

McNair Scholars Program

Academic Excellence 1995-2020

2019-2020 • Volume 25



McNair Scholars Program

Academic Excellence 1995-2020

2019-2020 • Volume 25



Editors

Daphne Cavallaro
Ashley Cervantes
LaWanda Holt-Fields
Joseph Nguyen

The Journal of Research Reports
is published annually by the
Wichita State University
McNair Scholars Program
1845 Fairmount
Wichita, Kansas 67260-0199



Administration

Interim President..... Dr. Andy Tompkins
Vice President for Diversity and Community EngagementDr. Marché Fleming-Randle
Associate Vice President for Special Programs Deltha Q. Colvin

From the Director

It is with honor that I present Volume 25 of the Journal of Research Reports, “McNair Scholars Program: Celebrating 25 years of Academic Excellence, 1995 – 2020.” The articles featured in this journal represent the work of Program participants from the 2019-2020 grant year. As one reads these articles, it is clear that the scope of research interests is as diverse as students who are served by the McNair Program. Many of our students are from underserved communities, ethnic minorities, and may identify as the first in their family to pursue a college education. The Program staff are so pleased with the efforts that went into producing this significant and intellectual body of work.

The Program can only achieve these accomplishments with the support of University faculty, staff and administrators. Through the leadership of faculty who serve as research mentors, Scholars have been inspired to complete research projects despite any obstacles they may have encountered during this process. We applaud the dedication displayed in making undergraduate research a reality. The unwavering support of these students from faculty, staff, and the McNair Scholar Program is a testament to the African Proverb, “*It takes a village to raise a child,*” thank you for being a part of our “village.”

As we close the third year in a five-year grant cycle, 2017 – 2022, celebrating 25 years of academic excellence, we are excited to continue the tradition of promoting undergraduate research on the campus of Wichita State University. Within this journal, you will find the work of fifteen (15) undergraduate students whom we are showcasing for the work completed, the learned lessons, the commitment to think outside of the box, and perform outside of the classroom. This journal contains full manuscripts, summaries and extended literature reviews from our Scholars. The development of these documents serves to cultivate and develop research skills, provide experiences in navigating the research process, and to create and develop relationships with faculty that could potentially assist students in applying, being admitted to, and enrolling into graduate programs. The high impact activity of conducting scholarly research is supported in an effort to assist our Scholars by leveling the playing field in their pursuit and completion of doctoral studies.

A special thank you is given to the staff for their dedication to the Program and the students that we serve. *Ms. Daphne Cavallaro*, research coordinator; *Mr. Joseph Nguyen*, writing tutor; *Ms. Ashley Cervantes*, program counselor and student confidant; and *Ms. Neshia Greene*, senior administrative assistant and all-around Program support. Lastly, *Ms. Deltha Q. Colvin*, associate vice-president, who provides unending support for me and the McNair staff as a whole.

Finally, I congratulate these Scholars for a job well done; and I applaud their efforts in sharing their brilliance with the academic community and they take the reins to diversify academia in thought and works. I thank them for the opportunity to serve as their director.

Table of Contents

WSU Administration

Letter from Lawanda Holt-Fields, Director
WSU McNair Scholars Program

2

Research Manuscripts

Daniela Vega

*College Student Perceptions of Integrated
Behavioral Health Care on Campus*

7

Inneké L. Vargas

*The Significance of Racial Categorizations on
Mental Health Service Outcomes*

17

Research Summaries

Abel D. Velasquez

The Psychology of Social Media Engagement

27

Ana Barbara Hernandez

*The Mirroring Effect of Young Adult
Literature: Racial Representation in Morris
Award Winners, 2009-2019*

31

Angela Portillo

*Pilot Study: Vertical Jump
Comparison Between Vertec, Dari Motion
Capture, and My Jump 2 App*

35

Autumn Minor

*Assessing Substance Use Among College
Students and How to Promote Counseling*

41

Crystal Zacarias

*Freedom of Speech: Effects of U.S. School
Monolingual Practices on Hispanic Students*

45

Jannet Balderrama

*Isolated Dental Pulp Stem Cell Motility in a
3D matrix*

51

Joseph Sekavec

*Complex Analysis and Fluid
Flow Summary*

57

Kenya Sevilla

*Food and Other Insecurities Among Students:
An Assessment of the University's Role in
Meeting Staff and Student Needs*

63

Kyla Morris

*A Mixed Methods Study: An Evaluation of
Sisters and Brothers for Healthy Infants &
Collection of Maternal Voices*

69

Maria Banuelos Galicia

*Effect of Lyrical Versus Nonlyrical Music on
Reading Comprehension in College Students*

75

Taj Allen

*Investigating the Role of Domain 4 of the
Anthrax Protective Antigen on Stability and
Immunogenicity*

81

Ya-Aida Sillah

*Understanding Knowledge of Fall
Prevention in Care Homes*

89



Research Manuscripts

College Student Perceptions of Integrated Behavioral Health (IBH) Care on Campus

Daniela Vega *and*
Rachel Petts, PhD

Psychology Department, Wichita State University

Abstract

The purpose of this study was to understand college student perceptions of integrated behavioral health (IBH) care on a college campus and how likely students are to seek mental health help in an IBH setting compared to traditional mental health care. Participants were recruited from a sample of 2,000 students at Wichita State University. Seventy-four participants completed an online survey regarding perceptions of IBH (e.g., benefits of the model) and their intention to seek help in that setting. Results found that 40.5% of students felt very comfortable receiving mental health treatment in the same setting as physical health, and 35% found the merger of student health and student counseling services to be beneficial. There was no significant difference found between intentions to seek help for mental health care in IBH versus traditional mental health care. Results suggest that the IBH model may be an acceptable model of care for college students and they are just as likely to seek help there as they would a traditional mental health professional. More research is needed to examine what factors may influence acceptability as well as intentions to seek help.

Introduction

The Integrated Behavioral Health (IBH) approach of health care service delivery is becoming popular as a way to bring behavioral health services and primary care services into one setting. This approach to health care uses a team-based method to treat behavioral health problems and biopsychosocially influenced health conditions (Hunter et al., 2018). The ultimate goal is to “enhance the primary care team’s ability to manage and treat such problems/conditions, with resulting improvements in primary care services for the entire clinic population” (Hunter et al., 2018, p. 127). In this

approach, a behavioral health consultant (BHC) is typically incorporated into the primary care team to support the primary care provider (PCP) and team as well as to provide behavioral health services onsite. This contrasts with traditional mental health and medical care, which have historically operated separately and with little to no collaboration. The integration of mental/behavioral health and health care has the potential to improve access to, and quality of, health care for individuals, and is gaining traction as a viable alternative to traditional models of care across a variety of health care settings. One such setting is college campuses.

College Mental Health and Integration

The prevalence and severity of mental health problems in college students has increased greatly over the years (American College Health Association, 2020). This may not only affect their academic performance but can have a long-term effect on a person's mental and physical health if left untreated (Pratt et al., 2012). In college, students often do not have access to mental health care or health care in general. There are various barriers that play a role in a student getting access to these forms of care, such as finances, time, language barriers, insurance, etc. Stigma may also be a factor that delays or prevents college students seeking mental health care (Eisenberg et al., 2009).

College campuses do have student health centers as well as counseling centers that may help prevent, detect, and treat mental health issues. However, most student health and counseling centers are not integrated or involve much collaboration (American College Health Asso-

ciation, 2010). Given the promise of integrated behavioral health care in the community and the rising prevalence of mental health issues in college students, the IBH model may be a promising option to improve access to mental health care on college campuses. However, to date, limited research exists regarding the integration of student health services and mental health services on college campuses. The research that has been completed is mostly preliminary, although promising.

Current State of Research for Integration on College Campuses

Utah State University's integrated student health care program aimed to enhance university student mental and physical health, reduce waitlists at the university counseling center, increase mental health referral follow-through and much more (Pratt et al., 2012). A 63-item survey was created to evaluate the integrated behavioral health care program. The results showed that the primary care providers had little to no training in the diagnosis and treatment of mental health conditions during or after their medical education. Providers felt most confident in treating conditions they were used to, such as depression or anxiety. When it came to other disorders such as personality or substance abuse, providers felt less confident. Providers had great satisfaction working with behavioral health consultants and noted an increased level of collaboration and communication in the team. Recommendations from this study for future universities wanting to develop an integrated model on campus suggests a few things. Taking time to look through the current model of care can be beneficial in terms of

looking at its barriers to implementation (Pratt et al., 2012). Surveys can help identify areas that may need to be addressed in the program. The implementation of screening instruments can be extremely beneficial in terms of increasing the communication between the provider and patient regarding their behavioral health factors and treatment. After reviewing the survey, it can then be determined what type of model would be more appropriate (Pratt et al., 2012).

In an early report done at a large Midwestern University, 200 participants with medical appointments were assessed to see the benefits, limitations, and other factors of the current model. This study evaluated the possible need for implementing an integrated care model at the university (Alschuler et al., 2008). The majority of participants presenting at the setting had severe illnesses. Only one was identified with behavioral issues and that patient had been referred from counseling services. Self-reports were completed by the providers themselves who showed modest confidence in treating behavioral issues. A major implication from this study was that providers need to better assist behavioral issues, but they do not feel exceptionally qualified to do so. To remedy this, they would like to be paired with a BHC. This study was able to provide practical evidence for the need of an IBH model of care in a campus setting.

Finally, research has shown that when counseling centers and student health centers integrate, mental health issues are more prevalent than in a traditional separated model of care (Turner et al., 2018). Findings also showed that while students with and without mental health disorders reached out for help, students showed higher use in a

standard clinical model. However, patients who seek help in an integrated setting are more likely to keep up with their upcoming appointments. In an integrated setting, there is collaboration between two different professionals that can help bring costs lowered through more cost-effective treatment.

Statement of the Purpose

College students typically seek out basic medical services in a nonemergency situation at their student health clinic. Students are learning how to take care of themselves financially, and this may limit students to seek specialty services for things such as mental care. There are high rates of mental health conditions in college students that such lack of research for integration on a college campus is surprising. College students often do not address their mental health conditions due to barriers, such as language, insurance, finances, stigma, etc. A great deal of stigma centers on mental health and help-seeking. This model of care can help give access to mental and behavioral health care to many people who do not have access to it and as well as for primary care. Limited research exists regarding the integration of student health services and counseling services, more exploration is needed to determine how best to implement and disseminate the model of care.

A first step in conducting IBH research on college campuses may be to survey college students about their perceptions of IBH and the likelihood of seeking help in that setting. This may impact implementation of IBH on campus and how it is offered to the student population. Recently, Student Health Services (SHS) and Coun-

selling and Prevention Services (CAPS) merged into the Student Wellness Center on Wichita State's campus. The merger now provides the opportunity for more collaborative and integrated services on campus. Given this recent change to a more integrated model of care at WSU, the pur-

pose of this project was to answer the following research questions: 1) What are college students' perceptions about IBH on campus? and 2) Are college students just as likely to intend to seek mental health help in IBH settings in comparison to traditional mental health care?

Methodology

Participants

Participants for this study were students at Wichita State University, age 18 or older. Participants were recruited from the Wichita State University campus through email. A sample of 2,000 student emails was randomly selected from a database to receive the recruitment email. Seventy-four participants completed the survey for a completion rate of 3.7%.

Demographics

Demographic questions were asked, including age, which gender the participant identified most with, race/ethnicity, year in school by credits attained, if the participant was an in-state student, type of insurance the participant had, and previous usage of Counseling and Prevention Services, Student Health Services, and WSU Psychology Clinic. The most frequently reported race/ethnicity was Euro-American/White (63.5%) and year in school by credit hours was senior (33.8%). The majority of students were in-state (82.4%) and most reported insurance status was private insurance (44.6%). For student health services, 40.5% reported previous usage and 21.6% reported previous usage for counseling and prevention services. See Table 1 for details.

Materials

This study is part of a larger project examining college student perceptions of integrated behavioral health care. Only measures used in the current study are reported below.

Student Perceptions of IBH

Seven items were created to assess student perceptions of IBH. First, participants were asked if they were aware of the merger between Student Health Services and Counseling and Prevention Services at the Wellness Center (item 1). Next, participants were asked to rate their comfort level in receiving mental health treatment in a medical setting using a five-point Likert-type scale (i.e., (1) *Not at all comfortable* to (5) *Extremely comfortable*; item 2). Participants were also asked to rate how likely they would utilize the Student Wellness Center for health care and mental health care, respectively, using a five-point Likert-type scale (i.e., (1) *Extremely unlikely* to (5) *Extremely likely*; items 3 and 4). In addition, participants were asked how beneficial they perceived the merger of health and mental

health on campus, using a five-point Likert-type scale (i.e., (1) *Not at all beneficial* to (5) *Extremely beneficial*; item 5).

The last two questions focused on the potential barriers to accessing the Student Wellness Center (item 6), as well as the potential benefits (item 7). Participants were able to “choose all that apply” from eight different barriers or benefits. Potential barriers participants were able to choose from included: lack of privacy, financial issues, stigma, transportation, quality of services, helpfulness of services, lack of time, or no barriers anticipated. Possible benefits participants were able to choose from included: easier access to a mental health (MH) professional, the collaboration of a primary care physician and MH provider, saving time being at the same office for services, higher quality of care, reduced stigma, whole-person/holistic care, saving money on health care costs, or no benefits anticipated.

Intentions to Seek Help

A psychometrically validated measure was used to assess intentions to seek help. The general help-seeking questionnaire (Wilson et al., 2005) considers the likelihood of a person seeking help from another person or professional for a personal problem. Participants were asked to rate the

degree of which person they may consider seeking help from for a personal problem. This 11-item questionnaire had a 7-point scale that ranked from 1 (*Extremely unlikely*) to 7 (*Extremely likely*). Participants were given a fill in the blank option to add in another person or professional not listed in the questionnaire. Researchers added in the following option to address intentions to seek help in IBH: “Mental health professional located in your doctor’s office.” The Cronbach’s alpha for the current sample was .801, indicating good internal consistency.

Procedure

Prior to data collection and recruitment, the study was approved by the WSU Institutional Review Board. Current students were randomly recruited from a Wichita State University email database. An email was sent describing the purpose of the study and asking for participation. After consenting electronically, participants were asked to complete the survey administered through Qualtrics, which took approximately 10-15 minutes. Participants who started the survey but did not complete received two reminder emails to complete. The survey remained open for completion for approximately one month.

Results

College Student Perceptions of IBH

Over half (54.1%) of respondents were aware of the merger of Student Health Services and Counseling and Prevention Services at the new Wellness Center. In terms of comfort level in receiving mental health treatment in the same place

medical help is received, the majority of students felt very comfortable (40.5%) or extremely comfortable (24.3%), while 23% were moderately comfortable, 6.8% were slightly comfortable and 2.7% were not at all comfortable. The majority of students saw the merger of mental health and

health as very beneficial (35.1%) and extremely beneficial (33.8%), 17.6% saw it to be moderately beneficial, and 10.8% saw the merger being slightly beneficial.

The highest reported result for the likelihood of utilizing the Student Wellness Center for health care showed 28.4% were neutral and 18.9% was reported for extremely likely, likely, and unlikely, respectively. The remaining results showed 13.5% were extremely unlikely to utilize the Student Wellness Center for health care. In terms of utilization of the Student Wellness Center for mental health care showed that most students (31.1%) were neutral, 18.9% reported both likely and unlikely, 17.6% were extremely likely, and 12.2% were extremely unlikely.

The top 3 reported potential barriers of accessing the Student Wellness Center are not having enough money (25.7%), no time to visit the Wellness Center (31.1%) and no anticipation of any barriers (29.7%). The top 3 reported poten-

tial benefits of an integrated health model are easy accessibility to a mental health professional (59.5%), a primary care physician and mental health provider collaborating in on the care of a patient (50%), and saving time in seeing mental and physical health in the same office (56.8%). See Table 2 for all reported barriers and benefits, along with percentages.

Intentions to Seek Help

Results showed that there was not a significant difference between intentions to seek help from a mental health professional in IBH ($M = 4.41$, $SD = 1.89$) and intentions to seek help from traditional mental health care professionals ($M = 4.69$, $SD = 1.83$), $t(67) = -1.9$, $p = .061$. Furthermore, a one-sample t -test indicated that intentions to seek help from a mental health professional in IBH was no different than a neutral score of 4 (between a score of 3 “unlikely” and 5 “likely”), $t(67) = 1.79$, $p = .078$.

Discussion and Conclusion

This study focused on two main questions: what are college students’ perceptions about IBH on campus, and are college students just as likely to intend to seek mental health help in an IBH setting compared to traditional mental health? In this study, students’ perceptions towards integrated behavioral health care were more accepting on a college campus. Students saw many benefits in this setting of care for both mental and physical issues. Barriers were reported as well and will be able to give more insight towards the use of the Student Wellness Center. The intentions

to seek help in an IBH setting did not differ in the intentions to seek help in a traditional mental health care setting. Considering the benefits of an integrated health care setting, one might have expected intentions to be higher in the IBH model. However, it is promising that intentions to seek help were at least equal to traditional care. Overall, this study provides some groundwork evidence for the promising implementation of this model of care on college campuses.

Limitations

At the start of this study, COVID-19 took effect and became a pandemic, and, as such, took a major toll on the country. This caused many schools, restaurants, and businesses to temporarily close as groups of 10 or more people were not allowed due to the quick spread of COVID-19. Wichita State University had to move to remote classes for the remainder of the school year. This became a limitation as some students were left without technology and for others, it became harder for them to access these resources. These were resources that were much easier to access on campus prior to COVID-19. It was a stressful time for students as they were focusing on classes closer to finals and had to adjust to online courses during an uneasy time. It is likely that the global health crisis affected the survey response rate and may reduce the generalizability of the results. A

lack of incentive could have also reduced motivation to complete the survey. Other limitations include the use of self-report measures to evaluate perceptions and potential behavior (i.e., intentions to seek help).

Future Research

There is still more to look into with integrated behavioral health (IBH) care in college campuses. Given the overall acceptability of the model and at least modest intentions to seek help in an IBH setting, future research may focus on actual service utilization of integration on college campus. Moreover, it may be helpful to examine what factors (e.g., stigma) impact acceptability and utilization. Results from studies such as this may help with implementation in other college campuses across the nation.

References

- Alschuler, K., Hoodin, F., & Byrd, M. (2008). The need for integrating behavioral care in a college health center. *Health Psychology, 27*(3), 388–393.
<https://doi-org.proxy.wichita.edu/10.1037/0278-6133.27.3.388>
- American College Health Association (2020). *American College Health Association-National College Health Assessment III: Reference Group Executive Summary Fall 2019*.
https://acha.org/documents/ncha/NCHAIII_Fall_2019_Reference_Group_Executive_Summary.pdf
- American College Health Association (2010). Considerations for integration of counseling and health services on college and university campuses. *Journal of American College Health, 58* (6), 583-595.
- Eisenberg, D., Downs, M.F., Golberstein, E., & Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review, 66*(5), 522-541.
- Hunter, C. L., Funderburk, J. S., Polaha, J., Bauman, D., Goodie, J. L., & Hunter, C. M. (2018). Primary Care Behavioral Health (PCBH) model research: Current state of the science and a call to action. *Journal of Clinical Psychology in Medical Settings, 25*(2), 127–156.
<https://doi-org.proxy.wichita.edu/10.1007/s10880-017-9512-0>
- Pratt, K. M., DeBerard, M. S., Davis, J. W., & Wheeler, A. J. (2012). An evaluation of the development and implementation of a university-based integrated behavioral healthcare program. *Professional Psychology: Research and Practice, 43*(4), 281–287.
<https://doi-org.proxy.wichita.edu/10.1037/a0028122>
- Turner, J. C., Keller, A., Wu, H., Zimmerman, M., Zhang, J., & Barnes, L. E. (2018). Utilization of primary care among college students with mental health disorders. *Health Psychology, 37*(4), 385–393. <https://doi-org.proxy.wichita.edu/10.1037/hea0000580.supp> (Supplemental)
- Wilson, C. J., Deane, F. P., Ciarrochi, J., & Rickwood, E. (2005). Measuring help-seeking Intentions: Properties of the general help-seeking questionnaire. *Canadian Journal of Counselling, 39*(1), 15-28.

Table 1. *Demographic Variables of the Sample in Means or Percentages*

	n	%
Age <i>M (SD)</i>	25.26	(9.75)
Female	42	56.8
Male	23	31.1
Gender variant/non-conforming	2	2.7
Race/Ethnicity		
Euro-American/White	47	63.5
Hispanic-American/Latino(a)	9	12.2
Asian/Asian American	7	9.5
American Indian/Alaskan Native	2	2.7
African American/Black	2	2.7
Other/Prefer to self-describe	2	2.7
Bi/Multi-	1	1.4
Racial		
Year in school (by credit)		
Senior	25	33.8
Junior	22	29.7
Sophomore	12	16.2
Freshman	7	9.5
Graduate Student	1	1.4
In-State Status		
Yes	61	82.4
No	6	8.1
Insurance		
Private	33	44.6
No Insurance	7	9.5
Other	7	9.5
Student insurance plan/United	1	1.4
Healthcare Student Resources		
Previous usage of CAPS, SHS, etc.		
Student Health Services	30	40.5
Counseling and Prevention	16	21.6
WSU Psych Clinic	2	2.7

Note. CAPS = Counseling and Prevention Services; SHS = Student Health Services; WSU= Wichita State University. Not all percentages add to 100% due to missing data.

Table 2. *Frequency and Percentages of each Barrier and Benefit of IBH Reported*

Barriers		
	n	%
Lack of privacy	16	21.6
Not enough money	19	25.7
Lack of transportation	2	2.7
Stigma	11	14.9
Services not helpful	4	5.4
Doubts of quality of services	16	21.6
No anticipation of barriers	22	29.7
Lack of time	23	31.1
Benefits		
	n	%
Easier access to MH professional	44	59.5
Collaboration between PCP and MH provider	37	50.0
Save time seeking mental and physical health care	42	56.8
Higher quality of services	10	13.5
Reduced stigma	23	31.1
Whole-person/holistic care	24	32.4
Save money on health care	8	10.8
No anticipation of benefits	4	5.4

Note. IBH = Integrated Behavioral Health; MH = Mental health; PCP = Primary care provider

The Significance of Racial Categorizations on Mental Health Service Outcomes

Inneké L. Vargas *and*
C. Brendan Clark, PhD

Psychology Department, Wichita State University

Abstract

Mental health stigma is a long-standing problem within the African American community. Despite increasing social acceptance among younger generations, stigmatization dissuades patients from seeking psychotherapy. In addition to historical stigmas, minorities contend with unbalanced power differentials within cross-racial therapeutic settings. These factors reduce the chances of satisfactory treatment outcomes and may result in client disengagement. This study examines historical experiences in healthcare among African Americans in the United States, the effects of cross-racial dyads in therapeutic settings, and how these issues affect the current utilization of on-campus mental health services among minority college students. The study had a total participant pool of ($N = 102$). The majority of participants were White non-Hispanic ($n = 69$) women ($n = 80$). The final results indicated no significant difference in mental health service outcomes between minority ($N = 33$) ($M = 18.15$, $SD = 3.82$) and non-minority groups ($N = 67$) ($M = 18.83$, $SD = 3.44$).

Keywords: African Americans and healthcare, minorities, mental health stigma, college students, treatment outcomes

Introduction

It is vital that the client-practitioner therapy relationship be founded on trust. Without trust, clients are less inclined to share information with their therapist, thereby limiting the efficacy of their treatment; others may choose to discontinue treatment altogether. Treatment outcome satisfaction rates have substantial implications on clients' willingness to seek treatment and is a contributing factor to mental

health stigmas. Owen et al. (2013) define mental health social stigma as the fear of judgement from others in their social network for seeking mental health treatment. There is little empirical research on the satisfaction rates with on-campus mental health services for minorities at predominately White institutions (PWI). This study explores the influence of cross-racial therapy dyads on treatment satisfaction and the utilization of on-campus mental health services among minority students compared to their White counterparts.

A large number of new adopters of mental health services include students on college campuses. Lipson et al. (2019) conducted the most comprehensive college student mental health service utilization study to date. The study aggregated 10 years of data from the Healthy Minds Study, a web-based survey conducted annually, comprising 155,026 students from 196 campuses. Results showed an upward trend of mental health service utilization across the 10-year span, from 19% of students seeking treatment in 2007 to 34% of students seeking treatment in 2017. Lipson et al. (2019) also reported stigma rates, both perceived stigma and personal stigma, decreased from 64.2% to 46.0% and 11.4% to 5.7%, respectively. It is important to note the majority of participants (74%) were White students, and no specific data was given for minority student utilization.

The under-utilization of mental health services by minority college students is alarming considering 75% of all lifetime disorders are diagnosed by age 24 (Cadigan et al., 2019). A rising number of students choose to self-medicate with tobacco, marijuana, and alcohol as opposed to seeking healthy mental health services

(Nobiling & Maykrantz, 2017). On campuses with systems-related barriers, such as counselor availability and a lack of mental health resources, utilization falls to about 10% among psychologically distressed students (Marsh & Wilcoxon, 2015). These systems-related barriers can be attributed to longer than usual wait times for appointments and a lack of mental health networks. Other contributing factors to underutilization can be attributed to students not having enough time to seek services when needed (Dunley & Papadopoulos, 2019). The Wichita State University Counseling and Prevention Services (CAPS) provides low-cost counseling services to students. Their office is equipped to assist students with a variety of therapeutic services including group therapy, psychiatric consultations, psychological assessments, and crisis information. All services are open and available to all students; however, the current disparity between the number of minority counselors versus non-minority counselors could be a factor in minority student underutilization.

Chang and Berk (2009) observed the increase in interracial dyads as more African Americans seek therapy. The detriments of cross-racial therapy settings have been explored as far back as the early 1980s with Ridley (1984) indicating cultural paranoia as a leading cause of nondisclosure between Black patients and White therapists. Chang and Yoon (2011) conducted a study that included 23 ethnic minorities. Researchers reported that participants believed their White therapist could not understand pertinent elements of their life experience (Chang & Yoon, 2011). One possible negative outcome of cross-racial dyads is the possibility of discrimination. Mays

et al. (2017) conducted a study based on the California Quality of Life Survey. The survey revealed 15% of minority adults reported feelings of discrimination during a health care visit with a 4% rating of discrimination during mental health visits (Mays et al., 2017). Another aspect of cross-racial dyads is cross-cultural therapeutic settings. A Canadian study by Sametband and Strong (2013) paired eight volunteer counsellors and patients to explore the effects of cross-cultural engagement in patient and counselor relationship. The micro-level misunderstandings could be cleared up by repeating words and phrases for clarity while the macro-level misunderstandings in which participants were unable to coordinate the conversation altogether were more difficult to navigate (Sametband & Strong, 2013). These misunderstandings exemplify how patients can experience negative implications on their treat-

ment outcomes due to verbal and non-verbal miscommunications.

This study broadly explores the discrepancies with on-campus mental health service satisfaction between racial categories. It more narrowly explores how counselor race affects minority student service utilization. An online survey was administered to minority and non-minority students to determine if utilization and perceptions of therapeutic rapport differed as a function of race. My hypotheses were that there would be a discrepancy between the levels of satisfaction between the two groups and minority students would report lower utilization based on counselor race. The main anticipated limitation is low minority student participation. This is a common limiting factor with psychology surveys on PWI campuses.

Methods

Participants

The participant pool was selected on a voluntary basis. Participants were welcome to select the survey from a list of available studies in the Wichita State University SONA system. The survey took approximately five (5) minutes to complete, but it was not timed, and participants were also given the freedom to skip any questions they did not feel comfortable answering. Each participant was awarded one (1) SONA credit upon successful completion of the survey. Consent was obtained at the beginning of the survey with skip logic set to eliminate participants under the age of 18 and over 89. This skip logic ensured participants were of legal age to consent but not over the special identifier demographic of persons over the age of 89.

The study was available in Qualtrics on March 16, 2020, with response limit set to one hundred participants. When one hundred participant responses were received in SONA, the survey was removed from the available study list in SONA. There were two additional participants included in the final survey data for a total of ($n = 102$). This likely occurred because two participants accessed the survey via copying and pasting the Qualtrics link in a browser as opposed to the direct access in SONA. As the survey was anonymous there was no way to separate those participants from the others, therefore their responses were left in the results. The majority of the respondents were White ($n = 69$), women ($n = 80$) between the ages of 18-24 ($n = 88$) See Table 1.

Table 1.

	Participant Demographics				
Sex	Female	Male			
	(n = 80), 79.21%	(n = 21), 20.79%			
Age	18-24	25-34	35-44		
	(n = 88), 86.27%	(n = 11), 10.78%	(n = 3), 2.94%		
Race	White/Non-Hispanic	Asian	Hispanic	Black/African-American	American Indian
	(n = 69), 67.65%	(n = 16), 15.69%	(n = 10), 9.80%	(n = 6), 5.88%	(n = 1), 0.98%

Materials

The study received approval from the Institutional Review Board (IRB approval number 4704) on March 9, 2020. Qualtrics, a survey creation and analysis platform, was used to create the survey and collect and analyze the data. The survey was posted in SONA and accessible via mobile and desktop platforms. Participants were able to select the study from the list of available surveys and were required to meet the inclusive criterion as listed above. Once consented, participants were asked about their experience with on-campus mental health services at WSU. To determine satisfaction rates with their counseling services, participants were asked to respond to questions from The Satisfaction with Therapy and Therapist Scale – Revised (STTS-R) (Oei & Green, 2008). The answer selections were condensed on a Likert Scale with the options of (1) Disagree, (2) Neither Agree or Disagree, and (3) Agree.

Design

This study is a non-experimental mixed methods design. The survey consisted of twenty questions. Four questions collected demographic information including gender, age range, race, and international student status. Four questions were created by the researchers to assess participant feedback specifically pertaining to the Counseling and Prevention Services (CAPS) at Wichita State University. The remaining twelve questions were formulated based on the Satisfaction with Therapy and Therapist Scale – Revised (STTS-R).

Participants were asked if they have received services from Counseling and Prevention Services (CAPS) on the WSU campus. The independent variables were race, a factor in satisfaction outcomes with regard to cross-racial therapy dyads, and their engagement or lack of engagement with CAPS. The dependent variable is how participants ranked their experience. The quantitative data was gathered through the STTS-R and qualitative data was gathered through an open-ended question asking participants to share

any general opinions about on-campus mental health services.

Results and Discussion

A one-way ANOVA was used to compare rapport rates between on-campus mental health service practitioners and minority and non-minority students. There was no significant difference found between the two groups $F(.81)$, $p = .370$. The study revealed that minority students reported only slightly lower satisfaction rates ($M = 18.15$, $SD = 3.83$) than White students ($M = 18.83$, $SD = 3.44$). In this case the null hypothesis was accepted. Of the 102 participants, a majority (67%) had never sought or received services through CAPS. When asked if they would be more likely to utilize CAPS if there were more minority counselors, 22% of participants stated they agreed with that statement. Of the participants who did seek CAPS services, 29% of participants agreed that they were satisfied with the quality of therapy they received. See Table 2.

The most significant responses about participant feelings about their experiences with CAPS could be best summarized with the final survey questions. When asked if they avoided certain topics with their counselor because they were of a different race seven 7% of participants agreed that this was true. While only 2% of participants agreed that the lack of minority counselors affected their choice to seek services with CAPS, 7% agreed that they avoided discussing certain topics with their counselor specifically due to the fact that they were of a different race.

These sentiments were echoed in the open-ended qualitative section of the survey. When asked to share any additional con-

cerns about CAPS participants mentioned that LGBTQ+ individuals should also be considered when discussing underrepresented minority groups. As mentioned in the introduction, there are systems-related barriers present at WSU with regard to CAPS; students felt there needs to be a specific announcement made during orientation to inform students that CAPS is available with on-campus care to ensure students know of their resources. One poignant review from a participant who had not sought services through CAPS specifically mentioned that if there were more minority counselors, they would feel more comfortable to be themselves in a therapy setting and would answer truthfully to what was asked of them. The ultimate goal for the study results is to use data to validate the formation of a minority-focused support group named, “You Good?”. This group will be all-inclusive but emphasize student issues which disproportionately effect minority students.

Table 2.

	Yes	No		
Q1 Have you ever sought or received services through Counseling and Prevention Services?	33.33%	66.67%		
Q2 Are you and international student?	3.92%	96.08%		
	Disagree	Neither Agree or	Agree	SD
Q2 The lack of minority counselors affected my choice to seek services with CAPS	40.20%	57.84%	1.96%	0.52
Q3 I would be more likely to utilize CAPS if there were more minority counselors available	23.53%	54.90%	21.57%	0.67
Q4 My counselor and I were of the same race	22.22%	54.55%	23.23%	0.67
Q5 I was satisfied with the quality of the therapy I received	6%	65%	29%	0.55
Q6 The therapist listened to what I was trying to get across	3%	58%	39%	0.54
Q7 The therapist seemed to understand what I was thinking and feeling	6%	59%	35%	0.57
Q8 I was able to focus on what was of real concern to me	6%	58%	36%	0.57
Q9 I felt free to express myself	7%	53%	40%	0.6
Q10 The therapist provided an adequate explanation regarding my therapy	5%	59%	36%	0.56
Q11 The counselor was negative or critical towards me	48%	49%	3%	0.55
Q12 I avoided discussing certain topics with my counselor because of our difference in race	41%	52%	7%	0.6

Conclusion

The number of students who felt CAPS did not serve minority students with the same outcomes as non-minority students were thankfully low. However, these small numbers represent students who have not and would not seek services through CAPS based on the racial differences among available staff. This data proves the null hypothesis: there is not a significant difference in the satisfaction rates of CAPS services between minority and non-minority groups. The second hypothesis rejects the null hypothesis as there are students who have avoided CAPS citing race as the direct cause. For the purpose of timeliness, this study was limited to one hun-

dred participants. It would be interesting to see the responses from a larger participant cohort and future research could investigate this study's limitations by deploying this study at a larger university population. The low-minority participation could be remedied by making the survey available at universities with higher minority enrollment such as a Historically Black College or University (HBCU). By design this would facilitate an emboldening of the minority voice. The future focus for this study will be to start a minority-focused support group to provide a space for open discourse on minority issues of students at a PWI.

References

- Cadigan, J. M., Lee, C. M., & Larimer, M. E. (2019). Young adult mental health: A prospective examination of service utilization, perceived unmet service needs, attitudes, and barriers to service use. *Prevention Science*, 20(3), 366-376. doi:10.1007/s11121-018-0875-8.
- Chang, D. F., & Yoon, P. (2011). Ethnic minority clients' perceptions of the significance of race in cross-racial therapy relationships. *Psychotherapy Research*, 21(5), 567-582. doi: 10.1080/10503307.2011.592549
- Dunley, P., & Papadopoulos, A. (2019). Why is it so hard to get help? Barriers to help-seeking in postsecondary students struggling with mental health issues: A scoping review. *International Journal of Mental Health and Addiction*, 17(3), 699-715. doi:10.1007/s11469-018-0029-z.
- Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased rates of mental health service utilization by U.S. college students: 10-year population-level trends (2007–2017). *Psychiatric Services*, 70(1), 60-63. doi: 10.1176/appi.ps.201800332.
- Marsh, C. N., & Wilcoxon, S. A. (2015). Underutilization of mental health services among college students: An examination of system-related barriers. *Journal of College Student Psychotherapy*, 29(3), 227-243. doi:10.1080/87568225.2015.1045783.
- Mays, V. M., Jones, A. L., Delany-Brumsey, A., Coles, C., & Cochran, S. D. (2017). Perceived discrimination in health care and mental health/substance abuse treatment among Blacks, Latinos, and Whites. *Medical Care*, 55(2), 173–181. <https://doi.org/10.1097/MLR.0000000000000638>.
- Nobiling, B. D., & Maykrantz, S. A. (2017). Exploring perceptions about and behaviors related to mental illness and mental health service utilization among college students using the health belief model (HBM). *American Journal of Health Education*, 48(5), 306-319. doi:10.1080/19325037.2017.1335628.
- Owen, J., Thomas, L., & Rodolfa, E. (2013). Stigma for seeking therapy: Self-stigma, social stigma, and therapeutic processes. *The Counseling Psychologist*, 41(6), 857–880. <https://doi.org/10.1177/0011000012459365>.
- Sametband, I., & Strong, T. (2013). Negotiating cross-cultural misunderstandings in collaborative therapeutic conversations. *International Journal for the Advancement of Counselling* 35, 88–99. <https://doi.org/10.1007/s10447-012-9169-1>.



Research Summaries

The Psychology of Social Media Engagement

Abel D. Velasquez *and*
Robert Zettle, PhD

Psychology Department, Wichita State University

Introduction

One of the most increasingly used methods of communication is social media; it has grown exponentially in the last decade. It is becoming easier to communicate with other people across the globe in a matter of seconds. Social media has evolved into more than leisure and entertainment, it is now used for other purposes: jobs, academics, marketing, business, and communicating between professionals and clients. As a result, more people are using social media for long periods of time. With the quick evolution of technology, it is becoming more important for researchers to see what potential risks could result from using social media for long periods of time. Some studies have shown increased emotions, such as depression, stress, anxiety, low self-esteem, etc. A study conducted by Reid and Wagle in 2014 examined the benefits and risks associated with social media. For risks, they saw that it can lead to online bullying which can then lead to feelings of depression, anxiety, and low self-esteem. They also highlight many benefits that come with using social media. Social media provides adolescents with a way to express their creativity and learn to build their communication skills. This can allow them to build confidence and learn how to make healthy relationships. These findings provoke important questions. What are people who experience emotions like stress or anxiety doing on social media? What habits are being made and what potential motivators exist for people who use social media for long periods of time? Are people who experience depression, stress, anxiety, etc. using social media as a way to distract/avoid uncomfortable situations that are happening in their lives? This study looks at the potential relationship between social media usage and avoiding stressful situations.



Methodology

Procedure

Participants were asked to complete the survey with four questionnaires: the Social Networking Time Use Scale (SONTUS), the Depressions Anxiety Stress Scale (DASS), the Multidimensional Experiential Avoidance Questionnaire, and the Marlowe Crowne Social Desirability Scale. After completing the survey, they were prompted with the debriefing statement explaining what the study was attempting to find with their responses and advised not to share their experiences until after the study was completed. The scores were assessed for each individual questionnaire. A regression analysis was performed to see if there was any type of relationship between the scales while using the SONTUS as the dependent variable for the different situations' participants use of social networking. This told us which variables had a strong correlation with each other.

Participants

Participants were college students from Wichita State University who attended classes during the spring 2020 semester. They were recruited through convenience sampling using the SONA System where students were given the opportunity to sign up and take the online survey for the study. Before beginning the survey, all participants had to agree to the consent form and agree that they were at least 18 years old or older to participate in the study. Two-hundred and eighty-seven Wichita State students (75 male, 206 female, and 2 preferred not to say) participated and responded to the survey. Of the sample, 65 % were White or Caucasian, 12.6% Asian, 11.6 % Hispanic/Latinx, and 9.5% Black

or African American. The study plan and materials used were approved by the Institutional Review Board at Wichita State University prior to any data collection. Participants who completed the survey were awarded two SONA credits for their participation.

Survey and Measures

The 159-item questionnaire was comprised of four different scales: The Social Networking Time Use Scale (SONTUS) to measure social media usage, Depression Anxiety Stress Scale (DASS) to measure emotional distress that may be present using social media, the Multidimensional experiential avoidance questionnaire (MEAQ) to measure participant's level of experiential avoidance while using social media, the Marlowe Crowne Social Desirability Scale to make sure people are answering genuinely, and basic demographic questions. There was also a manipulation check in the survey to be certain that all participants were paying attention and answering with careful examination of the questions.

Results

After cleaning the data, we were left with 261 responses. A linear regression was used to see correlations among the different variables of the other scales using the different components of the SONTUS as the dependent variables and other sub scales of the DASS, MEAQ, Marlowe-Crowne, and demographic questions as the demographic questions. Looking at component 1, time spent using social media during free periods, there was statistical significance for assigned sex at birth ($p = .029$, $\beta = .134$) and Latinx ($p = .010$, $\beta = -.173$) correlated with procrastination

($p = .020$, $\beta = .177$) and distraction ($p = .017$, $\beta = .161$). In component 2, Time spent using social media used for academic related periods, ethnicity ($p = .005$, $\beta = -.196$) and Latinx ($p = .034$, $\beta = -.142$) were statistically correlated with behavioral avoidance ($p = .010$, $\beta = -.199$) and distraction ($p = .011$, $\beta = .170$). In component 4, time spent using social media during stress periods, assigned sex at birth ($p = .001$, $\beta = .194$) were significant alongside stress ($p = .013$, $\beta = .247$), procrastination ($p = .000$, $\beta = .254$) and distraction ($p = .003$, $\beta = .189$).

Discussion/Conclusion

Each component of the SONTUS provides insight into what motivating factors might contribute to the use of social media for those specific instances. In component 1, the beta coefficient table suggests female and Latinx students were significantly correlated with using social media during free periods as a means of distraction and procrastination. This suggests that female and Latinx students who use social media in their free time are doing so as a means of distraction from possible uncomfortable situations as well as procrastinating an activity that could cause discomfort. For component 2, nonwhite and Latinx students used social media during academic related periods as a form of distraction. This might seem like a strange relationship as it suggests that minority students use social media for academic purposes to distract them from something that can cause discomfort. In component 4, female students used social media during stressful periods, predictably experiencing stress as detected

by the DASS, and used social media for procrastination as well as for distraction. This might suggest that female students who are experiencing stress turn to social media as a distraction and to procrastinate something that might be uncomfortable for them. Understanding the possible motivating factors that can contribute to social media use is something that should be investigated further. If people who use social media as a distraction or repression for uncomfortable situations, this could create a negative feedback loop if people experience worse feelings while being on social media.

There were a few limitations that should be considered regarding the results of the study. The study was conducted during the COVID-19 pandemic, which resulted in more people being at home and on social media probably more than they usually are. Wichita State University closed the campus to most individuals, classes being conducted remotely, and most communication

over the internet. This altered the environment in which the survey was given to the students. This could have skewed some of the numbers as people may have reported higher time usage of social media than they would normally do. This also could have influenced responses for the MEAQ and DASS scales. There was a large gap between male students and female participants; female students made up 73% of the sample which could have had an effect of scores weighting more towards female students than male.

Understanding if people are using social media to avoid stressful situations is central to this research because of the known risks that are associated with social media usage. Replicating this study with better representation of different ethnicities and equal representation of gender could give a clearer idea if these results are generalizable. Possible future studies could investigate both the experiential avoidance of social media and seeing if people experience worse emotions of depression, stress, and anxiety after using social media for long periods of time.

References

- Reid, D., & Weigle, P. (2014). Social media use among adolescents: Benefits and risks. *Adolescent Psychiatry*, 4(2), 73–80.

The Mirroring Effects of Young Adult Literature: Racial Representation in Morris Award Winners, 2009-2019

Ana Barbara Hernandez *and*
Katherine Mason Cramer, PhD

School of Education, Wichita State University

Introduction

Young adult literature (YAL) can inspire individuals as they develop and prosper. When racial representation is not present, it can have adverse effects—especially on children of color. Exploration of racial representation in the Morris Award from 2009-2019 is crucial because the award merits up and coming authors.

The Morris Award, first established in 2009 (Morris Award), is given to a first-time author who is an impressive voice in YAL. Bill Morris, the award's namesake, was a highly influential individual in the publishing world. His main goal in life was to promote children's and YAL in every capacity. After his death in 2003, he bequeathed \$400,000 of his estate toward the award. This award also celebrates his life and his drive to influence young adults through literature. Amy Corbitt, Coordinator of Curriculum Materials Center and Reserves for Vanderbilt University, writes on behalf of the Morris Award and the compelling work it brings to YAL awards. In her research guide for Young Adult Book Awards, she describes the Morris Award as “enriching the lives of its reader,” and in its short-term, awards novels that appeal to a wide range of teens (Corbitt).

Race is a pertinent factor in YAL for a number of reasons. According to Rudine Sims Bishop in her highly regarded article “Mirrors, Windows, and Sliding Glass Doors,” books can sometimes be windows that help the reader transcend their world and make themselves a part of the story. If reflected right, they can also act as mirrors to help readers see themselves within the literature, characters and potentially the world at large. It is also important for YAL novels to be conscientious of their audience. When writing about characters of color, especially those going through difficulty, it is crucial to accurately depict their hardships and dialogue. If this is not done, it is not only a disservice to the story, but the readers of color as well.

When considering racial representation in YAL, it is also necessary to address certain stereotypes that may be problematic. Settings in which characters of color are depicted is a factor of concern when looking at stereotypes. Geography is much more than a location on a map. It is used to distinguish people in several ways such as the way they speak, their mannerisms, how they interact with others, etc. Unfortunately, geography can often hold negative connotations regarding a person's socio-economic status, their worth, and, overall, how they are viewed in society. This is primarily shown in novels involving people of color, especially the African American and Hispanic communities. Ebony Thomas hones in on urban settings in YAL, and points out that urban settings do not always equate lived experience to minority characters. She illustrates this with two novels: one from 2008 entitled *Chasing Tail Lights* by Patrick Jones, chronicles a White character residing in the working-class part of

Flint, Michigan trying to escape their situation. On the other end, another 2008 novel entitled *A La Carte* by Tanita S. Davis is about a Black girl residing in San Francisco who has big dreams of becoming the next Julia Child (Thomas).

When discussing racial representation in YAL, it truly seems like the conversation is "black and white." Sams and Allman's literary article explores the issues and misconceptions of Arab and Asian American people in YAL, and how these stories are not explored as much as they should. It opens the conversation to explore other races and cultures, which makes the Morris Award a wonderful candidate to research for this study, since its purpose is to recognize new authors and stories in YAL (Sams & Allman). The purpose of this specific study was to analyze the eleven award winners of the Morris Award from 2009-2019 and find the racial representation of the protagonists within these novels.

Methods

This research was based on the framework utilized by Rudine Sims Bishop. In her novel *Shadow and Substance: Afro-American Experience in Contemporary Children's Fiction* she created categories based on how African American children were portrayed in YAL: socially conscious, melting pot, and culturally conscious. For this research, the following data points were considered when reading and collecting data from the eleven award winners of the Morris Award: author background and race, physical characteristics of the protagonist, and if/how race is addressed.

In regards to author background, the data was based on author biographies on the physical

backs of the novels, and author biographies included on goodreads.com. This analysis showed that race was comprised of seven White authors, two Black authors, one Hispanic author, and one Persian author. In terms of physical characteristics of the protagonist, six novels (three by White authors and three by authors of color) explained their protagonists in detail, while the other five did not. The last category concerning whether race was addressed revealed only four novels—out of eleven—addressing race in some manner. Interestingly, three of the four authors who addressed race were authors of color (Persian, Hispanic and Black backgrounds).

Discussion/Conclusion

Even though the Morris Award strives to recognize new authors, it has not succeeded in representation. Only 36% of the authors, from 2009-2019, are authors of color, and only 36% of the novels address the race of characters of color. In order to address this limitation, one recommendation for the Morris Award is to employ sensitivity readers and diversity interns to assist in finding diverse YAL talent. The utilization of sensitivity readers can not only improve diverse literature, but prevent misrepresentation. For example, in 2016, a book by the name of *A Birthday Cake for George Washington* was pulled from publication

when it was seen as highly insensitive, since it depicted slavery as joyful rather than a violation of human rights. Employing sensitivity readers and diversity interns can prevent wrongful representation like this, and bring forth more accurate, diverse YAL for readers to enjoy (“What Is a Sensitivity Reader”). Further research in YAL should explore topics like sexuality and mental health within characters of color. This would provide more information to readers of color, showing them that their stories matter and deserve to be told.

References

- Bishop, Rudine Sims. “African American Children’s Literature.” *Handbook of Research on Children’s and Young Adult Literature*, doi:10.4324/97802038443543.ch16.
- Corbitt, Amy. “Research Guides: Children’s and Young Adult Book Awards: Home.” *Home -Children’s and Young Adult Book Awards - Research Guides at Vanderbilt University*, research-guides.library.vanderbilt.edu/PBDY_childrensbookawards.
- Sams, Brandon, and Kate Allman. “Complicating Race: Representation and Resistance Using Arab and Asian American Immigrant Fictions.” *The ALAN Review*, vol. 42, no. 2, 2015, pp. 68–79., doi:10.21061/alan.v42i2.a.7.
- Skuenn. “Morris Award.” *Young Adult Library Services Association (YALSA)*, 7 Oct. 2019, <http://www.ala.org/yalsa/morris-award>.
- Thomas, Ebony E. “Landscapes of City and Self: Place and Identity in Urban Young Adult Literature.” *The ALAN Review*, vol. 38, no. 2, 2011, doi:10.21061/alan.v38i2.a.2.
- “What Is a Sensitivity Reader and Can I Become One?” *Writer Unboxed*, 24 June 2018, writerunboxed.com/2018/06/24/what-is-a-sensitivity-reader-and-can-i-become-one/.

Pilot Study: Vertical Jump Comparison Between Vertec, Dari Motion Capture, and My Jump 2 App

Angela Portillo,
Millicent Setzkorn, *and*
Heidi VanRavenhorst-Bell, PhD, CPT

Human Performance Studies, Wichita State University

Introduction

Vertical jump provides a valuable index of muscular power, which is often used to assess an athlete's sport performance capabilities (Buckthorpe et al., 2012). Vertical jump may be assessed by measuring vertical jump reach (e.g., Jump-and-Reach Test, Sargent's Test, *Vertec*) and by measuring vertical jump height (elevation distance from floor to foot) (Balsalobre-Fernandez et al., 2015; Ferreira et al., 2010; Nuzzo et al., 2011; Wang et al., 2018). Coaches and strength conditioning professionals often utilize vertical jump to gauge an athlete's lower extremity strength while further identifying potential weaknesses. Additionally, vertical jump testing is commonly used to evaluate the effectiveness of training programs' purpose toward developing explosive power in a training program, as well as determining modifications needed within the periodization training (Hedrick & Anderson, 1996). Vertical jump has been assessed for decades with the use of the traditional Vertec system; however, with advancements of technology, new assessment tools have emerged such as DARI Motion Capture and the My Jump 2 App.

These new technological approaches are more geared toward assessing and recording vertical jump. They are becoming more readily available and have been shown to provide additional output measures (i.e., force, velocity, flight time) that are useful in developing a robust vertical jump as well as being applicable to an athlete's functional performance in sport. Additionally, these new approaches

introduce the potential for administering vertical jump assessments in a controlled clinical setting (Vertec, DARI, My Jump 2), while some accommodate the illusion of field/court play (Vertec, My Jump 2). The purpose of this study was to explore whether there was a significant difference in vertical jump measures between the traditional Vertec, DARI motion capture, and the My Jump 2 Application. In addition, the study sought to determine whether a familiarization trial significantly enhanced an athlete's baseline vertical jump measure, while also seeking to determine whether known differences in performance measures by sex were consistent across vertical jump modalities.

Learning Objectives

- Evaluate and Determine advantages and disadvantages of each vertical jump assessment tool.
- Distinguish and Understand differences between vertical jump reach and vertical jump height.
- Identify key vertical jump output measure(s) and determine how each may benefit functional performance and coaching in a particular sport.

Methods

Forty-one healthy young adults ($N = 41$), age 18 years and older ($M = 22$, $SD = 2.69$), volunteered for this study. Following the completion of a Wichita State University IRB approved informed consent form, participants completed a PARQ+ questionnaire to establish physical and functional health to meet inclusion criteria prior to data collection. Exclusion criteria controlled for cardiovascular, skeletal muscular, and neuromuscular disorders or other conditions that could

negatively affect physical exertion. All 41 volunteers met the inclusion criteria and were included in this study. One participant, however, was unable to biomechanically perform the task at hand and was therefore removed from the study. Two additional participants were removed from the study due to technical error of equipment. Table 1 provides an overview of the remaining participants in this study.

Table 1. Descriptive group means, standard deviations, and sum males, females and overall.

Group by Gender	Number of Participants (N)	Age (years) <i>Mean \pm SD</i>
Male	19	22 ± 2.41
Female	19	22 ± 3.02
Overall	38	22 ± 2.71

All 41 participants completed a familiarization trial followed by a baseline vertical assessment for each method: *Vertec* jump, the DARI jump, and My Jump 2. Order of vertical jump assessment modalities was randomized to control for the learning effect and fatigue. Maximal vertical jump for *Vertec* jump was recorded as the highest

height of two jumps recorded (DeMaria, 2019), while DARI and My Jump 2 maximal vertical jump measures were recorded based on system output. Participants received a minimum of a 5-minute rest period between each assessment to further control for fatigue (Yingling et al., 2018).

Results

The results of this study showed that vertical jump measures between the Vertec and DARI were comparable ($m = 55.88 + 14.97$, $m = 50.59 + 14.14$; $p = 0.45$), respectively, while the My Jump 2 app was found to be significantly different ($m = 38.31 + 15.37$; $p = .01$). Findings further supported the implementation of a familiar-

ization trial prior to recording a baseline vertical jump measure ($p = .01$) for Vertec and My Jump 2, respectively. The study also showed a significant sex difference in vertical jump abilities between males and females ($p = .01$), regardless of the modality, Vertec, DARI, or My Jump 2.

Discussion

The purpose of this study was to explore whether there was a significant difference in vertical jump measures between the traditional Vertec, DARI motion capture, and the My Jump 2 Application. In general, the findings supported that Vertec and the DARI system delivered comparable measures, while the My Jump 2 app provided measures that were significantly lower. Such findings, however, require a more complete and critical distinction as to the vertical jump measurement each of these modalities assesses. The Vertec and DARI findings being in agreement may be due to the fact that each is known to measure vertical jump reach. Each of these assessments considers not only the distance an individual's feet lift off the floor but the biomechanical ability of one to simultaneously elongate one's torso and upper extremities to attain a

height of maximal vertical jump reach (Ferreira et al., 2010). The My Jump 2 app, however, measures vertical jump height: a measurement that only assesses the height-distance attained from the ground-to-foot lift of a jump and excludes the elongation of the torso and upper extremities (Usher et al., 2017). Such differences in vertical jump measures reinforces the need for a coach and/or athlete to understand what output they need and the purpose for that output. For example, a volleyball player may value the output from either Vertec or DARI to assess and maximize not only vertical height but vertical reach to elevate above the net and elongate their reach to spike the ball over the net in a clean, controlled movement. In contrast, a track athlete seeking maximal explosion out of the starting blocks may find the My Jump 2 app and vertical jump height more beneficial. Of similar consideration is the

additional output measures provided by DARI and My Jump 2 (i.e., force, velocity, flight time). Such output offers valuable supportive data for a more intentionally targeted training program and may help elevate an athlete's overall performance. Vertec, however, does not offer any additional output and thereby may only serve as a basic vertical jump reach assessment tool.

This study further showed that regardless of the assessment method used, sex differences in vertical jump (jump and height) exist and align with prior literature acknowledging performance differences by sex (Stiffler et al., 2014). Therefore, when administering a vertical jump (height, reach) assessment or implement a training pro-

tol, a coach and/or athlete should be cognizant of appropriate sex-specific differences and expectations. An additional finding of this study that warrants particular attention is the significant improvement in both the vertical jump reach performance using Vertec and the vertical jump height using the My Jump 2 between the familiarization trial to the baseline trial. This suggests that a coach should avoid a one-and-done assessment protocol when evaluating an athletes' capabilities. Last, although not a primary focus of the study, accessibility and system mobility to administer a vertical jump assessment in a sport-specific setting or in a controlled clinical setting may also play an integral part as to which vertical jump assessment tool is used.

Conclusion

Overall, the study determined that vertical jump was best defined by distinguishing whether an individual was performing a vertical jump reach or a vertical jump height measure. Once such a measurement was defined, it was indicated that Vertec and DARI are equally comparable tools for measuring vertical jump reach. However, DARI delivers additional output that may be advantageous to a coach and athlete for performance enhancement purposes, while adversely hindering the accessibility and system mobility that may be necessary and accommodating of Vertec. The My Jump 2 app, although not comparable to the Vertec and DARI in regards to vertical jump measure (vertical jump reach),

did offer value when seeking output specific to lower extremity explosive power (vertical jump height). The My Jump 2 app also provides the versatility of system mobility and capturing vertical jump height measures in optional settings (clinical, field, court). For coaches and athletes alike, the determination of which vertical jump assessment tool may be most advantageous to an athlete's performance lies in whether to assess an athlete's vertical jump height or vertical jump reach. In addition, one must consider the sport at hand, the position the athlete plays in a particular sport, and what resources are readily available to administer such an assessment.

References

- Balsalobre-Fernández, C., Glaister, M., & Lockey, R. A. (2015). The validity and reliability of an iPhone app for measuring vertical jump performance. *Journal of Sports Sciences*, 33(15), 1574–1579. doi: 10.1080/02640414.2014.996184
- Buckthorpe, M., Morris, J., & Folland, J. P., (2012). Validity of vertical jump measurement devices. *Journal of Sports Sciences*, 30(1), 63-69.
- DeMaria, C. (n.d.). Using the Vertec for vertical jumps. Retrieved October 17, 2019, from <https://www.livestrong.com/article/117191-vertical-jump-using-vertex/>
- Ferreira, L. C., Schilling, B. K., Weiss, L. W., Fry, A. C., & Chiu, L. Z. (2010). Reach height and jump displacement: implications for standardization of reach determination. *Journal of Strength and Conditioning Research*, 24(6), 1596–1601. doi: 10.1519/jsc.0b013e3181d54a25
- Hedrick, A., & Anderson, J. C. (1996). The vertical jump: A review of the literature and a team case study. *Strength & Conditioning Journal*, 18(1), 7-12.
- Nuzzo, James L; Anning, Jonathan H; Scharfenberg, & Jessica M. (2011). The reliability of three devices used for measuring vertical jump height. *Journal of Strength and Conditioning Research*, 25(9), 2580-2590.
- Stiffler, M. R., Sanfilippo, J. L., Brooks, M. A., & Heiderscheit, B. C. (2014). Counter movement vertical jump force and power differs by gender and sport. *Medicine & Science in Sports & Exercise*, 46, 728–729. doi: 10.1249/01.mss.0000495674.03075.ed
- Usher, J., Imtair, R., Castro, D., Brar, E., Gomez, J., O, J., & Yingling, V. R. (2017). Vertical jump height measurements. *Medicine & Science in Sports & Exercise*, 49(5S), 599–600. doi: 10.1249/01.mss.0000518568.87900.a2
- Wang, J., Xu, J., and Shull, P. B. (2018). Vertical jump height estimation algorithm based on takeoff and landing identification via foot-worn inertial sensing. ASME. *Journal of Biomechanical Engineering*, 140 (3), 034502. doi: 10.1115/1.4038740
- Yingling, V., Castro, D. A., Duong, J. T., Malpartida, J., Usher, J. R., & Jenny, O. (2018). The reliability of vertical jump tests between the *Vertec* and My Jump phone application. *Peer Journal*, e4669. doi: 10.7717/peerj.4669

Assessing Substance Use Among College Students and How to Promote Counseling

Autumn Minor *and*
Rhonda K. Lewis, PhD

Psychology Department, Wichita State University

Introduction

Substance use is a serious problem in the United States. Over 25 million people in the United States report using illicit drugs and over 65 million acknowledge recent misuse of alcohol (Forser et al., 2018). In this case substance use includes alcohol, marijuana, and illicit drugs (i.e. opioids, methamphetamines, heroin, crack cocaine). In the United States, there has been an increase in heroin overdose deaths and an increase in overdose deaths from prescription opioid pain relievers between 2001 and 2014, (Gjersing & Bretteville & Jensen, 2018).

In order to understand substance abuse, it is important to know where the abuse or misuse begins. Hawkins and Catalano (1992) conducted research in the early 1990's on risk and protective factors—including, examined contextual, individual, and interpersonal factors, that lead to substance abuse among young people. When looking into the adolescent stages, it was found to be beneficial to look at different aspects of why children might use substances. Adverse childhood experiences (ACEs) refer to experiences during childhood such as physical and sexual abuse, parental neglect, parental alcoholism, and parental divorce, that occurred prior to the age of 18 years of age that have posed a substantial risk for the subsequent development of negative health outcomes in adulthood (Windle, Haardofer, Getachew, et al (2018). The ACE study has been used in many forms and has many different results when it comes to the connection between adverse childhood experiences and substance use. Taken together, the literature is clear that ACEs are correlated with negative outcomes for adolescents and college students. Thus, it is important for researchers to document the ACEs that might affect the college students on their campuses and intervene in order to address their issues.

Research suggests that college students are at risk to use and misuse substances; for instance, reported binge drinking and illicit drug use has increased from 34% to 41% among college students (Forster

et al., 2018). As previously, stated it is important to examine the relationship between the ACEs and mental health issues as this relationship may trigger stress among college students and lead to poor mental health, alcohol use, and diminished health status (Forster et al., 2018). There is an estimated 1 in 20 adults or 250 million people between 15 and 64 years of age who used drugs at least once in 2014 (Bhupendra et al, 2018). It is important to note that the knowledge of not just alcohol use but general substance use is presently a problem, and we need to work on how to prevent and control the use of substances (Bhupendra et al, 2018).

There is a correlation between the ACEs and substance abuse. Also of concern is the lack of help-seeking in college students. There have been multiple studies that show barriers when it

comes to help seeking among college students (Hunt & Eisenberg, 2010). These barriers include lack of time, privacy concerns, lack of emotional openness, and financial constraints (Hunt & Eisenberg, 2010). Students may not know they need help, are unaware of the services available, or may be skeptical of treatment (Hunt & Eisenberg, 2010).

Research Questions: Is there an association between Adverse Childhood Experiences and substance use. What are the help-seeking behaviors of college students in relation to substance abuse? Was the help-seeking beneficial? What would they suggest to change or improve the service? The purpose of this research project is to examine the substance use among college students and their help-seeking behaviors through the use of a survey.

Methods

Participants and Setting

The participants in this study were 115 college students located on a Midsized Midwestern campus of about 15,000 students total. Seventy-three percent were female and 25% were male. The mean age of participants was 19 years old. Participants' age range was 18 to 50 years old.

Instrumentation

The survey consisted of 80 questions and included basic demographic questions, help seeking questions (open-ended), and the ACEs (Adverse Childhood Experiences Questionnaire (Ford, D.C et al. 2014.), (10 –item). A sample question from the ACEs survey, was, “Did you have parents or other adults in the household of-

ten swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?” This study was also included a survey that was related to substance use. An example of a question from this survey: “How old were you when you were first exposed to substances, including (Tobacco, Electronic cigarettes, Vaping, Alcohol, Marijuana, Methamphetamine, Heroin, Crack-cocaine, Prescription drugs, or any other substances)?”

Procedure

This study was approved by the Institutional Review Board (IRB) at Wichita State University (WSU), it was created using the Qualtrics platform and through SONA which is the research participant pool through the WSU Psychology

Department. Participants were asked to sign a consent form, required to be at least 18-years old, and be enrolled as a Wichita State University student. The survey took approximately 15 minutes to complete. To encourage participants to complete the survey, they were offered to enter their names into a drawing to win a \$25.00 gift card.

Data Analysis

In order to answer the three research questions: A correlation matrix, descriptive statistics, frequencies, chi-square, and a T-test using SPSS (Pallant, 2013) were used to analyze the data.

Results

The first research question examined the prevalence of substance use among college students. Sixty-six percent reported they did not use substances. The most common substance reported to be used was tobacco. An Independent T-test determined there was no difference between the substance use rates between males and females on tobacco, marijuana, and E-cig. Alcohol was approaching statistical significance: Females (N=84) M=2.42; SD 1.65. Males (N=29) M 1.69; SD .96. Levene's Test of Equality of variance was conducted to test the difference between males and females on those who drank in the last 30 days. $F=5.639$; .01; $t(-2.28)$ df (84).

The second research question examined if there was any correlation between the ACEs and substance use. A Pearson Correlation bivariate matrix was conducted to determine whether the ACEs was correlated with substance use in the last thirty days. There was no statistical-

ly significant correlation between ACEs scores or having adverse childhood experiences and using substance use in the last 30 days. However, there was a negative correlation between Adverse Childhood Experiences and drinking in the last 30 days at $-.019$ and there was a negative correlation between ACEs and marijuana use in the last 30 days at $-.68$. Tobacco and E-cig use in the last 30 days and ACEs were $.024$ and $.049$, respectively. Overall, there was not a correlation between having adverse childhood experiences and using substances in the last 30 days. The third research question examined the help-seeking behaviors of college students in relation to substance abuse. The study looked at the prevalence rate of substance use among college students and then asked the students through the survey if they sought some type of help and what that help might look like (see the Discussion section).

Discussion/Conclusion

This study found that the prevalence rate of substance use among college students was relatively low. The results showed that adverse childhood experiences were not correlated with using substances in the last 30 days nor were there differences between males and females

when it came to using substances (i.e. tobacco, marijuana, E-cig). The difference between alcohol use and other substances approached significance, making it the most noteworthy finding. This correlates with past research, since drinking has been shown to be more of an issue among

college students (Wechsler, H et. al. 1995). In addition, the results showed that college students rely on family and peers more than professionals. Mental health professionals need to find out what the mechanisms are preventing college students from seeking out services: lack of knowledge, time or costs.

This study examined college students and substance use and how to promote counseling. Previous researchers have explored how the adverse childhood experiences connect to substance use. Other research has noted how often students use alcohol and tobacco, but has not investigated how other substances were used and if they were related with adverse childhood experiences or how college students received services to help or cope with these issues.

Limitations

There were several limitations noted in this study. First, one limitation may be the sample size as we only had 115 participants, and this could have affected the results by not giving us enough power to detect difference. Second, there was a problem in launching the survey and a glitch resulted in the elimination of 16 participants. Third, few male students participated, and results may not be representative of the campus population. Part of the survey used was not a

standard survey; this may have caused an issue such as questions not being interpreted correctly due to wording, which could have effected how the data was interpreted. However, the substance use was measured using a standard survey and the ACEs is a standard survey. Results achieved surface validity. Finally, there was not a large number of underrepresented minorities, and it is unclear if this was a representative number for this study. In the future, we may have to over-sample to attain more of a racially and ethnically diverse sample.

Future Research

Future research should include a focus group to ask students directly about substance use and college. Conducting a randomized sample and conducting a targeted sample with racial and ethnic minorities may improve the outcomes of this survey. This survey will be taken further to look more in-depth at the adverse childhood experiences and the root cause of substance use and also encourage future research in this area to explore root causes for effective prevention and drug abuse treatment. It is important to build upon the information that was gathered in this study will help to possibly view adolescent decision-making along with how they view substances and their future.

References

- Ford, D. C., Merrick, M. T., Parks, S. E., Breiding, M. J., Gilbert, L. K., Edwards, V. J., Dhingra, S. S., Barile, J. P., & Thompson, W. W. (2014). Examination of the factorial structure of adverse childhood experiences and recommendations for three subscale scores. *Psychology of Violence, 4*(4), 432–444. <https://doi.org/10.1037/a0037723>
- Pallant, J. (2013). *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*. 5th Edition. McGraw Hill. Open University Press.
- Wechsler, H., Dowdall, G. W., Davenport, A., & Castillo, S. (1995). Correlates of college student binge drinking. *American Journal of Public Health, 85*(7), 921-926. <https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.85.7.921>

Freedom of Speech: Effects of U.S. School Monolingual Practices on Hispanic Students

Crystal Zacarias,
Jennifer Pearson, PhD, and
Jodie Simon, MA

Department of Sociology, Wichita State University

Introduction

The number of emergent bilinguals in United States public schools is increasing (Shin & Kominski, 2010). Schools have historically served as agents of assimilation for minority children and, while the policies that supported the assimilation of children have been removed, some effects still remain (Najjar et al., 2019). Despite policy removal, Hispanic communities are still concerned with assimilation and loss of identity (Winstead & Wang, 2017). Even when supportive policies are enacted to suit students' needs for further language cultivation, classrooms are not being held to those changes. In a survey done in Illinois around the 2010 policy, which required preschools with 20 or more emergent bilinguals to offer home language instruction, it was found that practices to accommodate bilingual kids were not believed in, supported, or enforced by their directors (Hadi-Tabassum & Gutierrez, 2017). Since the development of heritage language can be stifled, bilingual students are sometimes limited in their language development, understanding only words used in their household, which can cause inner-conflict and a lack of confidence in their Spanish abilities (Winsler et al., 2014). Without proper language cultivation, students can develop anxiety about speaking their heritage language, similar to the anxiety experienced by people who are learning a completely new dialect, known as xenoglossophobia (Costa, 2015). Rejection and restriction of languages play a part in students feeling shame about not understanding their heritage and may lead to them becoming disconnected from it (Winslead & Wang, 2017). Cultures are suppressed and barriers are created by limiting how and when heritage languages are used (Najjar et al., 2019). In social settings, these problems and attitudes divide individuals and exclude minorities who may speak other languages (Najjar et al., 2019).

Schools have an immense role in student learning and language. School settings often are student's primary interaction with U.S. culture, serving as a bridge between students' cultural heritage and mainstream US culture (Najjar et al., 2019). Besides the benefits for a student's identity and personal development, there are cognitive benefits from being multilingual as well. Compared to monolingual children, bilingual children show advantages in domains of cognitive functioning and metalinguistic awareness (Winsler et al., 2014). Due to these children's experience of interchanging two or more languages, they have advantages in areas of inhibitory and executive control. Students who participated in dual programs have achieved similar success. With dual language programs, a sense of belonging is created, that nurtures a student's heritage. This

sense of support and belonging protects students against depression and anxiety, and increases their chances for academic success (Najjar et al., 2019).

With concerns about the continuing effects of historic assimilation in schools and research about the benefits of bilingual programs, this project seeks to explore if language use is still deterred even though monolingual policies are no longer in effect. The present study seeks to examine language development in emergent bilinguals and explore what participants identify as impactful experiences. This study also seeks to explore the relationship between early restrictions of language use in schools to later hesitation and discomfort with language use in higher education settings, possibly deterring students from higher education settings altogether.

Methods

Participants were collected using convenience sampling in order to reach the largest number of potential participants during the COVID-19 pandemic, where university campuses were closed physically and moved to remote learning and services. Interviews were conducted on four Spanish-English bilingual participants, all of whom were female. Participants reported Spanish, Mexican, and Peruvian heritage. The participants were between ages 22 and 29 and were either pursuing or had completed their college education.

Each structured interview was audio recorded and then transcribed by the student researcher. Some questions were open ended to allow par-

ticipants to respond in their own words. All questions were designed to avoid dichotomies and leading subtexts (Esterberg, 2002). Transcriptions were analyzed for commonalities, patterns, and structures. Open coding led to the discovery of various themes about peer influences, home influences, policy influences, language, and identity. Themes were narrowed down through focused coding until they suited the majority of the participants.

Results

This study sought to look into the academic career of Hispanic students and gauge their experiences to develop an estimate of where and how U.S. public schools influence emergent bilinguals. Participants were asked about their language use, how their identity ties to their bilingualism, and their experiences in U.S. public schools. In this study, I found that participants heavily tied their connection with Hispanic culture to the Spanish language. Participants also identified that the most significant impact to their heritage language and its usage in U.S. public schools was their peers, who often reflected societal and political tensions from the world in classrooms.

Participants did not find U.S. public schools, through teachers or policies, to have impacted their language ability. Programs that helped students cultivate language were non-existent in their educational experience and entirely unheard-of for some of the participants. Participants reported that negative peer interactions were not stopped or engaged by administration or teachers. Family and community dynamics also played a part of comfort when using language, and to avoid ridicule or embarrassment of their linguistic abilities when with other Spanish speakers, participants reported withdrawing and disengaging from in-depth conversations.

Discussion

Participants in the study reported that peer culture and family systems led to anxiety around their heritage language. While intentions may have been harmless, participants reported that having peers isolated their language and made them feel uncomfortable. The environment of using language is important. The insecurity and isolation that are apart of current environments are not part of a supportive environment. Since students bring societal and political views into class, participants were wary to speak Spanish if it was requested since they did not know how peers would respond. Most study participants accepted that there was a time and place for language use, but with language being such a big part of their identity, excluding the use of language impacted them immensely.

While students might not necessarily need to use Spanish since the curriculum is in English, they should have the ability to use Spanish in

school. One student reported that during class peers would ask teachers to prohibit the minority students from using Spanish due to fears they were talking about other students. Despite there being no policies that prohibit language use, the school culture can still prohibit heritage languages. While this barring of language came from the request of a student, that part of the peer culture is still part of school culture. Language should not be barred, and schools should not permit its exclusion unless it is hindering to the educational environment. In social settings, these problems and attitudes divide individuals and exclude minorities who may speak other languages (Najjar et al., 2019).

Learning a language is difficult, and can lead to psychological stress (Costa, 2015). That's why U.S. students learn and continue to learn English through school. Having parents and families teach youth entire languages is bound to have

some pitfalls. Community programs and classes to enhance Heritage language are especially time consuming and can be costly. Participants reported that family was sometimes a deterrent for speaking a language, since they were scared of failure and felt their language skills were inadequate. Answers were usually kept short and the participants would not engage in lengthy conversations, fearing embarrassment.

Dual language programs can help create supportive environments where bilingual students can cultivate their language in a more accepting and conscientious learning space. This can also make school settings more welcoming, by shaping acceptance of the language in the curriculum that fellow students can follow. School settings often are student's primary interaction with U.S.

culture, serving as a bridge between students' cultural heritage and mainstream U.S. culture (Najjar et al., 2019). Schools should strive to improve this interaction and be aware of its impacts.

Multiple limitations of the study should be acknowledged in interpreting the results. A convenience sampling method was utilized, representing only a small population of Hispanic bilinguals. This study was also conducted on students who had all completed high school and were pursuing or had completed a bachelor's degree, so it was not representative of those students who did not pursue higher education after high school. Since participants were recalling their school experiences, this also relies on distant self-reflection. Further research should be conducted by younger participants at different age ranges.

Conclusion

The findings of this study hold significant implications for understanding language shame, loss, and the connection of U.S. public schools to language development. The experiences and feeling of rejection in Spanish-English Hispanic bilinguals can lead to disconnections from peers and isolation. If competent dual-language programs are successfully integrated, emergent bilinguals can feel supported and self-conflict can be avoided through language cultivation. Studies are needed regarding younger participants who may have experienced dual language programs. Future research should also consider non-college

participants as well to see if language restrictions deter people from academia. Colorism may also play a role. Language intolerance may be connected to skin pigmentation.

Attention should be given to the family support aspect found in this study. Supportive policies and programs for minority students are not in place and/or are not being properly offered to students. A larger sample should be used, and future research should explore similar topics with emergent bilinguals/multilinguals, of various heritages and ethnicities, across different regions of the U.S.

References

- Costa, P. (2015). Reenvisioning language anxiety in the globalized classroom through a social imaginary lens. *Language Learning*, 65(3). Retrieved from <https://doi.org.proxy.wichita.edu/10.1111/lang.12121>
- Esterberg, K. G. (2002). *Qualitative methods in social research*. Boston: McGraw-Hill.
- Hadi-Tabassum, S. & Gutierrez, I. (2017). The first of the firsts: Leadership and legislation for bilingual preschools in Illinois. *Journal of Multilingual Education Research*, 7(13). Retrieved from <https://eric.ed.gov/?id=EJ11761>
- Najjar, K., Naser, S. C., & Clonan-Roy, K. (2019). Experiences of arab heritage youth in US schools and impact on identity development. *School Psychology International*, 40(3), 251-274. doi:10.1177/0143034319831057
- Shin, H. and Kominski, R. A. (2010). *Language use in the United States 2007: American Community Survey Reports*. US Census Bureau.
- Winsler, A., Kim, Y. K., & Richard, E. R. (2014). Socio-emotional skills, behavior problems, and spanish competence predict the acquisition of english among english language learners in poverty. *Developmental Psychology*, 50(9), 2242-2254. doi:10.1037/a0037161
- Winstead, L., & Wang, C. (2017). From ELLs to bilingual teachers: Spanish-english speaking latino teachers' experiences of language shame & loss. *Multicultural Education*, 24(3-4), 16-25. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1162651.pdf>

Isolated Dental Pulp Stem Cell Motility in a 3D matrix

Jannet Balderrama and
Li Yao, PhD

Department of Biological Sciences, Wichita State University

Introduction

The Global Burden of Disease Study in 2010 found that low back pain and neck pain were among the 10 major causes of disability globally (Vos, 2012). Back pain often contributes to limitation in performing activities of daily living (ADLs) such as bathing, getting dressed, ambulating, and using the restroom. Additionally, it may interfere with people's ability to work and contribute to an overall poor quality of life.

Chronic back pain or neck pain is often the result of degenerative disc disease (DDD). Disc degeneration causes damage that alters the biomechanics and function of the intervertebral disc (IVD). A normal human IVD consists of the annulus fibrosus (AF), nucleus pulposus (NP), and the endplates. The cartilage end plates on the IVD lie on top of and below the nucleus NP and AF (Raj, 2008).

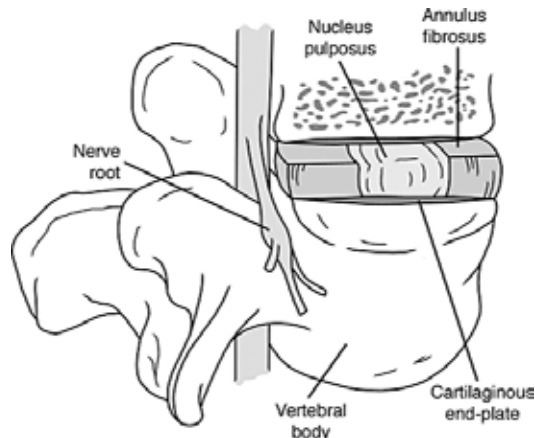


Figure 1.1 Two vertebral bodies and a normal intervertebral disc between them (Raj, 2008)

In our study we focus on the regeneration of the NP, located at the center of the IVD. The chondrocyte-like cells of the nucleus pulposus are imbedded in a gelatinous matrix with aggrecan, elastin, and collagen. Collagen is a valuable component of the IVD that provides tensile strength and allows the tissue to return to its original shape after stretching (Yu et al., 2002). This role of the NP in the intervertebral disc makes it the appropriate component of the IVD to focus on when investigating a treatment for DDD.

In the initial stages of disc degeneration, the nucleus pulposus tissue becomes stiffer and less gel-like, which limits its ability to absorb shock. Other changes to the IVD include calcification of the endplates, decrease in waste removal efficiency, and dehydration of the NP. These changes may lead to cell death and reduce the IVD's ability to support load (Buckwalter, 1995). For some individuals, symptoms may be mild and can be treated with physical therapy and/or over-the-counter medications to decrease pain, inflammation, and restore muscle strength. In more severe cases, surgery may also be recommended. The surgical procedures often performed for treatment of disc degeneration are discectomy, spinal fusion, or total disc replacement (Yu et al., 2002).

Unfortunately, these options do not treat the underlying cause of the issue and often come

with other potential complications. Consequently, patients may not experience complete or permanent relief of symptoms (Anderson et. Al, 2005). Therefore, new treatments are focused on cell regeneration therapy methods that involve differentiation of stem cells into IVD cells for transplantation. Dental Pulp Stem Cells (DPSCs) are good candidates for cell therapy because they are relatively easy to extract compared to other mesenchymal stem cells that are derived from bone marrow, adipose tissue, and embryos.

DPSCs also have low immunogenicity when taken from the same person they are going to be transplanted into (Potdar, 2015). In this study, we outline the method for using the μ -Slide Chemotaxis assay to observe DPSC migration. Studying cells in a 3D matrix is important because it allows us to observe cell motility and chemotaxis in an in-vivo-like environment before they are transplanted in a live model.

Differentiation is induced by culturing the cells in growth medium supplemented with neural cell inducing growth factors. In a study by Yoon et al., cells cultured in recombinant human BMP-2 (rhBMP) had an increase in cell number compared to the control group with no rhBMP-2 added. (Yoon et al., 2003). Bone morphogenetic protein is a promising option for the differentiation of DPSCs into NP cells.

Methods and Materials

Commercial Dental Pulp Stem Cells were cultured and maintained in in 37° C atmosphere with 5% CO₂. Cells were cultured either in medium containing BMP13, BMP14, or no growth factor. A hemocytometer was used to determine cell density. Depending on cell count, cell suspension was prepared to obtain a concentration of 100,000 cells. Cell suspension was prepared as a mixture of NaOH for neutralization, type II collagen-hyaluronic acid hydrogel, and DPSC cells in DMEM medium.

A μ -Slide chemotaxis chamber from ibidi technologies was used for observation of cell

motility in a 3D environment. Approximately 8 μ l of cell suspension was injected into the observation area through injection port A. Following gelation, a 100 μ l pipette was used to fill the left reservoir with 65 μ l of DMEM medium. Then, the right reservoir was filled with 65 μ l of DMEM medium. All ports were closed with plugs, and the chamber was observed under a microscope to verify presence of cells in the observation area. The chamber was then incubated in 37° C atmosphere with 5% CO₂ for 24 hours, then observed under a video microscope.

Results

Figure 1.3 shows the DPSCs in a type II collagen matrix immediately after seeding in the μ -Slide chamber. The cells are seen in their spherical form. Figure 1.4 shows the cells one day after seeding in the chamber. Here neuron

cells are seen in their expanded dendritic form.

In this study, differentiated DPSCs stained positive for aggrecan and type II collagen. This is observed for BMP13 growth factor in Figure 1.2 and BMP14 in Figure 1.3.

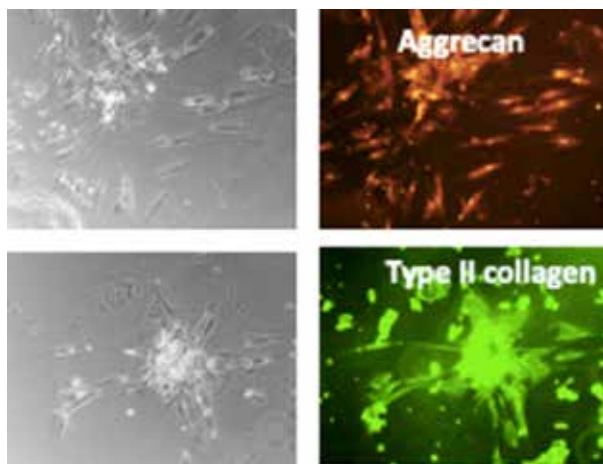


Figure 1.2 BMP13 Induced DPSCs

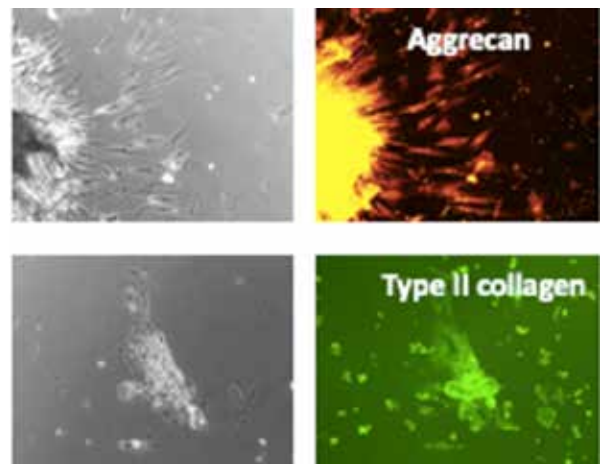


Figure 1.3 BMP14 Induced DPSCs

Discussion/Conclusion

Humans undergo a natural degeneration of their intervertebral disc column. For some individuals this causes chronic back and/or neck pain that can limit their day to day activities and decrease their overall quality of life. More traditional methods for treating DDD are limited and may result in undesired consequences such as decreased range of motion of the spine.

The data observed in Figure 1.2 outlines the capacity for DPSCs and DPSC-derived nucleus pulposus cells to maintain their mobility in type II collagen-hyaluronic acid hydrogel. After multiple experiments we were able to determine the cell density range for seeding and optimum injection technique for future experimentation. Future work will involve the addition of chemoattractant and cytokine into the chamber reservoir to investigate immune responses and cell motility in these conditions with comparison to our control.

Our results suggest that BMP13 and BMP14 growth factors can induce HDPSCs toward a nucleus pulposus phenotype. We predict a more ideal treatment will involve a combination of growth factors to ensure that cells are properly differentiated and are able to survive transplan-

tation. Observation of dental pulp stem cells in a 3D chemotaxis chamber provided evidence of differentiated cells' ability to maintain their migratory behavior.

Data obtained in this study supports the ongoing efforts of researchers to validate disc cell regeneration as a suitable option to decrease and potentially reverse the effects of disc degeneration. Similarly, a study by Yoon et al. showed that cell culturing with recombinant human BMP-2 (rhBMP) had an increase in cell number compared to the control group with no rhBMP-2 added (Yoon et al., 2003). This data also provides evidence for the potential of bone morphogenetic protein as an option for the differentiation of DPSCs into NP cells.

In addition to treatment for DDD, DPSCs may be used for other studies in regenerative medicine. If cultured with other growth factors, these stem cells can be induced to replace other tissues that are damaged by disease or injury. Research of dental pulp stem cells provides opportunities to explore new treatments for a variety of medical conditions. This holds significant value in improving many people's health and quality of life.

References

- Anderson, D. G., Albert, T. J., Fraser, J. K., Risbud, M., Wuisman, P., Meisel, H., Vaccaro, A. R. (2005). Cellular Therapy for Disc Degeneration. *Spine*, 30(Supplement). doi:10.1097/01.brs.0000175174.50235.ba
- Buckwalter, J. A. (1995). Aging and Degeneration of the Human Intervertebral Disc. *Spine*, 20(11), 1307-1314.
- Potdar, P. D. (2015). Human dental pulp stem cells: Applications in future regenerative medicine. *World Journal of Stem Cells*, 7(5), 839.
- Raj, P.P. (2008), Intervertebral Disc: Anatomy–Physiology–Pathophysiology–Treatment. *Pain Practice*, 8: 18-44.
- Vos, T., Flaxman, A. D., Naghavi, M., Lozano, R., Michaud, C., Ezzati, M., Murray, C. J. L. (2012). Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: A systematic analysis for the global burden of disease study 2010. *The Lancet*, 380(9859), 2163-96.
- Yoon, S. T., Kim, K. S., Li, J., Park, J. S., Akamaru, T., Elmer, W. A., & Hutton, W. C. (2003). The Effect of Bone Morphogenetic Protein-2 on Rat Intervertebral Disc Cells in Vitro. *Spine*, 28(16), 1773-1780.
- Yu, J., Peter, C., Roberts, S., & Urban, J. P. (2002). Elastic fibre organization in the intervertebral discs of the bovine tail. *Journal of Anatomy*, 201(6), 465-475.

Complex Analysis and Fluid Flow Past A Cylinder

Joseph Sekavec *and*
Justin Ryan, PhD

Department of Mathematics and Statistics, Wichita State University

Introduction

In Mathematics, the word “fluid” can refer to a liquid or a gas. The theory of Fluid Dynamics, or Fluid Flow, applies to a broad range of topics such as air moving past an airplane wing, water powering a turbine, and weather patterns that involve rotating winds, like tornadoes or hurricanes.

Of the many problems in fluid dynamics that merit study, we will focus on uniform flow past a cylinder. Assuming that the flow is uniform in the sense that it behaves the same in every cross section orthogonal to the cylinder, problem may be reduced to a 2-dimensional flow in the plane. Moreover, it is assumed that the flow’s behavior at infinity—far away from the cylinder—is known and controlled.

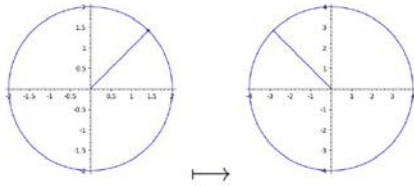
Adding circulation to the flow results in lift, which is what allows a very heavy airplane to take flight. Circulation also has an effect on the location of stagnation points. In a 2-dimensional model of an airfoil, adding circulation at ∞ (far away from the cylinder) can ensure that the Kutta-Joukowski condition is met. Even if the cylinder does not have a corner, one can adjust the circulation to change the stagnation points of the flow.

Background on Complex Numbers and Transformations

A complex number, denoted by the letter i , is defined as the square root of negative one.

Complex analysis is also required as the letter i is necessary for the Fundamental Theorem of Algebra to be true. This theorem states that every non-constant single-variable polynomial with complex coefficients has at least one complex root. This theorem applies to polynomials with real coefficients as well, since real numbers can be thought of as complex numbers with an imaginary part equal to zero.

Some of the more interesting applications of complex analysis lie within geometry and conformal mapping. For example, one might think of $re^{i\theta}$ as a dilative rotation about the origin in the complex plane through some angle θ ; that is, a rotation of the plane that also either expands or contracts the plane.



The figure above shows a mapping

$2e^{i\frac{\pi}{4}}$ to $4e^{i\frac{3\pi}{4}}$, by multiplying

$$2e^{i\frac{\pi}{4}} \cdot 2e^{i\frac{\pi}{2}} = 4e^{i(\frac{2\pi}{4} + \frac{\pi}{4})} = 4e^{i\frac{3\pi}{4}}.$$

Another family of transformers are the Möbius transformations. The Möbius transformations are defined as $T(z) = \frac{(az+b)}{(cz+d)}$ where a, b, c , and d are complex constants.

Transformations are often used to make problems easier. For certain problems it is useful to

change the domain of the problem. For example, transformations can be used to change the domain from one disk to another disk; or from a disk to the upper half plane; or from the exterior of an airfoil to the exterior of a disk. Transforming the real plane always requires a set of two equations, since the real plane is made up of two real variables. However, when we regard the plane as the set of all complex numbers, we may represent transformations by a single complex equation. The amount of information required isn't actually reduced since a complex number simultaneously encodes two real numbers: the real and imaginary parts.

The following transformation is given by the formula $1/w = z$. This is a map in Complex Analysis called an inversion. Geometrically, it maps all of the points inside of the unit disk, $|z| < 1$, to all of the points outside of the disk, and vice versa. It maps the points on the unit circle, $|z| = 1$, to points on the unit circle.

Definitions

Before doing any of the transformations intended, some definitions must be established first. The definition of what it means to take a derivative of a complex function, what it means for a function to be holomorphic, and the definition of the Laplacian of a complex function.

The definition of a holomorphic function can be expressed as $\frac{\partial z}{\partial \bar{z}} = 0$, and $\frac{\partial \bar{z}}{\partial z} = 0$.

The Laplacian of a function in polar coordinates is defined as $\Delta f = \frac{\partial^2 f}{\partial r^2} + \frac{1}{r} \frac{\partial f}{\partial r} + \frac{\partial^2 f}{\partial \theta^2}$.

A Joukowski map is defined by $z + \frac{\alpha}{z}$. The transformation maps a unit circle to an ellipse with an eccentricity of α .

Flow past a cylinder

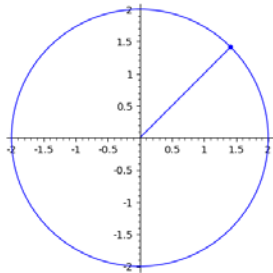
In order to model airflow past an air foil, modeling airflow past a cylinder must be done first. To do this, we create a cross-section of a unit cylinder (see Figure 2). Once complete, the equation for uniform flow can be utilized:

$$\varphi = U \left(r + \frac{1}{r} \right) \cos(\theta)$$

From this, the velocity field for air flow is obtained— $\Psi = U \left(r - \frac{1}{r} \right) \sin(\theta)$ —which defines the stream function while

$$\nabla \Psi = \left(\left(\frac{1}{r^2} + 1 \right) \sin(\theta), \frac{(1 - \frac{1}{r}) \cos(\theta)}{r} \right)$$

gives the streamlines.



Before plotting the streamlines, plot the cross section of a cylinder with radius r in the complex planes denoted by $re^{i\theta}$

Now with the cylinder, the streamlines can be added.

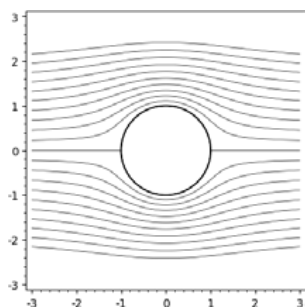


Figure 3

With the streamlines for airflow over a cylinder complete, now a Joukowski map is applied to model airflow over an airfoil.

Figure 4

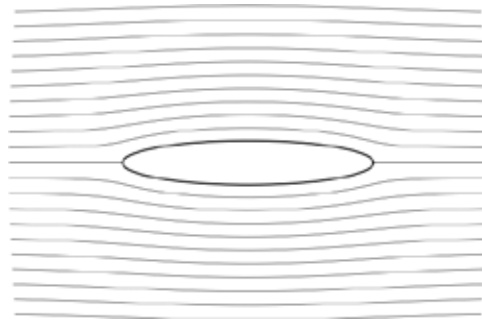
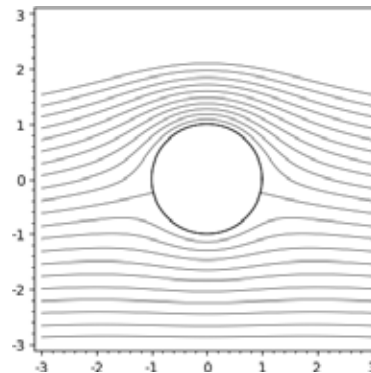


Figure 4 shows a plot of streamlines past an ellipse with an eccentricity of 0.7.

Once airflow over an airfoil is established, circulation can be added. Circulation will change the stagnation points in the ellipse. Figure 5 shows a streamline plot over the cross section of a cylinder with circulation.

Figure 5



Conclusions and Future Direction

Uniform flow over an air foil was modeled using complex analysis. In particular, angle preserving transformations of the plane were used to model fluid flow past a cylinder under certain assumptions. SageMath was used to plot the flow lines past a round cylinder, then these flow lines were mapped to domain for which the cylinder is not round. These domains can be thought of as sections of airplane wings. This model is useful for aerospace engineers in understanding what might be going on when air flows over an air-

plane wing. A limitation of this model was that it cannot easily plot circulating flow over shapes that are not circles.

Future research should include the study of transformations in the complex plane and conformal maps. Maps must be applied to other shapes where the transformation is not necessarily known. Additionally, numerical maps should be applied to help plot things such as circulating flow over different transformations.

References

- D.J. Acheson. Elementary Fluid Dynamics. Oxford Applied Mathematics and Computing Science Series. Clarendon Press, Oxford, 1990.
- L.V. Ahlfors. Complex Analysis. 1979. McGraw-Hill, Inc., Singapor, 1973.
- S. Childress. An Introduction to Theoretical Fluid Mechanics. Courant Lecture Notes. AMS, Providence, 2000.
- C.H. Edwards. Advanced Calculus of Several Variables. Dover Publications. 2012.
- Richard Haberman. Applied Partial Differential Equations. Pearson Education, fourth edition, 2004.
- S. MacLane and G. Birkhoff. Algebra. Macmillan, 1967.
- T. Needham. Visual complex analysis. Oxford University Press, 1998.
- E.B. Saff and A.D. Snider. Fundamentals of Complex Analysis. Prentice Hall, 2003.
- SageMath. Version 9.0. <http://www.sagemath.org/>. Released: 2020-01-01.
- J. Stewart. Calculus. Cengage Learning, 2015.



Food and Other Insecurities Among Students: An Assessment of the University's Role in Meeting Staff and Student Needs

Kenya Sevilla *and*
Amber Dean, PhD

Community Engagement Institute, Wichita State University

Introduction

Among groups in the U.S. that have and continue to face food and other insecurities, such as shelter and overall finances, are college students. Limited research has been done regarding this topic and its implications. Food insecurities are defined as “a lack of consistent access to enough food” by the United States Department of Agriculture (Coleman-Jensen et al., 2019). Food insecurities among colleges students can cause many general and mental health issues. If a college student experiences food insecurities, they are 15 times more likely to fail a course, fail more than one class, or withdraw from a class. In turn, this makes it more likely a student will not finish their degree. Students who do not finish their degrees also tend to have poorer health (Roberts et al., 2000). This study looks at what other insecurities might coincide with food insecurities. This research will answer questions regarding how the current services provided by WSU are meeting the needs of the students and staff, if the students and staff are using the resources being offered, and what other resources WSU could offer to support students need.

Methods

A five-minute, 17 question survey was sent out to WSU students and staff using Qualtrics. Platforms like Facebook, email, and messaging were used to attract participants and dispense the survey. Only Wichita State affiliated people were allowed to take the survey. The survey included demographic questions like employment, salary, and other necessary related background information.

Other questions regarding housing, health, and transportation, and how often the participants used WSU resources were also included.

Participants

A total of 30 participants completed the survey. Seven participants' answers were not used

because they did not complete the survey. An age restriction was set at 18 years of age and higher. Participants included undergraduates, graduates, faculty, and staff of WSU. Eighty-three percent of the participants who completed the survey were female, and 17% were male. The majority of participants were Hispanic or Latino.

Results

Regarding food insecurities, this study found that 43% reported they could not afford to eat a well-balanced meal. Forty-eight percent stated their household food did not last long. Regarding clothing insecurities, 35% reported they were embarrassed about their clothing. Eighty-seven percent reported they had clothes that protected them from the weather. Regarding visiting the doctor, 52% reported money was an obstacle that prevented them from seeing the doctor. Seventy-four percent of the participants reported that transportation had not been an issue for them, but 26% reported they have been late or skipped classes due to transportation issues. A majority

reported knowing about the services like Shocker Food Locker, financial aid, the counseling and testing center, student health, and TRIO. The majority of students reported they did not know about the service Share a Meal. A majority reported they have not used the following services: Shocker Food Locker, the counseling and testing center, student health, and TRIO. Sixty-five percent stated they have used financial aid. The majority reported they did not know the locations of the services Shocker Food Locker, Share a Meal, and TRIO. Most of the participants knew where financial aid, the counseling and testing center, and student health were located.

Discussion

The findings show that there is a small amount of food insecurity among the participants. Forty-three percent stated that they can not afford to eat a well-balanced meal. Students who experience food insecurities have reported that they also have fewer days of sleep, which was related to higher BMI and poor health (Martinez et al., 2019). Findings indicate that 52% of the participants do not see a doctor, because they can not afford to see one. Participants also do not use the resources that WSU has to offer. This can be

due to the fact that they do not know the location of the resources. No speculations can be made regarding the effectiveness of the resources that are being offered if they are not being used, but it is made clear that these resources need to be more broadly advertised and accessible for them to succeed.

Limitations

A limitation of this study was that a majority of the participants were female, and results

may not be generalizable to all students and staff at WSU and colleges across the United States. Another limitation was the small sample size. Circumstances came up while the survey was being distributed which only allowed for 30 stu-

dents to participate. During the research process, COVID-19 erupted in America which made universities across the nation shut their doors. Due to social distancing restrictions, it was difficult to meet with people and organize the research.

Conclusion

College is a time when we have to find out who we are as individuals and who we want to be, but it is also a stressful time. It can be even more stressful for students with food/shelter/monetary insecurities. Resources are offered at WSU to make that time less stressful for all students. Knowledge of the resources being offered is an important aspect for students in order for them to determine if they are in need or not. More advertising should promote the resources WSU has to offer and how to locate them. It is also important for more research to be conducted on food and other insecurities on college campus-

es as it will bring further insight into why some students might be struggling more than others. Little research has been done regarding the impact of food insecurities among college students. This same study could be replicated in the future at WSU with more participants to gain more definitive conclusions. Other universities can also study the impacts of insecurities on their campuses to better support their students and communities. Another direction that can stem from this research is examining why students are not using the resources offered at their university.

References

- Breneman, V., Farrigan, T., Hamrick, K., Hopkins, D., Kaufman, P., Lin, B.-H., ... McGowan, H. (2009). Access to affordable and nutritious Food: Measuring and understanding food deserts and their consequences. *United States Department of Agriculture*. Retrieved January 23, 2020, from https://www.ers.usda.gov/webdocs/publications/42711/12698_ap036fm_1_.pdf?v=0
- Coleman-Jensen, A., Gregory, C. A., & Rabbitt, M. P. (2019). Definitions of food security. *United States Department of Agriculture*. Retrieved January 22, 2020, from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx>
- Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2019). Household food security in the United States in 2018. *States Department of Agriculture*. Retrieved January 23, 2020, from <https://www.ers.usda.gov/publications/pub-details/?pubid=94848>
- Gaines, A., Robb, C. A., Knol, L. L., & Sickler, S. (2014). Examining the role of financial factors, resources and skills in predicting food security status among college students. *International Journal of Consumer Studies*, 38(4), 374–384. doi: 10.1111/ijcs.12110
- Lombe, M., Nebbitt, V. E., Sinha, A., & Reynolds, A. (2016). Examining effects of food insecurity and food choices on health outcomes in households in poverty. *Social Work in Health Care*, 55(6), 440–460. doi: 10.1080/00981389.2015.1133469
- Martinez, S. M., Grandner, M. A., Nazmi, A., Canedo, E. R., & Ritchie, L. D. (2019). Pathways from food insecurity to health outcomes among California University students. *Nutrients*, 11(6), 1419. doi: 10.3390/nu11061419
- Mcarthur, L. H., Ball, L., Danek, A. C., & Holbert, D. (2018). A high prevalence of food insecurity among university students in Appalachia reflects a need for educational interventions and policy advocacy. *Journal of Nutrition Education and Behavior*, 50(6), 564–572. doi: 10.1016/j.jneb.2017.10.011
- Nord, M., & Prell, M. (2007). Struggling to feed the family: What does it mean to be food insecure? *Washington*, 5(3), 32–39. Retrieved from <https://search-proquest-com.proxy.wichita.edu/docview/204855143?accountid=15042&pq-origsite=summon>
- Patton-López, M. M., López-Cevallos, D. F., Cancel-Tirado, D. I., & Vazquez, L. (2014). Prevalence and correlates of food insecurity among students attending a midsize rural university in Oregon. *Journal of Nutrition Education and Behavior*, 46(3), 209–214. doi: 10.1016/j.jneb.2013.10.007
- Payne-Sturges, D. C., Tjaden, A., Caldeira, K. M., Vincent, K. B., & Arria, A. M. (2017). Student hunger on campus: Food insecurity among college students and implications for academic institutions. *American Journal of Health Promotion*, 32(2), 349–354. doi: 10.1177/0890117117719620
- Reppond, H. A., Thomas-Brown, K., Sampson, N. R., & Price, C. E. (2018). Addressing food insecurity in college: Mapping a shared conceptual framework for campus pantries in Michigan. *Analyses of Social Issues and Public Policy*, 18(1), 378–399. doi: 10.1111/asap.12161

- Rhone, A., Ploeg, M. v, Williams, R., & Breneman, V. (2019). Understanding low-income and low-access census tracts across the nation subnational and subpopulation estimates of access to healthy food. Retrieved January 23, 2020, from <https://www.ers.usda.gov/webdocs/publications/93141/eib209summary.pdf?v=5278.4>
- Roberts, R., Golding, J., Towell, T., Reid, S., Woodford, S., Vetere, A., & Weinreb, I. (2000). Mental and physical health in students: The role of economic circumstances. *British Journal of Health Psychology*, 5(3), 289–297. doi: 10.1348/135910700168928
- Silva, M. R., Kleinert, W. L., Sheppard, A. V., Cantrell, K. A., Freeman-Coppadge, D. J., Tsoy, E., ... Pearrow, M. (2015). The relationship between food security, housing stability, and school performance among college students in an urban university. *Journal of College Student Retention: Research, Theory & Practice*, 19(3), 284–299. doi: 10.1177/1521025115621918
- Pryor, L., Lioret, S., Van Der Waerden, J., Fombonne, E., Falissard, B., & Melchior, M. (2016). Food insecurity and mental health problems among a community sample of young adults. *Soc Psychiatry Psychiatr Epidemiol*, 51, 1073–1081. doi: 10.1007/s00127-016-1249-9
- Jones, A. D. (2017). Food insecurity and mental health status: A global analysis of 149 countries. *American Journal of Preventive Medicine*, 53(2), 264–273. doi: 10.1016/j.amepre.2017.04.008
- Fraze, T. K., Brewster, A. L., Lewis, V. A., Beidler, L. B., Murray, G. F., & Colla, C. H. (2019). Prevalence of screening for food insecurity, housing instability, utility needs, transportation needs, and interpersonal violence by US physician practices and hospitals. *JAMA Network Open*, 2(9). doi: 10.1001/jamanetworkopen.2019.11514

A Mixed Methods Study: An Evaluation of Sisters and Brothers for Healthy Infants & Collection of Maternal Voices

Kyla Morris

Wichita State University, and

Sharla Smith, PhD

Department of Population Health, University of Kansas School of Medicine-Wichita

Introduction

The United States holds one of the highest rates of maternal mortality in the industrialized world (Lockwood, 2019). Of the 700 yearly maternal deaths in the United States, African American (AA) women suffer three to four times more than White women (Collins, et al., 2004; Lockwood, 2019; Shahul, et al., 2015). According to the World Health Organization (2020), maternal mortality is considered “the death of a woman while pregnant or within 42 days of termination of pregnancy.” This disparity between AAs and Whites is due to race, genetics, health status, income, education, lifestyle, chronic stress, quality of healthcare services, patient-provider interaction, racism, discrimination, and several environmental factors.

To address the disparity, researchers Dr.’s Sharla Smith and Michelle Redmond at the University of Kansas School of Medicine-Wichita (KUSMW) created Sisters and Brothers for Healthy Infants (SBHI) in 2018. This community-based initiative is comprised of KUSMW researchers and Black Greek Letter Organizations (BGLO) in Wichita, Kansas. Of the eight organizations in Wichita, each has provided an SBHI representative that attends monthly meetings and relays information back to their respective chapter. The goal is to eliminate the health disparities for AAs in Kansas by increasing awareness of the high rates of AA maternal and infant mortality and connecting individuals with local resources.

The first project of the initiative is the annual community event, Celebrate Day 366 (CD366), which celebrates babies that have lived past one year and provides resources and information to parents and parents-to-be. The event features free lunch, gift-cards, education, resources, an empow-

erment session, and giveaways. Some vendors featured at CD366 over the past three years include March of Dimes, the Black Nurses Association, Healthy Babies, Global Infant Safe Sleep Center, and the Wichita Area Breastfeeding Coalition. The second project of the initiative is to create a Kansas Birth Equity Network (K-BEN) that will develop a five-year plan to help sustain the tailored intervention that they develop. The National Birth Equity Collaborative defines birth equity as “the assurance of the conditions of optimal births for all people with a willingness to address racial and social inequalities in a sustained effort” (Crear-Perry). The K-BEN will surpass previous efforts in Sedgwick County because it involves the community’s participation, specifically health care professionals, policymakers, community stakeholders, advocacy organizations, and, finally, SBHI, whose representatives will serve as the project’s advisory board. The community’s extensive involvement will help

bridge the gaps between communities, hospitals, and governmental systems.

This study aims to understand how the experiences of bias, racism, mistreatment in care, and the community has impacted AA women’s pregnancies in Sedgwick County, Kansas and determine the effectiveness of SBHI as well as the initiative’s next steps through member feedback and recommendations. The work of SBHI has never been evaluated nor have AA maternal voices been collected in this area, making this study vital to the work currently being done to improve maternal and infant health in Kansas. People living in the areas most affected by the poor birth outcomes will be able to share their experiences and what they need from their health providers, community, and the system. The SBHI Evaluation Survey will allow for members to give their opinions of the collaboration and allow researchers to tailor future practices to the needs of SBHI, the K-BEN, and the community.

Methods

This study is part of a larger study and analysis, currently in-progress, focused on creating a network of invested and trained stakeholders striving to improve birth outcomes for AA women in Sedgwick County, Kansas. The objective of this study is to understand how the experiences of bias, racism, mistreatment in care, and the community have impacted African American women in Sedgwick County, Kansas, and to determine the effectiveness of SBHI and future development of the K-BEN through surveys. Inclusion criteria for the Maternal Voices Survey are AA women residing in Sedgwick County who have

been pregnant. Inclusion criteria for the SBHI Evaluation Survey are sorority and fraternity members of BGLO who live in Wichita and any other community members involved with SBHI.

Both surveys were 30 questions each, comprised of multiple choice and free response questions developed using REDCap, a secure web application for building and managing surveys. The Maternal Voices Survey had demographics such as zip code and race and asked about prenatal care, the birth, the infant, postpartum care, and birth equity. The SBHI Evaluation Survey had demographics, such as age, race, ethnici-

ty, sex, marital status, education, income, and number of children and surveyed community engagement, quality of SBHI collaboration and meetings, CD366 evaluation, knowledge of maternal and infant health, and opinions about the future K-BEN. The surveys were distributed via

email using a link and advertised on the SBHI Facebook page, at SBHI meetings and events, and Craigslist. This study was approved by the IRB at WSU as a reliance on the larger study approved by the IRB at KUSMW.

Results/Discussion

There were 63 responses to the Maternal Voices Survey, but only 19 responses (30%) were included in the data analysis due to missing fields such as name and the participant not living in Sedgwick County. There were 15 responses to the SBHI Evaluation Survey, but only 11 responses (73%) were included in the data analysis due to missing fields such as organization affiliation.

Maternal Voices

Our findings reveal that African American women are suffering in Sedgwick County, Kansas, and change is necessary. Patient-provider interaction is inadequate as demonstrated by the African American Maternal Voices Survey. These findings support the findings of Wallace and her colleagues (2017) where all, “Eighteen women expressed at least some negative sentiments about the quality of clinical care they received and their interactions with the healthcare system.” (p. 6). As expected, all participants reported at least one instance in their birth story where provider staff did not address their needs and their baby’s needs, detailing bias, racism, and mistreatment in care. Researchers speculate that consistent poor patient-provider interaction caused chronic stress, which is known to impact

birth outcomes, (Braveman, et al., 2017; Burris & Hacker, 2017; Collins et al., 2004; Lu & Halfon, 2003; Prather, et al., 2016, Shahul et al., 2015) thereby creating pregnancy complications in some participants.

Participants also demonstrate a need for increased education about prenatal and postnatal care which is consistent with previous literature which stated “that the majority of women with chronic hypertension who became pregnant did not know their blood pressure and did not start hypertension management before pregnancy” (Lu, et al., 2018, p. 78). Researchers suggest that some participants may not have known their blood pressure levels throughout their pregnancy simply because they were unaware of the complications it can cause or because they were sent home in several participant’s cases. Recent literature suggests it may be possible to eliminate some racial outcome disparities by medical treatment of certain risk factors (Shahul, et al., 2015).

SBHI Evaluation

SBHI members strongly support the SBHI/KU collaboration and are invested in its success, which is confirmed by feedback on the monthly meetings, CD366, and ideas for improvement. Almost three-fourths stated that they have been doing this work for various lengths and recog-

nize its importance in the community. As expected, SBHI members consistently mentioned a need for more participation of BGLO. Since more than half of the participants reported an increase in knowledge and correctly reported risk factors for a high-risk pregnancy, we have determined that SBHI is essential to reducing African American maternal and infant mortality and it can be supported towards reaching its goals in the community.

Findings from SBHI members also support the impact that bias, and racial discrimination by providers, has on African American women as demonstrated by the maternal survey results. The community's voices have been collected allowing SBHI to be uniquely positioned to effect change. These fraternity and sorority members are known as trusted community members because they have already been doing community service through their organizations. Furthermore, findings from SBHI members on the future actions of the K-BEN align with recommendations demonstrated by the California Maternal Quality Care Collaborative of prevention initiatives, communication and coordination of care among

providers, and standards of assessment (Lockwood, 2019).

Limitations

Several limitations must be discussed that were present in this study. Sample sizes were small in both surveys, limiting generalizability on a national scale. Similar opinions of the K-BEN and SBHI/KU collaboration can be assumed for some sororities but cannot be generalized to all fraternities since there was only one male participant. In contrast, the Maternal Voices findings can be generalized for populations representative of similar demographic backgrounds across the United States. Future research should obtain feedback from members of organizations who did not take the survey to better understand their needs and motivations to get involved. Researchers can also follow-up with the Maternal Voices Survey participants to create a video campaign that highlights their birth stories to further advocate for change. This research is necessary to decrease the disproportionate AA maternal and infant mortality rates.

Conclusion

This study provides a preliminary understanding of the experiences of African American women in Sedgwick County and SBHI's next steps to address the present disparity. A gap in the care of African American reproductive women is evident in the access to quality care and resources, such as counseling, provider failure to recognize warning signs or listen to the mother, delayed diagnoses, prenatal and postpartum care, racism, and discrimination. There is a need for

the Kansas Birth Equity Network: a group of trained diverse stakeholders as well as two sets of parents from the community who have been educated on the determinants of maternal mortality and are dedicated to helping AA women. They can develop an intervention tailored to the needs of AAs; other states can replicate it to meet their own community's needs. With this network, the necessary resources, advocacy, and support can be provided to those who need it the most.

References

- Braveman, P., Heck, K., Egerter, S., Tyan, P. D., Rinki, C., Marchi, K. S., & Curtis, M. (2017). Worry about racial discrimination: A missing piece of the puzzle of black-white disparities in preterm birth? *PLoS One*, 12(10). Retrieved from <http://dx.doi.org.proxy.wichita.edu/10.1371/journal.pone.0186151>
- Burris, H. H., & Hacker, M. R. (2017). Birth outcome racial disparities: A result of intersecting social and environmental factors. *Seminars in perinatology*, 41(6), 360–366. doi:10.1053/j.semperi.2017.07.002
- Collins, J. W., Jr, David, R. J., Handler, A., Wall, S., & Andes, S. (2004). Very low birthweight in African American infants: The role of maternal exposure to interpersonal racial discrimination. *American journal of public health*, 94(12), 2132–2138. doi:10.2105/ajph.94.12.2132
- Crear-Perry, J. (2020). National Birth Equity Collaborative. Retrieved from <https://birthequity.org/>
- Lockwood, C. (2019). Preventing maternal mortality. *Contemporary OB/GYN*, 64(1), 7-10. Retrieved from <https://search-proquest-com.proxy.wichita.edu/docview/2186660120?accountid=15042>
- Lu, M.C., Halfon, N. (2003). Racial and ethnic disparities in birth outcomes: a life-course perspective. *Maternal and Child Health Journal* 7(1), 13–30. <https://doi.org/10.1023/A:1022537516969acc>
- Lu, Y., Chen, R., Cai, J., Huang, Z., & Yuan, H. (2018). The management of hypertension in women planning for pregnancy. *British medical bulletin*, 128(1), 75–84. doi:10.1093/bmb/ldy035
- Prather, C., Fuller, T. R., Marshall, K. J., & Jeffries, W. L., 4th (2016). The impact of racism on the sexual and reproductive health of African American women. *Journal of women's health (2002)*, 25(7), 664–671. doi:10.1089/jwh.2015.5637
- Shahul, S., Tung, A., Minhaj, M., Nizamuddin, J., Wenger, J., Mahmood, E., ... Rana, S. (2015). Racial disparities in comorbidities, complications, and maternal and fetal outcomes in women with preeclampsia/eclampsia. *Hypertension in pregnancy*, 34(4), 506–515. doi:10.3109/10641955.2015.1090581
- Wallace, M. E., Green, C., Richardson, L., Theall, K., & Crear-Perry, J. (2017). “Look at the whole me”: A mixed-methods examination of black infant mortality in the US through women’s lived experiences and community context. *International journal of environmental research and public health*, 14(7), 727. doi:10.3390/ijerph14070727
- World Health Organization. (2020). Maternal mortality ratio (per 100 000 live births). Retrieved from <https://www.who.int/healthinfo/statistics/indmaternalmortality/en>

Effect of Lyrical Versus Nonlyrical Music on Reading Comprehension in College Students

Maira Banuelos Galicia *and*
Raymond Hull, PhD

Department of Communication Sciences and Disorders, Wichita State University

Introduction

More than half of adolescents from technologically advanced, developed countries report consuming electronic media on most evenings (Lemola et al., 2014). In the United States alone, the rate of smartphone ownership grew from 35% in 2011 to 56% in 2013 (Kwok et al., 2017). With the rise of technology, there have also been many concerns about youth and their ability to read. In past years, studies have discovered that student's performance on national achievement tests have been declining (Anderson & Fuller, 2010). One of the most important skills educators try to develop in their students is reading comprehension. Despite the educators' attempts to raise the score, they have remained low and this has given educators cause for concern regarding keeping America's public sufficiently educated.

Listening to music may adversely affect students while they are reading or studying. Unlike environmental noise and speech, listening to music while completing a task is a choice which many students and adults make because they say that it makes the task more enjoyable (Vasilev et al, 2018). In a study conducted by Etaugh and Michals (1975), popular music was found to adversely affect reading-test performance in college students. Even though technology was not as integrated at the time of their study as it is today, the need to understand the effect was still relevant. Music was consumed through record players and it was affecting cognitive processes. The study Etaugh and Michals conducted was unique because participants were asked to bring in their own choice of music, rather than have the researchers choose the music for them, which is what researchers in multiple studies have done. Etaugh and Michals' (1975) study tested whether unfamiliar sounds were bigger distractors

than familiar sounds. Their finding concluded that listening to preferred music interfered with the performance of females but did not interfere with their male counterparts. Etaugh and Michals suggested that a possible reason for this was the frequency in which each individual studied with music. In their study, the male subjects reported studying with music more often than the female subjects (Etaugh & Michals, 1975).

The study of the effect of music on reading comprehension is a complex as well as controversial subject. There are many variables that researchers need to control to completely understand what effects are taking place. Findings regarding the impact of music are on reading comprehension are mixed. So far, the answer for what exactly is being affected by music or how

music affects reading comprehension is still being debated. There seems to be a larger consensus that music alters reading comprehension and memory. The studies that have been published to date have not been able to be replicate the same results of past studies.

Purpose of this Study: The purpose of this study is to understand the different effects lyrical versus nonlyrical music may have on reading comprehension among college students.

Hypothesis: If students are listening to nonlyrical (no words) and lyrical (with words) music separately, then scores from listening to nonlyrical music will be higher than scores from listening to lyrical music. (Lyrical Music is more distracting than nonlyrical music).

Methods

Participants were recruited through email. Professors and instructors from Wichita State University were contacted and asked to forward an email containing links and other information on the survey to their students. The participants included 7 males and 5 females ranging from 18 to 44 in age. Due to the effects of Covid-19, this University closed to protect students, faculty, and staff's health and safety. This occurred when recruiting of subjects had just begun, which resulted in a small participant pool. The software Qualtrics was used to design a survey and collect the data. Students were told through email that the estimated time would be 10-15 minutes depending on each individual's reading skill. For this task, participants were asked to read two short stories while listening to music that were chosen by the researchers. One story was read with nonlyrical music, while the other was read

with lyrical music. After reading the stories with the prompted music selection, the participants answered simple comprehension questions about the stories they had read.

The two stories (Story A and Story B) were fictional, and although each had a different plot, the stories were designed with similarities in overall structure, vocabulary level, number of words, and content. Both stories were highly similar regarding the average reading time, and the complexity of the story. The two songs that were selected for use in this study were "Electric Feel" by MGMT (lyrical song), and "Resonance" by Home (nonlyrical song). Neither of the songs were considered acoustic songs. Half of the participants listened to Story A with the nonlyrical song and Story B with the lyrical song, which the other half listened to Story A with the lyrical song and Story B with the nonlyrical song.

Results

Microsoft Excel 2016 was used for data analysis; SPSS was not used due to the small sample size of the study. The group of participants that took the quiz over the fictional story while listening to lyrical music achieved an average score of 82.125%. The participants could decide whether they wanted to listen to the music while answering the questions, but once they started answering questions, they were not able reference the text. Next, the group of participants that took the quiz while listening to nonlyrical music achieved an average score for this section was 79.158%.

The following bar graphs reveal the scores while comparing them between genders. Figure 1.0 shows the number of participants that attained a certain score when they listened to nonlyrical music. For example, two female participants earned a 100% score on the quiz while listening to nonlyrical music. The light blue color

represents female participants, and the dark blue color represents male participants. The average score for the female participants listening to non-lyrical music was 85.7%. On the other hand, the average score for the male participants listening to nonlyrical music was 79.6%. Figure 2.0 displays the number of participants that attained a certain score while listening to lyrical music. The average score for the female participants listening to lyrical music was 85.7%, while the average score for the male participants listening to lyrical music was 74.5%. The average score for nonlyrical music was lower than the score for lyrical music. Even though the average for lyrical music was higher than nonlyrical, genders were still able to be compared and in both musical settings, the female group had a higher average than the male group. A larger sample is needed to generalize these results.

Figure 1.0

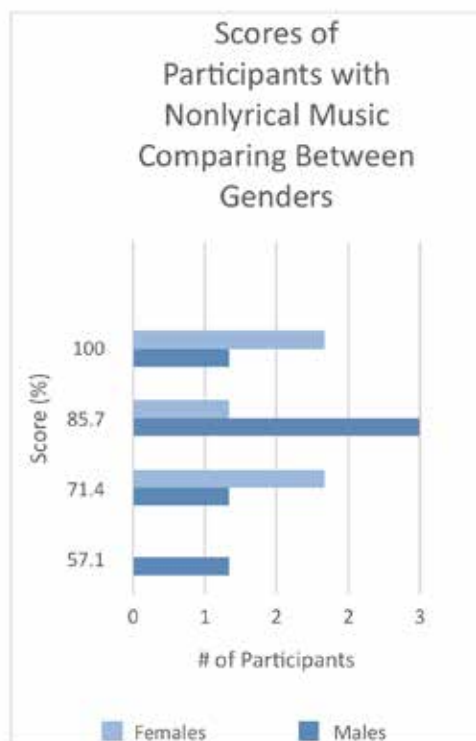
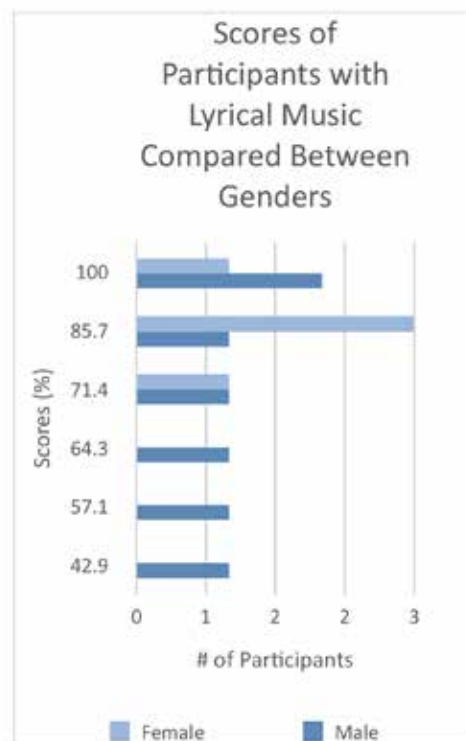


Figure 2.0



Discussion

The results from this study showed that lyrical music was less distracting to the participants than nonlyrical music, therefore rejecting the original hypothesis. The average of both groups (lyrical and nonlyrical) were still minutely close making definitive conclusion difficult and possibly nonviable. However, there is cause for further study from these findings. On both groups (nonlyrical and lyrical), females had a higher average score than their male counterparts. It is unclear whether this occurred because some individuals were possibly more accustomed to study with music than other individuals.

Some limitations in this study should be noted. First, at the beginning of participant recruitment, the University closed due to the effect of

Covid-19 which resulted in a small sample size. A larger sample size would be beneficial to generalize data to a desired population. Second, it was noticed that participants seemed to do worse on the second story that they read. This may be due to exhaustion or boredom. It may be helpful to have participants read only one story and answer the questions rather than two in order to receive more reliable results. For future research studies in this field, having a control group would also be helpful to understand the effects between not only lyrical and nonlyrical music, but also between reading with music and reading in silence. Research is needed to further explore other variables involve in the relationship between music and reading comprehension.

Conclusion

In conclusion, understanding how music is affecting reading comprehension can help educators instruct students on how to read and study more effectively. Educating students on the effects of music when they are younger may raise their reading comprehension score and better set them up for success. Studies have shown that music does indeed affect reading comprehension, although research is still needed to determine how

it is that music affects reading comprehension. It is also unknown if students will become unmotivated to complete reading tasks if listening to music while doing these tasks is not an option. If research can help determine how educators can help students in reading and studying methods while also living in a modernized world, then students can be better equipped to succeed in an academic setting as well as in a work setting.

References

- Anderson, S.A., & Fuller, G. B. (2010). Effect of music on reading comprehension of junior high school students. *School Psychology Quarterly*, 25(3), 178-187. 10.1037/a0021213.
- Etaugh, C., & Michals, D. (1975). Effects on Reading Comprehension of Preferred Music and Frequency of Studying to Music. *Perceptual and Motor Skills*, 41(2), 553-554. 10.2466/pms.1975.41.2.55
- Home (2016). "Resonance." *Odyssey*. Home.
- Kämpfe, J., Sedlmeier, P., & Renkewitz, F. (2011). The impact of background music on adult listeners: A meta-analysis. *Psychology of Music*, 39, 424-448. <http://dx.doi.org/10.1177/0305735610376261>
- Kwok, S., Lee, P. & Lee, R. (2017). Smart device use and perceived physical and psychosocial outcomes among hong kong adolescents. *International Journal of Environmental Research and Public Health*, 14(2), 205. 10.3390/ijerph14020205
- Lemola, S., Perkinson-Gloor, N., Brand, S., Dewald-Kaufmann, J.F., & Grob, A. (2014). Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *Journal of Youth and Adolescence*, 44(2), 405-418. 10.1007/s10964-014-0176-x
- MGMT (2007). "Electric Feel." *Oracular Spectacular*. Sony BMG Music Entertainment.
- Thompson, W. F., Schellenberg, E. G., & Letnic, A. K. (2011). Fast and loud background music disrupts reading comprehension. *Psychology of Music*, 40(6), 700-708. 10.1177/0305735611400173
- Vasilev, Martin R., Kirkby Julie A., Angele, Bernhard. (2018). Auditory distraction during reading: A bayesian meta-analysis of a continuing controversy. *SAGE Journals*, 2018, journals.sagepub.com/doi/abs/10.1177.1745691617747398.

Investigating the Role of Domain 4 of the Anthrax Protective Antigen on Stability and Immunogenicity

Taj Allen *and*
Jim Bann, PhD

Chemistry Department, Wichita State University

Introduction

Bacillus anthracis is the agent of anthrax—a common disease of livestock and, occasionally, humans—and is the only obligate pathogen within the genus *Bacillus*. This disease can be classified as a zoonosis, causing infected animals to transmit the disease to humans. *B. anthracis* is a Gram-positive, endospore-forming, rod-shaped bacterium, with a width of 1.0–1.2 μm and a length of 3–5 μm . The anthrax toxin protective antigen is the major immunogenic component of the anthrax vaccine. Anthrax toxin neutralizing antibodies have been shown to be primarily directed at domain 4, which is the domain responsible for binding to host cellular receptors (CMG2 and TEM8) and thus preventing further toxicity. The central role of Protective Antigen (PA) in the pathophysiology of anthrax makes it an excellent therapeutic target and allows vaccination with the PA-based human anthrax vaccine or purified PA results in the generation of a protective immune response. Past research has explored the binding of domain 4 as well as the safety and immunogenicity of an anthrax vaccine in which a recombinant *Escherichia coli*-derived, *B. anthracis* protective antigen is the principal antigenic component (Williams et al., 2009; Brown et al., 2010). The hypothesis of this study was that the reduced immune response to PA when CMG2 is bound is caused by CMG2 blocking a key epitope or epitopes within domain 4. As such, removal of domain 4 should elicit a significantly weaker immune response compared to a full-length PA, that is the majority of the immune response to PA is because of domain 4.

Methods

Exponential Amplification (PCR) was used to cut out domain 4 of the DNA sequence by using 12.5 uL of Q5 Hot Start High-Fidelity 2X Master Mix, 1.25 uL of 10 uM Forward Primer, 1.25 uL of 10 uM Reverse Primer, 0.2 uL of PQE80PA plasmid DNA, and 9.8 uL of nuclease-free water. These components were assembled in a thin-walled PCR tube. Reagents were then mixed completely with a Fisher Vortex. After being mixed completely, the solution was transferred to a thermocycler and put through an initial denaturation cycle of 30 seconds at 98 degrees Celsius, then 25 more cycles starting at 10 seconds at 98 degrees Celsius. The following cycles were 60 degrees Celsius for 20 seconds, then 72 degrees Celsius for 20 seconds, and a final extension cycle of two minutes at 72 degrees Celsius, with the solution being held at 10 degrees Celsius after finishing the cycling conditions. A KLD treatment was performed on the PCR product made by using 1 uL of PCR product formed from the previous thermocycler process. It was then mixed with 5 uL of 2X KLD Reaction Buffer, 1 uL of 10X KLD Enzyme Mix, and 3 uL of nuclease-free water. After adding these items, the solution was mixed well by pipetting up and down, then it was incubated at room temperature for 5 minutes. During the transformation process, NEB 5-alpha Competent E. coli cells were thawed on ice. After being thawed out, 5 uL of the KLD mix previously made were added to the tube of thawed cells and flicked to mix the solution. The mixture was put on ice for 30 minutes, and was then heat-shocked at 42 degrees Celsius for 30 seconds. At that point, it was put back on ice for another 5 minutes. Afterward, 950 uL of

room temperature SOC was pipetted into the mixture and then incubated with shaking at 37 degrees Celsius for 60 minutes in an incubator shaker. When that process finished, the cells were mixed thoroughly by flicking and inverting the tube containing the mixture. 50 uL was spread onto a selection plate and allowed to incubate overnight at 37 degrees Celsius. Afterward, the plate was put in the refrigerator to preserve the bacterial colonies. Using the Plasmid Miniprep Kit, 5 mL of bacterial culture was centrifuged in a clear 1.5 mL tube at full speed for 15-20 seconds in a microcentrifuge. After discarding the supernatant, 250 uL of ZymoPure P1(Red) was added to the bacterial cell pellet and resuspended completely by vortexing or pipetting. 250 uL of ZymoPure P2(Green) was added and then immediately mixed by inverting the tube 6 to 8 times, then allowed to sit at room temperature for 3 minutes. When there appeared a clear, purple, homogeneous viscous liquid, the cells were completely lysed. Then 250 uL of ice-cold ZymoPure P3(Yellow) was added and mixed thoroughly by inversion. After the sample turned yellow, the tube was inverted another 3 to 4 times. The solution was then incubated for 5 minutes and centrifuged for five minutes at 16,000 x g. Then, 600 uL of the supernatant from step six was transferred into a clean 1.5 mL microcentrifuge tube, then 275 uL of ZymoPure Binding Buffer was added to the solution and mixed thoroughly by inverting the tube eight times. After a Zymo-Spin II-P column is placed in a collection tube and the mixture is transferred into the column, the Zymo-Spin II P/Collection Tube assembly was incubated at room temperature for two minutes,

and then the mixture was centrifuged at 5,000 x g for one minute. 800 uL of ZymoPure Wash-1 was added to the column and then centrifuged at 5,000 x g for one minute; the process was repeat-

ed with 800 uL of ZymoPure Wash-2 added to the column and centrifuged at 5,000 x g for one minute. The wash steps were repeated again with 200 uL of ZymoPure Wash-2.

Results and Discussion

The two PCR products gained during the exponential amplification were put through gel electrophoresis and produced gel images that matched up with the expected kilobase size for the DNA which showed that a line of the sequence was deleted from the rest of the original starting sample DNA, with other products being the same size. The two plasmid samples obtained from the E. coli grown in the LB media had two different plasmid concentrations, with the first sample having 140 nanograms of plasmid per microliter solution and the second sample containing 220 nanograms of plasmid per microliter

of solution. The concentration amounts showed that the growth of the bacteria was done without contaminating the growth plates. It also exhibited the transformation of the plasmid into the E. coli cell using the heat shock method, working correctly to provide a good yield of the plasmid. After sending prepared plasmid samples to a partnered lab with the equipment to sequence DNA, a line of nucleotide base pairs was received and matched with the known sequence of the PA gene for domains 1-3. Figure 1 shows the PCR product was cut in the right place to delete domain 4 out of the PA gene.

Figure 1. PA Mutant Genetic Sequence

7/12/2020

NCBI Blast Nucleotide Sequence

Query	1238	CTTCGTTAGTGTAGGAAAAATCAAACTCGCGACAATTAAAGCTAAGGAAACCAAT	1297
Sbjct	1	CTTCGTTAGTGTAGG-AAAAATCAAACTCGCGACAATTAAAGCTAAGGAAACCAAT	59
Query	1298	TAAATCAAACTTGCACCTAATAATTATTATCCTCTTCAAAAATTTGGCGCAATCGCAT	1357
Sbjct	60	TAAATCAAACTTGCACCTAATAATTATTATCCTCTTCAAAAATTTGGCGCAATCGCAT	119
Query	1358	TAAATGCACAAGACGATTTCACTTCACTTCAATTAATGAATACAAATCAATTTCTTG	1417
Sbjct	120	TAAATGCACAAGACGATTTCACTTCACTTCAATTAATGAATACAAATCAATTTCTTG	179
Query	1418	AGTTAGAAAAACGAAACAATTAAAGATTAGATACGGATCAAGTATATGGGAATATAGCAA	1477
Sbjct	180	AGTTAGAAAAACGAAACAATTAAAGATTAGATACGGATCAAGTATATGGGAATATAGCAA	239
Query	1478	CATACAATTTTAAAAATGGAAGAGTGAGGGTGGATACAGGCTCGAACTGGAGTGAAGTGT	1537
Sbjct	240	CATACAATTTTAAAAATGGAAGAGTGAGGGTGGATACAGGCTCGAACTGGAGTGAAGTGT	299
Query	1538	TACCGCAATTCAGAAACAACGACGTATCATTTTAAATGGAAAGATTAAATCTGG	1597
Sbjct	300	TACCGCAATTCAGAAACAACGACGTATCATTTTAAATGGAAAGATTAAATCTGG	359
Query	1598	TAGAAAGCGGATAGCGCGGTTAATCCTAGTGATCCATTAGAAACGACTAAACCGGATA	1657
Sbjct	360	TAGAAAGCGGATAGCGCGGTTAATCCTAGTGATCCATTAGAAACGACTAAACCGGATA	419
Query	1658	TGACATTAAAGAGGCCCTTAAATAGCATTTGGATTAAACGAACCGAATGGAACTTAC	1717
Sbjct	420	TGACATTAAAGAGGCCCTTAAATAGCATTTGGATTAAACGAACCGAATGGAACTTAC	479
Query	1718	AATATCAAGGGAAGACATAACCGAATTTGATTTAATTCGATCAACAAACATCTCAA	1777
Sbjct	480	AATATCAAGGGAAGACATAACCGAATTTGATTTAATTCGATCAACAAACATCTCAA	539
Query	1778	ATATCAAGAATCAGT TAGCGGAATTAAACGCAACTAACATATATCTGTATTAGATAAAA	1837
Sbjct	540	ATATCAAGAATCAGT TAGCGGAATTAAACGCAACTAACATATATCTGTATTAGATAAAA	599
Query	1838	TCAATTAATGCAAAAATGAATATTTAAAGAGATAAACGTTTTTAATTGCTGAGG	1897
Sbjct	600	TCAATTAATGCAAAAATGAATATTTAAAGAGATAAACGTTTTTAATTGCTGAGG	659
Query	1898	TACCCCGGGTCGACCT	1913
Sbjct	660	TACCCCGGGTCGACCT	675

Conclusion

A PA domain 4-less mutant was successfully generated, which we plan to overexpress in *E. coli* to determine structure by circular dichroism. Since domain 4 alone can be overexpressed, whose structure has been shown to be identical to domain 4 in the context of PA, domain 4, and the domain 4-less, PA should have the ability to be combined to reconstitute the CD spectrum of full-length PA. This allows for whether the structure of the protein has been altered and the importance of domain 4 in the overall stability of the PA structure to be determined. Due to the nucleotide sequence being the same, results may be similar if not without a few differences owing to

domain 4's deletion. The main limitations during this study were the inability for *direct* study of the effects the PA mutant could have on a living organism's immune system (the samples would have to be sent to another institution to get that data). Overall, the study's goal to investigate the role of domain 4 in producing an immune response can ultimately help in the formulation of a new vaccine. Any gained information into the function that domain 4 gives to the overall PA structure will help with understanding the antibody/epitope interaction in domain 4 and the immune system.

References

- de Oliveira, F.F.M., Mamillapalli, S., Gonti, S., Brey, R.N., Li, H., Schiffer, J., Casadevall, A., Bann, J.G. (2020). Binding of the Von Willebrand Factor a domain of capillary morphogenesis protein 2 to anthrax protective antigen vaccine reduces immunogenicity in mice. *mSphere*, 5(1) e00556-19.
- Koehler T. M. (2009). *Bacillus anthracis* physiology and genetics. *Molecular aspects of medicine*, 30(6), 386–396. <https://doi.org/10.1016/j.mam.2009.07.004>
- Mirhaj, H., Honari, H., & Zamani, E. (2019). Evaluation of immune response to recombinant *bacillus anthracis* LFD1-PA4 chimeric protein. *Iranian journal of veterinary research*, 20(2), 112–119. From, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6716276/>
- Verma, A., Ngundi, M. M., Price, G. A., Takeda, K., Yu, J., & Burns, D. L. (2018). Role of the antigen capture pathway in the induction of a neutralizing antibody response to anthrax protective antigen. *mBio*, 9(1), e00209-18. doi:10.1128/mBio.00209-18
- Williams, A. S., Lovell, S., Anbanandam, A., El-Chami, R., & Bann, J. G. (2009). Domain 4 of the anthrax protective antigen maintains structure and binding to the host receptor CMG2 at low pH. *Protein science : a publication of the Protein Society*, 18(11), 2277–2286. <https://doi.org/10.1002/pro.238>
- Zhou, J., Ullal, A., Liberato, J., Sun, J., Keitel, W., & Reason, D. C. (2008). Paratope diversity in the human antibody response to *Bacillus anthracis* protective antigen. *Molecular immunology*, 45(2), 338–347. doi:10.1016/j.molimm.2007.06.159

Understanding Knowledge of Fall Prevention in Care Homes

Ya-Aida Sillah *and*
Nikki Keene Woods, PhD

Department of Public Health Sciences, Wichita State University

Introduction

When providing care for older adults, preventing falls and injuries is a high priority. As care providers in a nursing home community, it is important to keep in mind “falls can be a serious problem, resulting in suffering, disability, loss of independence and a decline in quality of life” (Kimmet, 2015). Acknowledging the effectiveness of fall prevention is imperative due to enhancing and maintaining the quality of life among residents in nursing home facilities. “Fall prevention is about recognizing a person’s falls risk factors then, where possible, removing or reducing them” (Kimmet, 2015). This study focuses on distinct attributes, such as multifaceted intervention programs, fall risk assessment tools, the effect of a fall, risk factors, and educational programs. These findings potentially demonstrate the knowledge direct care providers and administrative associates have as well as the potential strategic interventions that may need to be conducted to help spread fall prevention awareness.

Methods

Ways of obtaining information were explored for this study by visiting local nursing home communities. To gain participants, flyers were distributed and advertised at many local Wichita Nursing Home Communities. Before the questionnaire was dispensed, all participants were notified of their responses and personal information would remain anonymous as well as confidential. Approximately one week after the flyers were dispensed, a questionnaire survey was delivered to each administrator associate as well as direct care providers at all of the local nursing home communities. Twenty-five participants were included in this study. The main objective of this questionnaire was to obtain demographic data and evaluate the staff’s acquaintance with fall prevention.

Results

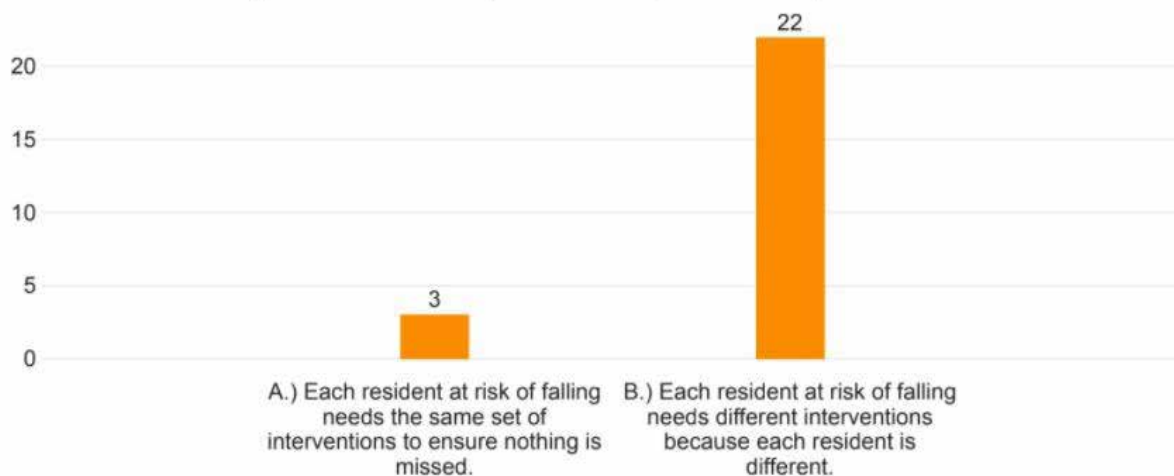
Twenty-five participants were surveyed. The results from the “What Do You Know About Fall Prevention?” questionnaire indicate that the majority of the participants appeared to have adequate knowledge in different concepts utilized in current fall prevention interventions. Based on previous research, this study identified many local Wichita Nursing Home Communities currently carry out standardized assessments when falls occur to determine an individualized care plan. “There are multiple risk factors for falls, and different patients may have different combinations

of risk factors” (Agency for Healthcare Research and Quality). After analyzing the collected data, question thirteen, on whether residents need individual or standardized fall intervention care plans, showed a vast majority (88%) in favor of residents needing different interventions. See Figure 1 for the complete responses to question thirteen. This shows local Wichita Nursing Home Communities not only take into account the standardized goal of safety practices to prevent any additional harm to residents, but believe in patient-centered care as the best prevention practice.

Figure 1. Sample question and responses from survey.

Q13 - Which statement best reflects the idealistic view when coming across a new or updated resident's care plan? (select one)

25 Responses: 12% Of Participants Selected A, 88% Of Participants Selected B



Participants were presented with options that might be implemented in nursing home facilities to maintain effective fall prevention. The majority of participants (68%) chose the possibility of allowing employee-led meetings. These meetings would require administrative associates to listen to employee's suggestions in regards to fall prevention strategies. This particular methodology would reflect guidelines from community-based

organizations. These guidelines would require a “fall prevention curriculum to show success, an evaluation must be an integral part of its design and operation, and evaluation activities must be part of the arranged activities” (Frieden, Thomas et al., 2015). These guidelines support of participants' preference for employee-led meetings so that all voices are heard in regards to efficient fall prevention strategies.

Discussion and Conclusion

This questionnaire allowed for the recognition of the strengths and boundaries of current fall prevention programs. Obtaining information from direct care providers and administrative associates helps determine what gaps in knowledge need to be addressed. Strengths all Wichita nursing homes had were informing all members of the community's educational aspects within fall prevention. "Having the right knowledge and skills can improve care and in doing so the health, wellbeing, and quality of life of residents" (Kimmet, 2015). Education is imperative when it comes to fall prevention due to the importance for all members' understanding of and compliance with communication tactics and practices for fall prevention. However, there are limitations to this in this survey, one being the inclusion of a multi-selected option for several multiple-choice

questions. This created uncertainty among participants about selecting the best answer while engaging with the survey. The construction of this questionnaire promotes fall prevention programs that use a patient-centered approach when identifying, protecting, promoting, and improving strategic interventions for the safety of residents. Future research for fall prevention should include identifying the finest pre-intervention strategies for all senior care communities to maintain effective fall prevention. Although every fall and injury cannot be avoided, this questionnaire encourages dialogue among administrative associates and direct care providers. Maintaining efficient communication will conduct proper targeted interventions for each resident to help maintain strength and independence leading to a reduction in falls.

References

- Agency for Healthcare Research and Quality. (2017). Module 3: Which fall prevention practice do you want to use? Fall prevention in hospitals training program. Rockville, MD. Retrieved January 12, 2020, from <https://www.ahrq.gov/professionals/systems/hospital/fallpxtoolkit/fallpxtk3.html>
- Carr, K., Weir, P. L., Azar, D., & Azar, N. R. (2013, January 30). Universal design: A step toward successful aging. *Journal of Aging Research*. Retrieved January 12, 2020, from <https://www.hindawi.com/journals/jar/2013/324624/>.
- Cattalani, L., Palumbo, P., Palmerini, L., Bandinelli, S., Becker, C., Chesani, F., & Chiari, L. (2015, February 18). FRAT-up, a web-based fall-risk assessment tool for elderly people living in the community. *Journal of Medical Internet Research*, 17(2), e41. Retrieved January 12, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4376110/>.
- City of Calgary, Canada. (2006, September 8). Rothman's Three Models of Community Organizing. Retrieved January 12, 2020, from <https://www.calgary.ca/csps/cns/publications-guides-and-directories/community-assessment-handbook/rothman-three-models-of-community-organizing.html>

- Currie, L. (2008, April). Fall and injury prevention. Patient safety and quality: An evidence-based handbook for nurses (Hughes R. G., Ed.). Agency for Healthcare Research and Quality, Ch. 10. Retrieved January 12, 2020, from <https://www.ncbi.nlm.nih.gov/books/NBK2653/>.
- Florence, C. S., Bergen, G., Atherly, A., Burns, E., Stevens, J., & Drake, C. (2018, March 7). Medical costs of fatal and nonfatal falls in older adults. The American Geriatrics Society. Retrieved January 13, 2020, from <https://onlinelibrary.wiley.com/doi/full/10.1111/jgs.15304>.
- Frieden, T., Houry, D., Baldwin, G., Dellinger, A., & Lee, R. (2015). Preventing falls: A guide to implementing effective community-based fall prevention programs. Centers for Disease Control and Prevention. Retrieved January 12, 2020, from https://www.cdc.gov/homeandcommunitybased/safety/falls/community_preventfalls.html.
- Gringauz, I., Shemesh, Y., Dagan, A., Israelov, I., Feldman, D., Pelz-Sinvani, N., & Segal, G. (2017, November 13). Risk of falling among hospitalized patients with high modified Morse scores could be further Stratified. BMC Health Services Research, 17 Retrieved January 13, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5684764/>.
- Haegerich, T. M., Sugerman, D. E., Annest, J. L., Kleven, J., & Baldwin, G. T. (2015, February). Improving injury prevention through health information technology. American Journal of Preventative Medicine, 48(2): 219-228. Retrieved January 12, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4700542/>.
- Kimmet, G. (2015, October 06). Managing falls and fractures in care homes for older people. Care Inspectorate. Retrieved January 13, 2020, from <http://www.careinspectorate.com/index.php/publications-statistics/76-professionals-registration/resources/2712-managing-falls-and-fractures-in-care-homes-for-older-people>.
- Sarmiento, K., & Lee, R. (2017, December). STEADI: CDC's approach to make older adult fall prevention part of every primary care practice. Journal of Safety Research, 63: 105-109. Retrieved January 12, 2020, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6239204/>.
- Palumbo, P., Klenk, J., Cattalani, L., Bandinelli, S., Ferrucci, L., Rapp, K., Chiari, L., & Rothenbacher, D. (2016, September 1). Predictive performance of a fall risk assessment tool for community-dwelling older people (FRAT-up) in 4 European cohorts. Journal of the American Medical Directors Association, 17(12): 1106-1113. Retrieved January 12, 2020, from <https://www.sciencedirect.com/science/article/pii/S1525861016302936>.
- S. A. G. E. Publications. (n.d.). Morse Fall Scale. Retrieved January 13, 2020, from [http://www.networkofcare.org/library/Morse Fall Scale.pdf](http://www.networkofcare.org/library/Morse%20Fall%20Scale.pdf).



McNair Scholars Program Wichita State University

**1845 N. Fairmount
Wichita, KS 67260-0199
www.wichita.edu/mcnair**

Notice of Nondiscrimination

Wichita State University does not discriminate in its employment practices, educational programs or activities on the basis of age (40 years or older), ancestry, color, disability, gender, gender expression, gender identity, genetic information, marital status, national origin, political affiliation, pregnancy, race, religion, sex, sexual orientation, or status as a veteran. Retaliation against an individual filing or cooperating in a complaint process is also prohibited. Sexual misconduct, relationship violence and stalking are forms of sex discrimination and are prohibited under Title IX of the Education Amendments Act of 1972. Complaints or concerns related to alleged discrimination may be directed to the Institutional Equity and Compliance Director, Title IX Coordinator or Equal Opportunity Coordinator, Wichita State University, 1845 Fairmount, Wichita, KS 67260, telephone (316) 978-3187.

The McNair Scholars Program is funded 100% by the U.S. Department of Education at \$271,193