is more work to be done. Researchers should continue to evaluate how risk assessment can effectively mitigate racial disparities by using various risk assessment tools or additional aspects of risk assessment in order to reduce the impact of race. A logical follow-up would examine the use of cluster types (which indicates youth's needs) in referral decisions.

Broader Implications

This study has considerable implications for studying issues of race across disciplines. Racial disparities at program referral is an understudied phenomenon perhaps because of guidelines in place (i.e. risk assessment) thought to be responsible for decision-making. However, it is critical to consider the pervasive nature of human bias and continuously utilize the power of research in seeking just treatment for minorities in every domain of society.

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The Relationship Factor: Latino and Black Students' Perceptions of Relationships with their Teachers by Bernadette Castillo

Keywords: School climate; Teacher-student relationships; K-12

Introduction

Finding direction to reduce the achievement gap, and creating a path toward more equitable schooling in urban contexts, is a necessary endeavor in educational research. The current educational landscape reflects changing student populations in schools and an achievement gap that continues to grow between Students of Color and White students. Overall, high school dropout rates in the United States have decreased to 7.1 percent over the last 11 years (U.S. Department of Education, National Center for Education Statistics). Yet, African American and Hispanic students endure the highest rates of students who drop out of high school. Positive school climate is connected to increased academic achievement when students feel safe, supported, encouraged and pushed to learn (Whitlock, 2006). This study seeks to in depthly examine the area of relationships by investigating the following research question: How do Latino and Black students' perceptions of relationships with their teachers shape their views of school climate?

Conceptual Framework

In a comprehensive literature review of policy, practice, and research in the area of school climate, Cohen et al (2009) found that a positive school climate is linked to academic achievement, school success, and students' healthy development. Thapa, Cohen, Higgins-D'Alessandro and Guffey (2012) built upon previous school climate research to thoroughly outline the literature into five dimensions of school climate: a) safety; b) relationships; c) teaching and learning; d) institutional environment; and e) process of school improvement through school climate. Here, I focused on research centered in the area of relationships, but also incorporat the areas of safety, teaching, and learning as part of the analytic framework. This study also utilized Critical Race Theory (CRT) as a part of its analytical framework to enhance the voices and experiences of Students of Color (Solorzano & Yosso, 2009).

Method

I focus on aspects of the student-teacher relationship as perceived by Latino and Black students within a sociopolitical context of racial disparities and student achievement initiatives. This research study employed a qualitative case study approach (Yin, 2003), highlighting the perspectives of students within a specialized program in a high school setting. Through interviews with student focus groups, this case study draws upon a larger inquiry-based data set gathered in a Midwestern school district. The focus group sessions were transcribed and coded for emerging themes using the qualitative data software MAXQDA.

Findings

The findings highlight teaching and learning strategies that facilitate positive student views of teacher-student relationships and school climate, suggesting broader implications for building and sustaining positive learning environments for students in urban contexts. I found several factors that may be important when considering teacher-student relationships. In particular, project-based learning strategies led to more positive student perceptions of their relationships with teachers and students believed that their opinions were important, appreciated and valued by their teachers.

Broader Implications

This study provides insight into how student perceptions can serve as a broad guideline to consider ways to build and sustain positive relationships in urban school contexts, particularly with students in traditionally marginalized populations. Many urban schools implement a misguided approach to school climate that focuses on aspects of physical safety by implementing punitive measures such as zero tolerance policies. In contrast to such damaging policies, focusing on building trusting student-teacher relationships has lasting effects for students' learning and development in urban and global contexts.

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The Effects of Lawmaking and Regulation of Clinical Research in Costa Rica: Discovering the Livelihood Repercussions on Locally Employed Research Teams by Deon Claiborne

Keywords: Law-making, Policy, Clinical Research, Medical Anthropology

This brief explore the effects of lawmaking and regulation of multinational pharmaceutical company clinical trials in Costa Rica and the direct impact this process had on the lives and wellbeing of those working in the industry. The research based on preliminary mixed method analysis of fifty-seven semi-structured interviews, across four strata: academic personnel, governmental employees and elected officials, public health care system physicians and personnel, and private clinic, university, and research center personnel; as well as archival government documents, and print media analysis over two years in San José, Costa Rica.

For nearly two decades, Costa Rica had been an increasingly attractive site for clinical research on vaccines, diabetes, and asthma and other diseases (Homedes and Ugalde 2014). However, in 2010, the Constitutional Court of Costa Rica ruled that a 2003 decree signed by the Minister of Health and the President of the country, which created a national council to guide and regulate clinical research within the country, was unconstitutional (Diaz 2010). As a result, no new protocols were approved for nearly five years. Pharmaceutical companies shifted their sites to Guatemala and Panamá and Costa Rican physician/investigators lost opportunities for publication and international collaborations. Approximately 200 people, who had worked locally in clinical research lost their jobs. Many of these workers were women working in support positions as study coordinators and data managers had to either leave the country to find work, return to work in the public health system, or remain unemployed. In 2015, a law was passed by the full Legislature to regulate clinical trials once again, but there are inconsistencies between the law and the regulations passed to enact the law. Many people remain skeptical about whether pharmaceutical companies will return or whether lost momentum will ever be regained.

This work seeks to identify the key stakeholders both for and against the conduct of clinical research in Costa Rica and examine their perceptions and opinions of clinical research, the suspension, and the new law. I argue that lawmaking can have unforeseen impact on the livelihoods and lived experience of people on all sides of such a process as lawmaking. By advancing knowledge of these direct effects of lawmaking and policy on individuals, we can better anticipate and solve the problems these processes can engender in the lived experience of the people most affected by the laws. In an ever-increasing global biomedical marketplace, this research significantly adds to the knowledge base in the areas of international clinical research and international markets, law-making and policy-making, livelihood studies, and medical anthropology.

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Estimating the Number of Unique Neurons in Neural Signal Recordings using Stationary Wavelet Transform by Sylmarie Dávila-Montero, Selin Aviyente and Andrew Mason

Keywords: Neural Signal Processing, Spike Sorting, Automated Clustering, Stationary Wavelet Transform

Introduction

In 2010, nearly 19% of the American population self-reported as having some kind of disability, with more than half reporting that the disability was severe (U.S. Census Bureau). People with severe physical disabilities often experience difficulties when performing simple activities, such as grasping a glass of water or a pencil. Advances in neuroscience and engineering offer this population an opportunity to regain control of their environment through Brain Machine Interfaces (BMIs). For example, BMIs provide the opportunity to control robotic hands by using neural signals generated by the thought of moving one's hand. In order to record neural signals from specific groups of neurons associated with the body activity of interest, microelectrode arrays are implanted on the brain. In today's BMIs, we can find microelectrode arrays with hundreds of channels. In practice, the number of channels determines the system's degrees of freedom, which are the various kinds of actions that a system can produce. It is of particular interest to increase the number of degrees of freedom in BMI's to provide users a natural and intuitive experience of controlling an artificial limb. However, more degrees of freedom imply the need of recording from a higher number of channels. The increase in neural information generated by increasing the number of channels requires automated neural signal processing methods to process large amounts of data.

In general, the processing of neural signals consists of identifying neural impulses (or neural spikes) from the neural recording and then pair to its respective firing neuron. To process neural signals, spike sorting algorithms are used. The spike sorting algorithm involves detecting neural spikes from within background noise, extracting features of the detected spikes to reduce the dimensionality of the signal, determining clusters based on the given features, and assigning specific neurons to each cluster. Automated methods for spike detection as well as feature extraction and classification have been well studied, but not for clustering, mainly because the number of unique neurons in a neural recording is unknown. Knowing the number of unique neurons recorded by a channel is crucial to determine the number of clusters in the data set. Thus in this research project, we work to answer the following question: Can we design tools to automatically determine the number of unique neurons in a neural signal recording in order to automate the clustering stage? The objective is to eliminate human intervention in the processing of neural signals obtained from thousands of channels.

Methods

In this work, a method for estimating the number of unique neurons in a neural signal recording is explored. To find the number of unique neurons in a neural signal recording, an algorithm that incorporates assumptions for the number of unique neurons in the signal and make use of the Stationary Wavelet transform (SWT), the K-means clustering algorithm, and the evaluation of the covariance matrix of each cluster was implemented. In order to extract information of interest that may be hidden in the signal, the SWT, a signal processing method, takes a signal and decomposes it at different frequency levels. The proposed method can be summarized as follows: apply SWT to each of the detected spikes, extract the maximum coefficient of the wavelet coefficients at specific decomposition levels to establish a feature space, compute reference points and assigning data points to the group of the nearest reference point, and calculate the covariance matrix of each cluster for all the assumptions.

Results
The proposed method was implemented in MATLAB software and tested using simulated neural signals obtained from an online database (Quiroga, 2004). The simulated neural recordings were modified to create data sets with one, two, and three unique neurons. The results show that the assumption of the number of clusters with the lowest sum of the elements of the covariance matrices gives the estimate for the number of unique neurons in the data set. By automatically determining the number of unique neurons, we process neural signals coming from thousands of channels without human intervention.

Future work
This method was tested using simulated neural recordings at ideal conditions (low noise interference and well separate clusters). For future work, we will test this method with real neural recordings where noise interference can be high and the waveform of the neural spikes from different neurons can share many similarities. Similarities between neural spikes from different neurons make the estimation of the number of clusters more challenging because that translates to clusters that can be misinterpreted as one.

Broader Implications
Automated clustering in spike sorting will effectively utilize thousands of implantable electrodes for recording of distinct neural signals. For the neuroscience community, it will represent an opportunity to study how a large amount of unique neurons interact with each other in specific areas of the brain, such as the motor cortex. For the people with severe physical disabilities, it will represent an opportunity to a more independent life style because recording from thousands of channels will provide high degrees of freedoms to perform a variety of daily activities.

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Tachykinin Activation on Enteric Glia- A Novel Mechanism of Enteric Nervous System Dysfunction During Irritable Bowel Syndrome by Ninotchska Delvalle and Brian Gulbransen

Keywords: Irritable Bowel Syndrome, Neuroscience, Inflammation, Glia

Introduction

Irritable Bowel Syndrome (IBS) is a chronic gastrointestinal (GI) disorder that affects 20% of the American population (Halland, 2015). IBS severely lowers patients' quality of life by producing symptoms including abdominal pain, diarrhea, cramping, constipation, and fatigue. Current IBS treatments have low efficacy due in part to the enigmatic cause of IBS (Beatty, 2014). However, acute gastroenteritis is increasingly implicated as a trigger (Beatty, 2014). Indeed, the appearance of IBS symptoms often follows a pathogenic infection. Many common pathogens are thought to cause permanent changes in gut function by their acute effects on inflammation. Gut inflammation, in particular, is a potent driver of GI dysfunction and many of the permanent effects of gut inflammation, such as changes in motility, are caused by alterations to the enteric nervous system (ENS).

The ENS is the major neuronal regulator of the GI system and controls essential GI functions including gastrointestinal motility, which is affected during inflammation (Furness, 2012). The ENS regulates motility by an intrinsic network of neurons that orchestrate contraction and relaxation patterns important for GI motility. Recent findings show that enteric glia, astrocyte-like cells that surround enteric neurons, regulate these neuronal networks, but exactly how these neuron-glia interactions contribute to gut function during disease remains unknown (Gulbransen 2012). During inflammation, there are several changes within the ENS, particularly an increased release of tachykinins. Tachykinins are neuropeptides important for neuronal communication. In the spinal cord increased release of tachykinins severely alters glial function, which in turn affects neuronal survival (Wiseler 2004). In this study, we aimed to determine if enteric glia express receptors for tachykinins and whether blocking these receptors could prevent neuronal loss during inflammation.

Methods

All experiments were performed with colon samples from 5-8 week old C57BL/6 male mice. To determine if enteric glia express tachykinin receptors, whole colon was collected and fixed overnight in Zamboni's fixative. Tissue was dissected to expose the myenteric plexus (subdivision of ENS that regulates motility) and analyzed using immunohistochemistry (IHC). To determine if blocking tachykinin receptors on enteric glia prevented neuronal loss, we used a Dinitrobenze sulfonic acid (DNBS) model of inflammation by treating mice with a saline control or DNBS enema for 48 hours. Mice were injected once daily with either a vehicle control or with the tachykinin receptor antagonist GR159897. After 48 hours of treatment, mice were sacrificed and colon tissue was collected and fixed for IHC. Neuronal survival was measured using IHC and labeling for enteric neurons and enteric glia. Data was analyzed by t-test on Prism.

Analysis and Results

Our IHC analysis demonstrated that enteric glia express Neurokinin-2 Tachykinin Receptor (NK2R). During DNBS treatment, mice lost a significant amount of body weight compared to our saline controls, this was not prevented by the tachykinin receptor antagonist. Importantly, treatment with the tachykinin antagonist prevented neuronal loss associated with inflammation. This data suggests that enteric glia are important for neuronal outcome during inflammation.

Future Work
In the future, we want to study enteric glial responses to NK2R activation. We will use different approaches to determine if enteric glia release transmitters in response to tachykinins that could alter neuronal survival.

Broader Implications
This research will help understand new pathways of neuron-glia communication and identify novel therapeutic targets to protect against neuron death during GI inflammation.

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Use of Landsat Satellite Imagery to look at the effects of Population Growth on Land use change in the Bamako Capital District by Gloria Desanker

Keywords: Land use cover and change, Remote sensing, Population growth, Landsat satellite imagery

Objective

The objective of this research is to use remote sensing data to look at how the land use cover in the Bamako Capital District changes due to rapid population growth. Using images from Landsat satellites 5 and 8, changes in land cover were analyzed using geospatial technologies to classify, detect change and run an accuracy assessment to determine reliability. The final products include: land use cover classified maps and change detection images of the capital district.

Summary

Bamako, the capital of Mali, has been experiencing rapid population growth over the past 40 years. As population increases, the size and development of the city also changes. These changes can be seen by the conversion of land from forest and bare ground, to houses, buildings, roads, highways and other infrastructure. Initially, Bamako was situated on the northern side of the Niger River, but as people migrated to the city due to economic and industrial development, the city limits crossed over to the southern side of the river and through the rest of the floodplain. According to the Royal Geographical Society, Bamako was estimated to be the fastest growing city in Africa and sixth fastest in the world in 2006. Deforestation and ecosystem degradation is continually increasing due to the rise in population in the capital, but can be controlled and mitigated if authoritative figures understand and advocate for the preservation of the environment.

Remote sensing technologies like Landsat satellites provide quick, reliable and easily communicable methods for analyzing the environment (Wulder et al, 2012). These satellites collect surface reflectance values, the different wavelengths of light that reflect off the Earth's surface, in the form of images. Different types of land cover reflect different wavelengths and the difference in these wavelengths can be identified. Between the years 1986 and 2006, there has been a significant decrease in bare ground from 120km^2 to under 40km^2 (Diallo et al, 2010). This was determined by taking Landsat imagery from the years 1986 and 2006, creating classes or categories in the image (bare ground, forest, built up or water); and comparing the areas of each class between the years.

Research Progress

Images of Bamako Capital District from 1960 using Landsat 5 and 2016 using Landsat 8 were collected from the United States Geological Survey (USGS) Earth Explorer website. The software ENVI (Environment for Visualizing Images) is used to crop the images to the desired boundary; classify using tools within ENVI to identify areas of forest, bare ground, infrastructure and water; and calculate total area of each of the classes from the two years. The difference between the areas will show the change in land use cover in Bamako.

Since the population of Bamako has been rising rapidly, it is expected to see that areas of infrastructure also increase. Therefore, the classified image from the year 2016 will have a larger area of infrastructure than the 1960 image.

Future Work
Satellite images are large files and processing them in ENVI takes time. If time permits and there is enough available storage, images from other years will be taken to be classified to output a rate of land use change over time.

Broader Impact
Looking at changes in landscapes at a local scale can help influence policy and government decisions to encourage a more environmentally conscious future. By doing so, we can track changes and create models of what our future may hold. Land use change analyses allow us to monitor changes in land use within and around urban areas. We can also identify areas of concern. Remote sensing technologies are constantly changing and improving the way data we receive from the world and how we look, making it more and more reliable (Wulder). With a better knowledge of how we affect the environment, comes the ability to create and implement policies that will help to conserve nature.

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Increasing Immigrant Latino Family Engagement in Schools through a Community-Based Initiative by Elizabeth Gil

Keywords: community-based organizations; immigrant Latino families; immigrant Latino parental involvement; immigrant Latino family engagement

Introduction

Research has shown that immigrant Latino families do not necessarily find schools to be welcoming spaces (Dyrness, 2007; Turney & Kao, 2009). Community-based organizations (CBOs) and initiatives, initially outside of school, have been sites where immigrant Latino parents have developed trusting relationships (Dyrness, 2007) and experienced a reduction in feelings of isolation (Delgado-Gaitan, 2001). The support networks established within these spaces also have led to greater confidence and increased parental involvement and inclusion within schools, as well as increased academic achievement for students (e.g. Ordonez-Jasis & Jasis, 2004) as parents navigate through their children's schools.

The purpose of this work is to examine the ways in which involvement in a community-based program provides support for immigrant families to connect with their children's schools.

Methods

This bulletin submission represents a portion of findings from a larger qualitative case study examining a community-based program that teaches technology skills within a Midwestern urban area with a large concentration of Latinos. The study uses data generated from program documents, participant observation over two years, and interviews with current and past program participants (four mothers, one father, and one grandmother), five children of program participants' (aged 10 -14), and program volunteers.

Analysis and Results

An analysis applying the lens of community cultural wealth (Yosso, 2005) indicated that participating in the program fostered participants' social and linguistic capital. Through participation in the program, parents strengthened social relationships among members of their local neighborhoods, while also learning about resources, such as area libraries, and interacting with others beyond their community. Parents also found support from the program director and volunteers who could help them understand letters sent home from school. Participants also shared information with one another, thereby helping one another navigate local institutions, including schools. The program promoted linguistic capital through its use of Spanish, participants' native language, as the language of instruction. Furthermore, study participants discussed how the stories they shared during and at the end of class led to new knowledge. Participant questions were welcome in the program and participants were also urged to ask questions in their children's schools.

Aside from building their technology skills, parents expressed that they were more aware of what their children were learning in school due to being able to access digital communications from school and being familiar with different computer programs that their children were expected to use in completion of assignments. The ability to take classes in Spanish (participants' native language) both increased access to content and sent messages to program participants that their language and culture were valued.

Future Work
Future work includes conducting a comparative case study with another researcher to re-analyze the data of two large studies of community-based programs geared toward increasing the parental involvement of traditionally marginalized parents.

Broader Implications
The immigrant Latino parents in this study benefitted from the learning and interpersonal relationships that took place within the context of their technology skills classes. Community-based programs can serve as spaces that foster social and linguistic capital through deepening interpersonal ties and increasing access to information leading to greater ability to connect with their children's schools. Through partnering with community-based initiatives, schools can learn how best to respond to the needs of and how to access the cultures of the growing numbers of Latino children in U.S. schools, now close to 25% of the K-12 public school population (Hernandez, Murakami, Cerna, Medina, & Martinez, 2013), in order to then incorporate these responses institutionally.

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Court-Involved Girls' Perceptions of the Attainability of a Desired Possible Self and Its Connection to Past Adversity and Current Behavior by Marva Goodson and Merry Morash

Keywords: Girls, Qualitative research, Adversity

Many criminologists agree that identity influences decisions and behavior relevant to breaking the law. With a focus on identity change for adults with extensive criminal histories, criminologists use different conceptualizations of the changes related to recidivism, describing changes variously as cognitive shifts and identity transformations, increased self-efficacy, and constructions of personal life narratives. In contrast to the attention to adults' identity development, limited research considers the identity development of court-involved girls.

Oyserman's (2015) psychological identity-based motivation (IBM) theory holds promise for understanding delinquent girls' identity development and its relationship to completion of high school and discontinuation of illegal behavior. This research focuses on girls' perceived attainability of a possible self. Individuals' perceptions of their possible selves is the future-oriented component of self-concept, and it is an essential first step in becoming who one wants to be. Possible selves "provide a goal post for current action and an interpretive lens for making sense of experience and so should influence both well-being and motivation" (Oyserman & James, 2011, p. 117). A balance between a desired possible self and its antithesis, a feared possible self, further motivates people to strategize and act to attain their desired self (Oyserman & Markus, 1990).

The purpose of the research described in this article is to draw on both feminist criminological research (summarized by Belknap, 2014) that emphasizes adversities common among court-involved girls and IBM theory (Oyserman, 2015) to generate and address unique research questions that guide the analysis. Consistent with feminist epistemology (Sprague, 2005), an aim of this research is to suggest interventions for court-involved girls that would promote strategies for attaining realistic possible selves and reduce their illegal behavior. The following research questions are addressed:

Research Question 1: How do court-involved girls describe their possible selves?
Research Question 2: Do they perceive their possible selves as attainable or unattainable?
Research Question 3: Are girls' perceptions of possible selves related to their experiences of adversities, their completion of high school, and their continued engagement in illegal activities?

The data were generated from a larger study of the backgrounds of girls who were heavily involved with juvenile court, their experiences in correctional programs, and their illegal behavior, school involvement, and employment. For the larger study, face-to-face interviews had produced qualitative data collected from 27 girls and 21 professionals designated by the girls as people who knew them well and who they were willing to have interviewed for the study. The data was organized in NVivo software for qualitative analysis.

The first step of the analysis was to create reliable, reproducible coding schemes for themes present in the qualitative data, and then to code the themes and factual information. The first author and an

advanced doctoral candidate confirmed intercoder reliability for the presence of each adversity for 10 cases (96.5% agreement), 100% agreement for the remaining themes, and the first author coded the remaining cases. Responses relevant to possible selves were coded as attainable if the girl provided: (a) a direct confirmatory statement or (b) an indirect statement implying ability to attain the desired possible self (e.g., “I believe I can reach my goals”).

Findings from the research suggest that girls with histories of sexual assault and emotional abuse were less likely than others to have attainable possible selves. Girls with unattainable possible selves more often broke the law as adults and dropped out of school. Disconnections between current selves and desired possible selves contributed to girls perceived inability to attain their desired future selves. These findings provide implications for intervention designs targeting court-involved girls. Effective interventions must note the work of IBM researchers which have shown that individuals must recognize the relevance of current actions to the attainment of a future goal (Lewis & Oyserman, 2015). In other words, more than a vision of a possible self is needed for youth to be motivated to take the steps to achieve that vision. Future research should explore the ways in which court-involved girls’ identities change prior, during, and after involvement in the juvenile justice system, and ways these perceptions influence education, employment, and deviance.

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Examining race, class, and gender through hair and the lived experiences of Black women by Qiana Green

Keywords: Examining race, class, and gender through hair and the lived experiences of Black women

Introduction

This research study examines the race, gender, and class experiences of Black women in higher education, specifically using hair as a lens of interpretation and understanding. Negative reactions to Black girls' and women's hair have recently been seen in the media. Some examples such as Black girls suspended from school because their hair violated the dress code, cornrows (a cultural style worn by Black women) were banned from the military, and Black women have been fired from jobs because their hair is considered unprofessional. However, one space missing from this conversation is higher education. Little is known regarding the hair experiences of Black women who navigate higher education spaces. Negative reactions to Black women's bodies (read hair) might have detrimental consequences to teaching and learning spaces, persistence of students, staff relations, and tenure promotion of faculty.

Jhally and Hall (1997) argue meaning is constructed through representation, concluding negative images and the lack of positive images, shapes the definition we internalize. Knowledge is defined and primarily based on the lives of White heterosexual men (Collins, 2009; Winkle-Wagner, 2009), deeming their experiences as normal. I utilize Black Feminist Thought in this research because it places Black women "as agent of knowledge" (Collins, 2009, p. 1) by centering Black women's lived experiences. Collins (1990) argues examining race, class, and gender (systems impacting Black women most) helps to reveal how domination, as a process, influences the lived experiences of Black women. Through rejecting forms of dominant ideologies and knowledge (media and representation) that "perpetuate objectification and dehumanization" (Collins, 2009, p. 7), Black women become empowered through self-definition and confronting interlocking systems of oppression. Because Black women's experiences have been ignored and erased (Collins, 2009; James, 2013), situating Black women as knowledge producers is needed. The primary research question guiding this study is how does examining self-identified Black women's lived experiences with their hair illuminate issues of race, class, and gender in higher education?

Methods

Utilizing Black Feminist Thought, this research furthers scholarship on representation, misrecognition, and deliberate silencing of Black women in higher education spaces. Participants included three Black women navigating various spaces and professional roles at a Midwestern predominately White institution (1 staff member; 1 graduate student; 1 undergraduate student). Semi-structured interview questions aimed to understand two things: a) what meaning do Black women make of recent issues in the media regarding Black women's hair? b) in what ways does a Black woman's hair impact their lived experiences while navigating higher education spaces?

Analysis and Results

All participants identified as Black women working full time in higher education and/or attending a university. Data collection consisted of one on one interviews. Interviews were audio recorded and transcribed. Transcripts were coded by examining chunks of data, rather than line-by-line (Charmaz, 2006), which is important when analyzing data gathered from Black women.

Multiple findings arose from this research study: First, more research is needed on the lived experiences of Black women navigating multiple higher education spaces. It is important to understand how their hair influences their lived experiences in higher education spaces. Second, utilizing culturally relevant theory and methodology is essential to understanding experience, especially for Black women. The use of Black Feminist Thought, for research with Black women highlighted: 1) they are not a monolithic group and 2) assisted in confirming the interlocking nature of race, class, and gender within their lived experiences in higher education spaces. Third, spaces of resistance and affirmation are needed in higher education. These spaces represented spaces of healing and counter the negative images and experiences encountered in higher education spaces. Lastly, an expanded definition of what it means to look/be professional is essential for society to adopt. Straight, long, relaxed hair does not define what it means to be professional. As a society, we need to challenge appearance standards and images in the media as they are currently defined.

Future Work

Findings indicate Black women's hair is not only a lens into race, gender, and class experiences in higher education, but also brings up issues of identity, sexual orientation, skin tone, and family dynamics. Further, examining the daily race, class, and gender instances of Black women provides a nuanced perspective of the structural oppression experienced by all minoritized groups in varying social spaces.

Broader Implications

Future research is needed on the actual lived experiences of Black women through their personal narratives. Further, future work should utilize culturally relevant pedagogies and methodologies that are applicable to Black women's lived experiences.

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Tyranny of the Algorithm? Societal Costs of Predictive Policing Systems by William Isaac

Keywords: Policing, Public Policy

Introduction

Police departments around the country are increasingly relying on a growing suite of predictive software in an attempt to do what was previously thought impossible: stop crime before it occurs. A recent survey found police agencies found that 70% planned to implement or increase use of predictive policing technology in the next two to five years (Police Executive Forum 2014). Despite this increasing adoption, predictive policing software -- and the policing tactics based on it -- has raised serious concerns among community activists, legal scholars, and skeptical police chiefs. Chief among these concerns are that the systematic racial and income biases encoded within police-recorded data – which predictive policing systems primarily used to develop their predictions -- will simply reproduce or strengthen pre-existing biases rather than yield novel insight.

Surprisingly, there are few studies which examine whether predictive policing systems lead to disproportionate outcomes for underrepresented communities, despite the litany of the research exploring the linkages between racial bias and law enforcement (Gelman, Fagan, and Kiss 2012; Lange, Johnson, and Voas 2005). One potential reason for this is the assumption that predictive policing algorithms are race neutral, but this assumption has yet to be tested empirically. This study seeks to address this research question by assessing whether predictive policing systems disproportionately target underrepresented communities by applying a recently published predictive policing model (Mohler et al. 2015) to publicly available data on drug crimes in the city of Oakland from 2009 to 2011.

Methods

The algorithm selected for my analysis was developed by Predpol, one of the largest vendors of predictive policing systems in the country and one of the only companies to publicly release a self-purported “race-neutral” algorithm in a peer reviewed journal (Mohler et al. 2015). This algorithm, originally based of models used to predict seismographic activity, uses a sliding window approach to produce a one-day-ahead prediction of the crime rate across a city or precinct using only the previously recorded crimes. The areas with the highest predicted crime rates are selected as potential hotspots and receive additional police units.

In our simulation we begin on January 1, 2011. The sliding window length is set to be six months. I then take all police records from the previous six months, starting at July 1, 2010 until December 31, 2010, and plug them into the model. The output of the model is a prediction about the crime rate for the city of Oakland for January 1, 2011. Finally, the model records the top 20 grid squares as locations that received targeted policing and repeats this procedure for every day until December 31, 2011.

Findings

In order to capture the difference between Blacks and whites and predictive policing, I derived local estimates of illicit drug use from a synthetic population of Oakland and survey data from the 2011 National Survey on Drug Use and Health. The estimates show that drug use between whites and Blacks to be roughly around 15% for both groups, but with whites' rate of drug use being slightly higher. So, given the parity of illicit drug use between groups we should expect Predpol's algorithm to be able to target both groups in a similar pattern.

Unfortunately, this does not appear to be the case, as our simulations show that Blacks would be targeted by predictive policing at roughly twice the rate of whites under our Predpol simulation (5% vs 10%). Individuals classified as a race other than white or black would receive targeted policing at a rate 1.5 times that of whites (5% vs. 8%). I find similar results when analyzing the rate of targeted policing by income group, with low income households experiencing targeted policing at disproportionately higher rates. Thus, allowing a predictive policing algorithm to allocate police resources would result in the disproportionate policing of low-income communities and communities of color.

Broader Implications

There is a real cost to policing for the members of communities targeted by police. Overpolicing imposes real costs on these communities, as increased police scrutiny and surveillance has been linked to worsening mental and psychical health (Sewell and Jefferson 2016a; Sewell and Jefferson 2016b) ; and, in the extreme additional police contact will create additional opportunities for police violence in overpoliced areas (Lerman and Weaver 2014).

Future Work

In this study, we focus only on the scenario where the algorithm finds the observed crimes in the locations forecasted by the Predpol algorithm, but it could be possible the presence of bias in the initial training data can be further compounded as police departments use biased predictions to make tactical policing decisions. This bias in the training data could create a feedback loop where the model becomes increasingly confident that the locations most likely to experience further criminal activity are the locations departments believe to be high in crime. A future study could assess whether the bias toward communities of color is further exacerbated when the feedback effect is added to the simulation.

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Kreyòl Food Stories as Cultural Rhetorics Methodology by Shewonda Leger

Keywords: Caribbean Culinary Practices, Diaspora Women, Culinary Narratives

Foods in Caribbean spaces are a form of celebration and unity. As a child, I remembered that with every family and church gathering food was always shared. Watching my mom and the other women cook Haitian recipes, I have always wondered why Haitian food took so long to prepare until I was old enough to help out in the kitchen. Through this moment of gathering in the kitchen with my mother and other Haitian women of all ages, I was able to practice different methods towards cooking the same recipes (including my own that have been influenced by African-American culture). Houston, pointed out that, "the shared cultural heritage that has come to exist among diverse groups of people, made distinct by different forms of religion, different languages, and different government systems" (1), have contributed to the changes and various ways of cooking Caribbean recipes.

Through multiple modes of digital composing with a combination of theory, my presentation will illustrate how society, class, age, and culture have significantly influenced,and continue to influence, Haitian cooking methods through a set of rhetorical practices and involuntary migration all over the world. With this shift there remains traditional connections between the old and new practices of cooking between younger and older generations. The book Caribbean Food Cultures mentions that consumption is a 'process of objectification' meaning both "a practice in the world and a form in which we construct our understandings of ourselves in the world" (qtd. Miller, 26). Consumption can be defined as a performative act that does more than fulfills a concrete purpose, but goes on further in constructing identities (Beushausen et al. 16), in order to express one's position in relation to society, class, age, and culture. Through these methods of constructing identities, Caribbean recipes have been altered, but the traditional methods of cooking have not—from tools to ingredients used.

My storytelling will share generational stories and cooking methods/recipes with panel attendees that my mother has shared with me in the kitchen, and also what factors (positive and negative) have influenced our individual cooking methods as Haitian-American/Haitian Women. Overall, this presentation will allow me the opportunity to hear and engage in Diaspora women's narratives and understand how migration have and continues to influence their identity and culinary practices, while making them aware of their own cultural culinary practices.

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Diabetes that correlates with Increased Urinary Tract Infections: Why is there an increased prevalence in Women? by Alshae Logan

Keywords: Urinary tract infections, *E.coli*, Women, Diabetes,

Introduction

Under natural conditions, the human urinary tract is able to fight against microbial infections (Rama et al., 2005). However, in diabetic patients, damage to the kidneys leads to loss of nutrients such as glucose and proteins, that shed into the urinary bladder. This enables *Escherichia coli* to flourish. Urinary tract infections (UTIs) are the most common infection in diabetic patients (Nitzan et al., 2015). Since diabetics have increased levels of glucose in their urine, bacteria can use this favorable environment to grow. Adherence of bacteria to the bladder mucosa is the critical step, which leads to the pathogenesis of a UTI (Ozer et al., 2015).

UTIs are more common in women because of their shorter urethra and the proximity between the anus and their urethral opening. Approximately, sixty percent of all women have at least one episode of a UTI in their life and up to twenty percent of young women with acute cystitis (infections of the bladder) develop recurrent UTIs (Al-Badr et., 2015). Typically, males don't experience increase in the incidence of UTIs until their latter years of life. Why are urinary tract infections more prevalent in diabetic women than diabetic men and what genes are significantly responsible for the interaction between *E.coli* and its host? The exact mechanism describing this occurrence of UTIs in diabetic women needs to be elucidated.

Generally UTIs are more prevalent in women than men. However, UTIs are more frequently diagnosed in diabetic women than non-diabetic women (Nitzan et al., 2015). Having a UTI decreases the frequency of urination while increasing the development of complications from the UTI. Complicated UTIs results from anatomic obstructions of the urinary tract. These abnormalities increase the quantity of residual urine and affect the normal clearance of bacteria by urination (Kodner et al., 2010).

When there is a detour in the route of circulation, the bladder contracts poorly interfering with normal urine clearance and allows urine to remain stagnant in the bladder for extended periods of time, which provide the nutrients to foster bacteria growth. The reason that diabetic patients have increased prevalence of UTIs is due to poor circulation since diabetes reduces the ability of infection-fighting white blood cells to attend respective areas inside the body.

Broader Implications/Future Directions

Urinary tract infections are one of the most common bacterial infections. Diabetic individuals are more prone to UTIs than any other population. *E.coli* employs a huge arrangement of virulence factors to successfully colonize and survive within the urinary tract. UTIs, which include infections of the bladder (cystitis) and kidney (pyelonephritis), predominantly affect women. UTIs are responsible for approximately 13 million yearly doctor visits in the United States (Rosen et al., 2008). A third of women will contract a recurrence within 3 to 6 months of the initial outbreak, and almost half the women will experience a relapse within a year (Al-Badr et al., 2013 & Rosen et al., 2008). Knowing the exact mechanism is of great importance because it will lead to a better understanding of the difference between men and women. This knowledge will have an important impact on infection risk assessment for women and better means of therapeutic intervention to improve quality of life by promoting interventions to prevent and treat infections.

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Race in Elementary Science Classrooms: A Call for Socio-Cultural Knowledge by Stefanie L. Marshall

Keywords: Science education, Elementary science, Education policy, Race

Introduction

In 2012, 40 percent of the students in public schools were students of color, while 82 percent of the teachers were White (USDOE, 2012). Given the disparity in classrooms between student and teacher demographics, I question how teachers are responding to discussions on race, and whether or not White teachers have the capacity to discuss race, specifically in elementary science classrooms. In A Framework for K-12 Science Education (National Research Council, 2012), which guided the development of the Next Generation Science Standards (NGSS), there is a call for "Science and Engineering Learning for All." The discussions around diversity and inequities in science education (i.e. inter- and intra- district differences, lack of resources, and deficit mindsets) and recommendations are both siloed in Chapter 11 and in Appendix D. This leaves the onus on teachers to seek information on inequities in science education, rather than explicit connections being made within the content and practice centered discussion in the framework.

This study utilizes Critical Race Theory (CRT) as a framework for analysis by illuminating how one teacher engaged/avoided race in his classroom practices, and essentially re-established hegemonic systems within his elementary science classroom. This study speaks to the aspects of the current educational policy scene that may contribute to the practices observed, as well as sheds light on what may be missing in teacher education programs and professional development.

Theoretical Framework: Critical Race Theory

Critical Race Theory (CRT) was developed within legal studies out of a need to name the "subtle" aspects of racism and to advance a stance of activism in order to change hegemonic social structures and norms (Delgado & Stefancic, 2012). One CRT tenet that emerged from the data collected for the purposes of this study was colorblindness.

Acts of colorblindness include explicit statements or actions that attempt to erase or not acknowledge race as a construct, which further illuminates the culture of power in schooling experiences. Mica Pollock (2004) utilizes this terminology while exploring the repercussions of Prop 209 in California, which was litigation intended to restrict race as a consideration for K-12 student enrollment plans, outreach programs, and college access. Referred to as "purposeful silencing of race words" (Pollack, 2004, p.3) and by deleting these words, both policymakers and constituents reproduce inequities.

Methods

This study utilizes a grounded research (Charmaz,1983) approach to examine how Mr. Smith, a White male, engaged with science content/ assessment and race in elementary science classrooms by examining, the policy constraints or supports, as well as implications for teacher preparation programs through the following data sources: (a) classroom observation, (b) formative assessments, (c) teacher responses to the assessment items, and (d) a semi-structured teacher interview. By using critical race theory as the interpretative lens, I examine the reflections, insights, and the teacher's response to his own practice, with specific attention to how race was or was not taken up in the classroom.

Findings

Although Mr. Smith demonstrated colorblind practices, his homeroom students spoke explicitly on race, which may indicate a higher level of trust with him in comparison to his non-homeroom class. One finding from this study is trust may have played a key role in the comfort of students to speak on race in their science class. The majority of Mr. Smith's class discussed race in their responses (7 of 12 groups). Mr. Smith also taught science to Ms. Park's class, and only 1 of 10 groups named race as a difference. Mr. Smith rationalized this as being due to him possibly mentioning race in his homeroom, and not in the other. However, as Mr. Smith said, race is an "obvious" construct.

Mr. Smith expressed that he did not "know [if] teachers [are] equipped to discuss race", which resulted in re-establishing hegemonic, colorblind, norms. This speaks to the insufficient support provided to teachers in both teacher education programs and professional development on sociocultural knowledge (Moll, 1992; Moll, Amanti, Neff, & Gonzalez, 1992). Sociocultural knowledge is the information a teacher possesses about who their students, families, as well as community are in order to orient practice. Sociocultural knowledge should serve as a lens by which teachers think critically about the pedagogical needs of students.

Broader Implications

Given the diversity of schools in the United States, sociocultural knowledge will become increasingly significant, especially in science classrooms. Sociocultural knowledge may be a base of information needed by current educators to enhance their decision-making in diverse science classrooms.

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"Modernizing" the Guatemalan Indigenous Midwife through Healthcare Reform: A Policy Discourse Analysis by Anna Christina Martinez-Hume

Keywords: Discourse Analysis, Healthcare, NGOs, Midwifery, Guatemala

Introduction

From 1998 until late 2015, the Guatemalan Ministry of Health (MOH) contracted non-government organizations (NGOs) to provide healthcare to indigenous Maya communities who lacked access. Due to language and geographic barriers, obtaining biomedical care is often not feasible for many, and these communities often rely on traditional Mayan midwives, for at-home births and general care. High rates of maternal mortality, however, have placed midwives under governmental scrutiny (Berry 2010). The NGO contracting program, known as the Coverage Extension Plan (PEC), required NGOs to train teams of community health workers. A traditional midwife was included as a member of the team. While midwives have long been a crucial aspect of healthcare in remote regions of Guatemala, their important role in communities has likely been affected by the PEC and other efforts to reform midwives and encourage communities to utilize biomedical healthcare facilities instead (Maupin 2008.) As part of a larger dissertation project (expected to begin in 2017) on the contracting program between the Guatemalan state and NGOs, this paper explores how this healthcare reform re-envisioned the role of Mayan midwives. Through the application of critical discourse analysis to an official PEC contract document, I ask how has the PEC policy represented or problematized indigenous midwives.

Methods and Analysis

To assess how midwives have been represented by the PEC, I applied a discourse analysis approachto an official PEC policy document entitled “Modelo de Extensión de Cobertura en el Primer Nivel de Atención” (Coverage Extension Model for Primary Care). This document outlines the PEC healthcare agenda and the roles and responsibilities for each PEC team member. Written discourse is understood to possess authority, and policy discourse, in particular, holds the power not only to address social problems but to define them (Johnstone 2008; Bacchi 2009). My discourse analysis approach adapted from other methodologies (Gee 2014; Bacchi 2009) focuses on problem representation, or how social issues are framed in discourse. I focused on word choice and repetition to highlight strategic framing. I also searched for intertextuality, or the adoption of other discourse and problem representations, within my source document. I coded these instances of framing, repetition, word choice, and intertextuality into emerging rationalities, intentions, and assumptions underlying problem representations of midwives.

Results

I found that the PEC problematizes both indigenous midwives and the Mayan communities whom they serve by framing them as anti-modern. The PEC categorizes the indigenous as “vulnerable” “risk” groups of “special attention” who must be “conditioned” “educated” and “trained” how to be modern healthy citizens. I found the PEC seeks to reform midwives into referral systems to biomedical care by stripping them of agentive actions. The trained midwife can no longer physically touch patients or facilitate deliveries, instead she can only “refer,” “promote,” “inform” and “counsel” patients to seek professional medical care. I also found evidence that the PEC adopted discourse from the Safe Motherhood Initiative, a global agenda for alleviating maternal mortality by reforming traditional

midwifery practices. These findings indicate that the Guatemalan state envisions Mayan communities and midwives as recipients of modernization and biomedicalization.

Future Work

The PEC was canceled in December 2015, but a replacement plan designed by the MOH will continue to train and utilize midwives as referral systems for biomedical care without the help of NGOs. My dissertation research has focused on the complex relationship between the state and NGOs, of which the reforming of midwives was only one aspect. My future research will explore these complexities more thoroughly, through an examination of how the fallout of the PEC contracts has affected government-NGO relationships and the political economy of NGOs who once relied on them.

Broader Implications

My findings, while not generalizable, may be indicative of similar global efforts towards reforming community health workers such as midwives within national health reforms. Promoter and referral systems are reflective of larger worldwide health agendas that emphasize community participation in combating health disparities. My discourse analysis indicates that policy addressing social issues simultaneously defines what those issues are. Thus, discourse analysis can be useful in assessing the process by which groups may be problematized within public policies.

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We Gon' Be Alright: Racial Microaggressions and Resilience of African College Students by Kristen J. Mills, M.A. and Jennifer Watling Neal, Ph.D.

Keywords: resilience, racial microaggressions, African American, education, predominantly white institution

Introduction

Racial microaggression research has identified the subtle indignities that persons of color experience day to day (e.g., low expectations of intellect). Focusing on the Black community, African American students who attend predominantly white institutions (PWIs) have been negatively impacted by racial microaggressions (Johnson-Ahorlu, 2010; Smith, Yosso, & Solórzano, 2007). However, African American students recount positive outcomes despite these experiences. Given the trend of enrollment at PWIs for African American students, and the upsurge of racial tensions in the United States, the exploration of racial microaggressions and related impacts on students is increasingly important. Using resilience theory as a framework (Fergus & Zimmerman, 2005), this study aimed to understand students' experiences of racial microaggressions and students' resilience in response to racial microaggressions.

Methods

Four focus group interviews were conducted with male and female African American students attending a large Midwestern PWI. Following Braun and Clarke's (2006) approach to thematic analysis, interpersonal and environmental racial microaggression themes emerged. Interpersonal racial microaggressions occur between two or more persons (e.g., offensive jokes or remarks) whereas environmental racial microaggressions have no apparent offender and involve macro-level factors such as policies or community/cultural influences.

Analysis & Results

Five interpersonal microaggressions were identified: 1) offensive jokes and remarks, 2) assumption of intellectual inferiority, 3) being avoided and unacknowledged, 4) assumption of criminal status, and 5) rude treatment. Experiences of offensive jokes and remarks, assumption of intellectual inferiority, and being avoided and unacknowledged were identified by participants across all focus groups.
Environmental racial microaggressions included: 1) segregation on campus, 2) lack of representation of persons of color, 3) biased campus response to criminality, 4) tokenism, 5) pressure to conform, and 6) cultural bias in courses. Segregation and lack of representation of people of color (POC) were described in all focus groups; cultural bias in courses was only described in female focus groups.
In response to these experiences, students identified both protective factors and adaptations that contributed to their resilience. Protective factors are characteristics or environmental assets that buffer against, interrupt, or even prevent risk. Six protective factors were identified including: social support, being vocal about racial microaggressions, motivation, university diversity, black student organizations, and physical activity. Social support was identified as a protective factor across all focus groups. Interestingly, being vocal about racial microaggressions was discussed by female students only, whereas motivation was described by male students only. Positive adaptations are defined as the mechanisms and strategies that an individual uses to facilitate positive outcomes despite risk. Positive adaptations included: self-reliance, self-care, becoming more assertive, educating oneself and others about issues related to racial microaggressions, being selective in social supports, discounting the offender's behavior, and resisting cultural discontinuity. Resisting cultural discontinuity emerged across female focus groups only.

Future Work

Unfortunately, African American college students attending a PWI experience many interpersonal and environmental racial microaggressions. Fortunately, protective factors (e.g., social support) and positive adaptations (e.g., resisting cultural discontinuity) may serve to buffer or interrupt the impact of racial microaggressions as communities and researchers strive to abolish these injustices. Expanding to multiple institutions including Historically Black Colleges and Universities, attending to differences across majors or colleges, matching the race and sex of the facilitator in both male and female groups, and conducting research at multiple time points may strengthen future studies. Future research should also explore resistance theory and ecological systems theory to unpack African American students' academic resilience. According to Carter Andrews (2012), resistance behavior is opposing a stressor rather than only managing the stressor. Applying both resilience and resistance theory may help identify and differentiate protective factors, positive adaptations or compensatory strategies, and resistance behavioral strategies. As resilience is developmental and multidimensional, future research can incorporate Bronfenbrenner's ecological systems theory, which emphasizes reciprocal interactions between individuals and their social environments over time (Bronfenbrenner, 1997).

Broader Implications

The results of this study are pertinent to the disciplines of psychology, education, and ethnic and racial studies while offering immediate implications for practice. Participants offered several recommendations for practice such as: increasing recruitment and retention of students, staff, faculty and administrators of color, altering diversity requirements (e.g., roundtable discussions and mandatory lectures), addressing hyper-criminalization (e.g., monitor and investigate campus police and improve infrastructure for reporting bias incidents), and addressing eurocentrism in courses (e.g., create/promote courses emphasizing/integrating material about POC). Separately, stakeholders across the university can organize to increase students' opportunities for discussions and strategic planning. Further, departments such counseling centers can use these findings to be better attuned to the stressors affecting this population, and garner support for group therapies. These implications focus on postsecondary institutions however they can be applied to other academic settings.

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The Köhler effect with the Inclusion of Diversity Author Field of Study: Sport and Exercise Psychology by Tayo Moss, Andrew Mac Intosh, Dr. Norb Kerr and Dr. Deb Feltz

Keywords: Motivation, Diversity, Group Dynamics

The Köhler motivation gain effect (defined as when an inferior team member exerts more effort when paired with a more capable partner,) has been established as a robust phenomenon in group contexts (Feltz, Forlenza, Winn, & Kerr, 2014). The Köhler phenomenon has been shown to be reliable since Weber and Hertel (2007) examined 17 Köhler effect studies with over 2000 participants, and found that the Köhler motivation gain effect is large in magnitude (g= 0.72).

Recent work by Moss and his colleagues (in press) examined how intergroup competition affected the group's performance on a set of muscular endurance tasks involving abdominal muscles (front plank, side plank and one-legged plank). Moss found that participants in the intergroup competition condition performed (d = 1.33) better than those in the non-competition conditions, suggesting that competition between groups may lead to a better overall group outcome. This finding supports the sixth suggestion reported in Kerr and Hertel's (2011) manuscript that ingroup-outgroup member differences might strengthen the impact of the Köhler effect.

These findings suggest that ingroup/outgroup memberships can play a role in group member motivation, and hence, in group performance. More specifically, in this project we explore how surface diversity (within-group heterogeneity in aspects such as age, race, and gender; (Williams & O'Reilly, 1998) might moderate the Köhler effect. For instance, it has been shown that males show a greater Köhler effect with a female than with a male partner (Lount, Messe, & Kerr, 2000). Likewise, Lount & Phillips (2000) found a stronger Köhler effect with an outgroup partner than with an ingroup partner. One type of diversity that has not been applied in this Köhler paradigm is racial diversity.

Timmerman (2000) is one of the few studies (e.g., Stone, et al., 1999) to examine racial diversity and team performance in two sport settings: basketball and baseball. The researchers gathered data from 871 professional basketball teams and 1,082 professional baseball teams from 1950 to 1997. Timmerman found that racial diversity was negatively associated (r= -.09) with team performance.

To conclude, this study will investigate the motivational implications of racial diversity in a group task. In particular, we will explore the compelling question of whether stereotypic views about performance might impact one's motivation and by extension, one's athletic performance while competing with a teammate of a dissimilar race. We will also investigate how, pairing participants of dissimilar races impact performance on an exercise task, in the context of dyads. We would like to extend Kerr and Hertel's (2011) implications for research on the Köhler effect with the inclusion of diversity. This research can potentially be helpful for the sporting community due the diverse nature of sports teams in today's society and an unquestioned belief that sports bring races together.

Based on stereotype research we expect the following results:

RQ 1: What are the effects of working with a partner of the same race?
Past Köhler motivation gain research on exercise has found that exercising with a more capable, virtual partner led to a 24 percent improvement in persistence for plank exercises.

Hypothesis 1: Participants exercising with a same race partner (SRP) should significantly improve their exercise performance in the second block, compared to the first.

RQ2: Will racial diversity moderate the Köhler motivation gain effect?
Research has provided evidence (Ward, 2004) for Black individuals being perceived by Whites as being athletically gifted compared to other races. Therefore, the second hypothesis is:

Hypothesis 2: White participants exercising with an African American partner (AP) will have a reduced Köhler motivation gain effect due to the added stereotype associated with the Black/White comparison.

Research has found that in a higher education context, Asians are more likely to be portrayed in study and research related settings, than in social settings (Wang & Cooper-Chen, 2010). Therefore, the third hypothesis is:

Hypothesis 3: Participants exercising with an Asian partner (AP) should have an inflated Köhler motivation gain effect due to the added stereotype threat associated with the Ehite/Asian comparison and working with an Asian partner.

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The structure and function of the juvenile spotted hyena scent pouch microbiome by Connie A. Rojas, Kay E. Holekamp and Kevin R. Theis

Keywords: Animal communication, Scent marking, Host microbiome, Metabolic function

Introduction

Animals' bodies are home to thousands of microbial species, which can exert profound effects on host physiology, reproduction, and development. Colonizing microbes are beneficial to their hosts, providing vital functions like the harvesting of energy, production of essential vitamins and minerals, promoting development of the immune system, and providing protection from opportunistic pathogens (Ji & Nielsen 2015). It is becoming increasingly clear that microbes can also affect their hosts' behavior. Specifically, they can protect their hosts from predation, increase their foraging efficiencies and reproductive outputs, and mediate their chemical communication systems (Archie & Theis, 2011).

In the spotted hyena (Crocuta crocuta), a highly social large carnivore, symbiotic bacteria appear to contribute to chemical communication, mediating hyenas' social interactions. A hyena's most conspicuous chemical signaling behavior is pasting, a form of scent marking wherein a hyena deposits scent pouch secretions ("paste") onto grass stalks. Paste is populated by diverse bacterial communities, and variation in the structure of these communities among hyenas appears to encode information about the hyena species, social group, sex, and reproductive state of the signaler (Burgener et al., 2008; Theis et al., 2013).

For hyenas and other mammals, it is unknown whether these bacterial communities change throughout development or whether they are functionally distinct from the communities inhabiting other body sites. Here, we 1) compare the structure of scent pouch microbiota at different developmental stages (adults vs. juveniles), and 2) compare the predicted metabolic function of the scent pouch microbiota to other body sites (scent pouch vs. rectum vs. mouth).

Methods

Sample collection: Paste was collected directly from the scent glands of 28 anesthetized juvenile and adult spotted hyenas, and swabs were taken of the scent pouch, rectum, and mouth of 11 additional juvenile hyenas (< 18 mos) in the Masai Mara National Reserve, Kenya.
DNA Sequencing: Genomic DNA was extracted from these samples using MO BIO kits. Bacterial 16S rRNA gene sequences in extractions were amplified using two broadly conserved primers targeting the gene's V6 – V4 variable regions and sequenced using 454 technology.
Sequence processing: Sequences were processed, clustered, and classified using mothur as outlined in Schloss et al. (2009). Microbiota profiles were visualized through nMDS plots and statistically evaluated using nonparametric MANOVA and permutation dispersion analysis. Microbiome functional profiles were inferred from 16s rRNA gene sequence data using PICRUSt and statistically analyzed using STAMP.

Results

Bacterial communities in the scent pouches of both adult and juvenile hyenas were dominated by fermentative anaerobes known to collectively produce many of the odors in spotted hyena paste. The bacterial communities of juveniles were different and more variable than those of adults ($p=0.0001$), which is consistent with microbiota data from other mammalian organs. At a functional level, pathways associated with the metabolism of fatty acids (including those implicated in scent marking), terpenes, and branched-chain amino acids were underrepresented in the scent pouch of juvenile hyenas

compared to adults ($p<0.05$).

Within juveniles, scent pouch communities were 91% different from rectal communities, and 43% of that variation was explained by the presence of 4 bacterial genera that are well known odor-producers. Additionally, the pouch microbiota had a greater representation of pathways associated with DNA replication, translation, and repair, and energy metabolism ($p<0.001$), while the rectum microbiota was enriched in pathways related to the metabolism of carbohydrates, xenobiotics, and secondary metabolites ($p<0.01$). Our results show that even among juveniles, scent pouch bacterial communities are distinct from those inhabiting other body sites and are likely contributing to juveniles' chemical signaling phenotypes.

Future Work

Future studies will explore the interplay between behavior and the microbiome. Specifically, we will investigate how a hyena's behavior influences its microbiota, and conversely, how microbiota can shape host's behavioral phenotypes. We will capitalize on the long-term behavioral and ecological dataset from the Mara Hyena Project to screen for factors that may be shaping microbiota structure (e.g. rank, group size, nutritional availability, mating behavior). A subset of these factors will then be experimentally tested in the field. We will begin by comparing microbiomes across 6 body sites (ears, nares, mouth, anal pouch, rectum, prepuce) in juvenile and adult hyenas spanning the spectrum of social ranks.

Broader Implications

This is the first study to characterize the microbiome at different body sites in any large carnivore, and also the first to address microbiome function within the context of social behavior. Hyenas have become a model system for studying complex social behavior so our findings may help elucidate the ways microbes shape the behavioral phenotypes of social animals in general, including humans.

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Are women better legislators? Examining women's legislative effectiveness at the state level by Jamil Scott

Keywords: Legislative effectiveness, State legislatures, Gender

Introduction

There are few studies that focus on the substantive impact of women officeholders, especially at the state level. Those state level studies that do examine female representatives' legislative behavior and agenda setting focus on a limited number of states or do not necessarily seek to bridge the gap between congressional and state legislature literature on the topic of female legislative effectiveness. Studies suggest that women outperform their male counterparts on the national level (Anzia & Berry, 2011; Volden, Wiseman & Wittman, 2013), but there is limited evidence in a select number of states that suggests this phenomenon carries over into state legislative office.

Thus, this study seeks to inform the literature on legislative behavior. Specifically, the study focuses on two questions. First, which legislative activities are most indicative of legislative effectiveness? Second, does the evidence that female legislators outperform their male counterparts on the national hold on the state level? I address these questions using data from the 2002 State Legislative Survey, a self report measure of state level officeholder activities and performance, as well as data collected on state officeholder legislative records. Given the findings at the congressional level, I expect to find that women are more likely to engage in activities that make them better at passing legislation.

Methods

Following prior work, I measure legislative effectiveness as bill passage. That is to say, if bill passage is the ultimate measure of legislative effectiveness, this study gets at which activities are most related to successful bill passage.

To test which legislative activities are related to successful bill passage, I use an ordinary least squares model. The dependent variable is a count of the number of bills that were passed into law of which the respondent acted as a primary author. In the model, I control for prior legislative experience, legislative professionalism, and partisan control of the legislature (which party dominates the legislature- a factor that may have some bearing on a legislator's ability to get a bill passed). The measures of legislative activities are categorical. I create three dichotomous (yes/no) variables to account for level of engagement for each legislative activity. The model differentiates between a great deal of time spent on a particular activity as high, and little time spent on a particular activity as low. The middle category, signifying an average amount of time on a particular activity, serves as the reference dichotomous variable.

I draw from the findings in the ordinary least squares model to capture the activities that are most influential in getting a bill passed. Using those legislative activities, I create ordered logit models in which the legislative activities are the dependent variables. Gender is the variable of interest here. Additionally, I control for the percentage of women represented in the legislature, the legislators' partisanship, and a multiplicative term including partisanship and gender, partisan control of the legislature, legislative

professionalism and political competition. The multiplicative term is used to control for any effect that gender and partisanship may play in conjunction with one another.

Analysis and Results

The ordinary least squares model suggests that only certain legislative activities are predictive of getting a bill passed as the primary author. In particular, spending more time studying legislation, developing legislation, building coalitions across parties, and obtaining government projects are all significantly related to being the primary author on bills that are passed into law.

Overall, the ordered logit models are significant and indicate that female legislators are more likely to engage in the examined legislative behaviors. These findings conform to my expectations as well as support the findings at the congressional level. All together, when bill passage as the primary author is the underlying metric for legislative effectiveness, female legislators are more likely to engage in the activities that lead to it.

Future Work

While the literature on women candidates and officeholders has progressed, further examination of officeholders may help us to better understand how gendered differences in legislative performance may influence representational outcomes for the public and legislative decision making. The conclusions that I can draw from the given data is limited in that the dataset only encompasses responses for one year and the dataset is largely based on self-report data of legislative behavior.

Due to the limitations of the data, I am unable to develop a measure of legislative effectiveness that mirrors those developed in studies at the congressional level. In future work, I would like to gather observational data on the legislative behavior of state level officeholders in order to further bridge the gap to the studies on legislative effectiveness at the congressional level.

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Professional Development for Minority Postdocs in STEM by Christopher Seals

Keywords: Underrepresented Minorities, Postdoctoral Fellows, STEM, Self-efficacy, Career goals.

Introduction

As postdoctoral fellows prepare to matriculate into the professoriate many face challenges including creating career goals, establishing valued mentorship, networking, and grant writing (Kohan, 2014). Instead of feeling as though faculty and institutions are devoted to providing professional development, often postdocs feel they are exploited for the low-cost labor they can provide (Rohn, 2011). These challenges are two-fold for underrepresented minorities (URM) in science, technology, engineering, and math (STEM), which makes them less likely to transition into the professoriate (American Institutes for Research, 2009).

Self-efficacy is a personal and socially constructed perception where one believes they can complete a task (Schunk & Pajares, 2005). Factors that influence URM students' self-efficacy in doctoral and career goal attainment in the STEM fields are multifaceted, and often intertwined with experiences of bias, stereotypes, STEM career identity formation, and a lack of a sense of belonging (Tine & Gotlieb, 2013).

This brief discusses a small part of a larger study, and analyzes the change in self-efficacy of URM postdoc students after attending a two-day workshop on career development. Researchers have yet to examine the postdoctoral experience of URMs in STEM positions and how they may benefit from career-focused professional development workshops.

Methods & Analysis

URM postdocs were invited to a two-day workshop that built skills in areas pertinent for postdocs to be successful - particularly in STEM faculty positions. Topics included: mentoring, grant writing, negotiating, and publishing. One week after the workshop, the postdocs received a survey about their self-efficacy in three skills and abilities related to working with their mentor, moving forward in their careers, and grant funding.

The participants' ages ranged from 28 to 49 years old (M = 35.7). There were 15 males and 25 females, one participant chose not to share age and gender. The racial and ethnic breakdown of the participants was: 22 (55%) identifying as Black/African American, 9 (23%) as Latino/Hispanic, and 8 varied and multiracial. All participants were postdocs from a public midwestern research one university.

A one-way repeated measures analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that postdocs' confidence in meeting their goals had not changed after attending the workshop. Also, the answers to the three survey questions were also rated on a 7-point Likert scale from 1(not at all confident) to 7 (extremely confident).

Findings

The self-efficacy of the postdocs showed significant growth in all three skills (N=39): (a) the ability to convince reviewers about the merit of a grant proposal $F = 113.33$, $p < .001$,(b) the ability to maintain effective communication with your mentor $F = 53.41$, $p < .001$, and (c) the ability to apply for academic jobs $F = 96.73$, $p < .001$. This self reported data infers that the postdocs felt more efficacious as result of attending the workshop in all three ability areas.

Future Work & Implications

This study may help future researchers determine how useful professional development workshops can be to the growth in task efficacy and potential career efficacy of URM postdocs. The workshop helped postdocs gain ability and knowledge in communicating and the job search process, and it was also effective in building postdocs' confidence to search and compete for grants and funding. Future research on this topic could explore the career goals of the URM postdocs, helping researchers gain a clearer idea of what type of career URM postdocs want. Findings that may suggest that STEM URMs have varying interests in becoming faculty could alter how researchers approach the problem of having a low number of URMs in academic research based positions. Overall, this workshop and other similar academic career focused workshops could play an important role in building the skills and competencies of URM postdocs to matriculate into future faculty positions and to succeed in academia.

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Engineering Plants for Biofuels by John Tran

Keywords: Biofuel, Cell wall, Lignin, Protein transport

Introduction

Plant cells are surrounded by a cell wall composed in part of complex carbohydrate molecules. The cell wall serves many vital functions for plant growth and development, as well as defense against pathogens. The cell wall allows the cell to maintain a high turgor pressure that allow plants to have the mechanical strength required for upright growth (Proseus et al., 2005, Hamann et al., 2014). The cell wall is composed of three major forms of polysaccharides; namely, cellulose, hemicellulose, and pectin (Cosgrove, 2005). Among these polysaccharides, cellulose is the most abundant constituent of the plant cell wall, and the most abundant biopolymer on Earth. Due to the abundance of cellulose, the plant cell wall is an excellent source of carbohydrates to use for the production of important chemicals or transportation fuels (Rubin, 2008). As the global population continues to increase, research focused on identifying plant genes that maximize plant cell wall's utility as sources of biofuel and other chemicals, has important implications for solving future energy demands (Lewis, 2006).

Generating biofuels from biomass involves digesting the cell wall to release cellulose for conversion into glucose followed by fermentation. Releasing cellulose is challenging as cellulose is strongly bound to a number of other cell wall polymers, making the digestion process inefficient and costly (Weng et al., 2008). Thus, research into cost-effective deconstruction strategies are required for biofuels to be economically viable.

Among the polymers that are bound to cellulose and make isolation of cellulose difficult is lignin. Lignin is a class of complex organic polymers that lend compressive strength and resistance to microbial degradation to the plant cell wall (Vanholme et al., 2010). The interaction between cellulose and lignin increases the difficulty of utilizing the cell wall as lignin is highly resistant to both mechanical disruption and enzymatic degradation. Because lignin is difficult to remove, the cost of producing sugars from biomass remains high. While the presence of lignin leads to challenges during biomass processing, lignin is essential to plants because of its functional role in maintaining the plant vasculature system. Therefore, it is impossible to engineer plants completely devoid of lignin (Chapple et al. 2007). The difficult task at hand is modifying the composition of lignin for efficient processing without compromising the lignin required for plant growth and development.

Lignin is derived from small molecules called monolignols (Boerjan et al., 2003). Monolignols are synthesized inside the plant cell and then transported across the plasma membrane to the cell wall. After reaching the cell wall, monolignols undergo polymerization to form lignin by a free radical catalyzed reaction (Bonawitz et al., 2010). Understanding how monolignols cross the membrane represents a critical step in altering the lignin composition of plant cell walls and will allow for selection of alternative versions of monolignols to alter the properties of lignin (Liu, 2012). We require that the transport mechanism is capable of transporting these altered compounds and that intermediaries required for their synthesis are not transported (Wilkerson et al., 2014). Current reports suggest protein transporters are involved in the translocation of monolignols from the cytosol (inside the cell) to the apoplast (outside the cell). One study presented evidence for a protein transporter mechanism by identifying an Arabidopsis thaliana protein as a monolignol transporter (Alejandro et al., 2012). Other studies have also supported the protein transport of monolignols hypothesis by reporting an ATP-dependent process (Miao et al.,

2010). An alternative hypothesis is that monolignols diffuse through the plasma membrane and do not require a specific transporter. The question I am interested in answering is whether protein transporters are required for the movement of monolignols across the plasma membrane. Using transcriptional profiling data sets I have identified transporter candidates. I will test the candidates using a biochemical assay with proteins produced in yeast for transport activity. If a candidate is found to have binding activity with monolignols, I will inactivate the genes in plants to determine the phenotype.

Methods

I am using a recently generated RNA-sequencing dataset measuring gene expression during stem development of *Sorghum bicolor*, a grass species grown for food, feed, fibre, and fuel (McKinley et al., 2016). After selecting genes with similar expression patterns as known genes involved in lignin biosynthesis, I will clone them into yeast. Using yeast to express the protein of these candidate genes, I will collect protein enriched membrane fractions from the yeast cell. I will then determine whether or not these membrane proteins have a binding affinity for monolignols.

Findings

I have found several candidates that display a similar expression pattern to known genes involved in cell wall biosynthesis. We will functionally characterize these genes for their potential to transport monolignols by using a set of known monolignols.

Broader Implications

The global population is expected to reach 9.5 billion by 2050. An increase in population of this magnitude will place a large demand on natural resources such as food and fuel. Generating other sources of fuel other than fossil fuel will be critical for meeting future demands and for curbing the increasing levels of carbon dioxide in order to slow global warming.

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Notes:

What is MSU AGEP?

The Alliances for Graduate Education and the Professoriate (AGEP) at Michigan State University (MSU) is a National Science Foundation program that supports recruitment, retention, and graduation of U. S. students in doctoral programs of the natural and social sciences, mathematics, and engineering. The focus of AGEP places special emphasis on a fully inclusive recruitment and development of students from U.S. population groups historically underrepresented in fields of the sciences, technology, engineering and mathematics (STEM); and the social, behavioral, and economic (SBE) sciences.

A goal of AGEP is to promote changes that transform U. S. universities to embrace the responsibility of substantially increasing the number of underrepresented U. S. minorities who will enter the professoriate in STEM and SBE disciplines. Graduate students, post-docs and faculty who participate in building the AGEP Community at MSU will provide a key to changing the culture of U. S. colleges and universities to embrace building world-class STEM and SBE faculty members who fully reflect the diversity in race, gender, culture and intellectual talent of the U.S. population. We have a series of events throughout the year, including monthly community meetings, Fall/Spring Conferences, and student outreach activities. You can follow us on LinkedIN and Facebook and request to be added to our list-serve by emailing the MSU AGEP Program manager, Steven Thomas at msuagep@grd.msu.edu.

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