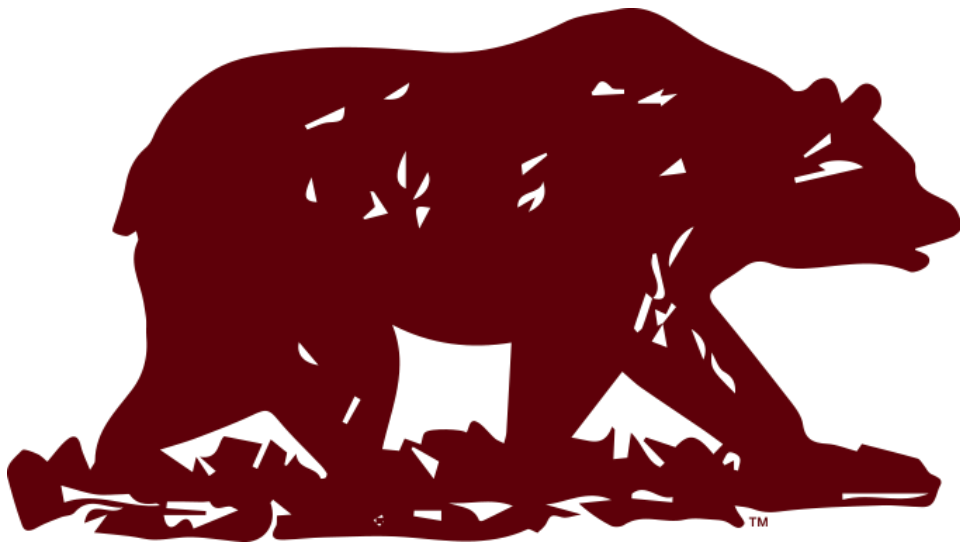


**Missouri  
State**

McQUEARY COLLEGE *of*  
HEALTH AND HUMAN SERVICES

# STUDENT RESEARCH SYMPOSIUM



**MAY 6, 2022**

**3-5PM**

**PSU BALLROOM**



## McQueary College of Health and Human Services

### *Student Research Symposium*

Welcome to the 26<sup>th</sup> Annual McQueary College of Health and Human Services Student Research Symposium. The purpose of the symposium is to highlight student research and to provide an opportunity for students to gain experience discussing their scholarly work.

We are thrilled that this year's symposium has returned to an in-person event and are excited to hear the interprofessional research conversations that symposiums can evoke. Above all we are looking forward to celebrating MCHHS students' outstanding work, to acknowledging the faculty members who serve as mentors, and to recognize the schools and departments which support discovery.

To all McQueary College of Health and Human Services faculty, staff, alumni, board members and students, THANK YOU for participating in this year's symposium! Your hard work, dedication, and active participation is greatly appreciated.

I would also like to thank the MCHHS Student Research Symposium Committee members for their time and effort in organizing the symposium:

Dr. Ashlea Cardin, Occupational Therapy  
Dr. Christie Cathey, Psychology  
Dr. Melissa Fallone, Psychology  
Dr. James Hackney, Physical Therapy  
Dr. Michael Hudson, Public Health and Sports Medicine  
Dr. Anne Marie Hunter, Biomedical Sciences  
Dr. Wafaa Kaf, Communication Sciences and Disorders  
Dr. Bogdan Kostic, Psychology  
Dr. Jianjie Wang, Biomedical Sciences  
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Mrs. Rebeca Reut-Robinson, Executive Assistant  
Ms. Molly Laird, Administrative Specialist

*Dr. Mark A. Smith*

Dean, McQueary College of Health and Human Services

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1. Ezri Beckmann
2. Larry Davis
3. Matthew Freese
4. Stephanie Mitchell Urich
5. Hannah Matheney
6. Emma Wise
7. Claire Nichols
8. Christian Rivas
9. Derrick Marshall
10. Gabrielle Ramos
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81. Claire Zuch
82. Emily Lohrbach
83. Sophia Wolken
84. Abigail Bjerken
85. Himawari Tsuchiya
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*\*Indicates virtual presentation*

### BIOMEDICAL SCIENCES

#### 1. Global Effects of the Clean Water Crisis

Ezri Beckmann, Gabrielle Ramos, Mikaela Suess,  
Travis Jackson, Amanda Brodeur  
Faculty Advisor: Amanda Brodeur

771 million people lack access to clean water and about 1 million people die each year from water-related diseases. Access to clean water globally would reduce child and maternal mortality rates, eliminate physical injuries, improve overall health, and prevent the spread of infectious diseases. Some examples of microbiological contaminants are *Vibrio cholerae*, Hepatitis A, and *Escherichia coli*. Such contaminants can cause a range of symptoms, from diarrhea to liver inflammation. Unsafe levels of contaminants can lead to diverse health effects including gastrointestinal illnesses, nervous system effects, and chronic diseases such as cancer. Low-income countries with poor sanitation and access to healthcare, can have more severe and fatal health outcomes. Efforts to promote access to clean water for struggling individuals around the globe primarily rely on donations from organizations to improve water quality. Currently, many companies are trying to enhance the availability of clean water for individuals worldwide. In upcoming years, the concerns related to water contamination and overall water availability can be reduced through cooperation among worldwide organizations and individuals across the globe.

#### 2. Further Characterization of the Skeletal Phenotype in *Idua-W392x* Knock-In Mice as a Model of Mucopolysaccharidosis Type I

Larry Davis, Olivia Isaacks, Ashley Shank, Grace Scherschel, Sophia Jensen, Samuel Nelson, Palak Tiwari, Michael Rexroad, George Sakellis, Emily Hefferle, Amanda Brodeur  
Faculty Advisor: Amanda Brodeur

Hurler syndrome, also known as Mucopolysaccharidosis type 1, is a rare autosomal recessive disorder caused by the deficiency of

lysosomal enzyme alpha-L-iduronidase (IDUA). Consequently, the accumulations of glycosaminoglycans in the lysosome cause cellular dysfunction. In this particular lysosomal disorder, the absence of IDUA in individuals can be characterized by cognitive and hearing impairment, organ enlargement, degenerative joint disease, and bone deformities. Despite current treatments to improve the symptoms, very few treatments improve the bone phenotype. As a result, diagnosed individuals experience disabling, painful bone disease that often requires surgical intervention. To examine the bone phenotype, the research team is using a knock-in mouse model, containing a nonsense mutation similar to a common human IDUA mutation. To better understand the physicochemical composition of the bone in the IDUA mouse model, Immunohistochemistry (IHC) can be used. IHC examining RANK and RANK ligand was performed to further examine osteoclast function in the mouse model. IHC of wildtype and IDUA bones was performed, and RANK and RANK ligand localization was examined in IDUA samples as compared to wildtype.

#### 3. Further Investigation of the Initiating Mechanism of the Type I Collagen Glomerulopathy

Matthew Freese, Kaitlyn Armstrong, Drake Headrick, Grant Headrick, Olivia Hetzel, Garrett Reid, Clare Scheier, Emily Takacs, Kambria Todd, Kaitlyn Weber, Amanda Brodeur  
Faculty Advisor: Amanda Brodeur

In chronic renal disease, the progressive accumulation of collagen and other extracellular matrix proteins in the mesangium of nephrons results in fibrosis, glomerulosclerosis, and eventual renal failure. Mice deficient in *proa2(I)* collagen are a model for Type 1 Glomerulopathy because they accumulate homotrimeric type I collagen in the mesangium. Picosirius red (PSR) staining was used to evaluate collagen deposition. Histological evaluation and lesion scoring of kidney sections demonstrated that *Colla2*-deficient homozygous and heterozygous mice exhibit abnormal glomerular collagen deposition. Following staining,

immunohistochemistry was used to determine if platelet-derived growth factor (PDGF) B and D are responsible for initiating glomerulopathy in our mouse model. IHC results show PDGF-B in both tubules and glomeruli of homozygous and heterozygous kidneys, while PDGF-D is found primarily in tubules of homozygous and heterozygous kidneys. In addition, the wild-type kidneys did not show the same staining for PDGF-B and PDGF-D that was seen in Coll1a2-deficient kidneys. These results indicate that PDGF-B and PDGF-D deserve further investigation as potential initiators of renal fibrosis.

#### **4. Evaluation of Nutrition Risk in Uninsured, Low-Income Patients: Research Development and Implementation**

Stephanie Mitchell Urich, Madison Kurth, Allison Jacobs, Sean Eddington, Jessica Willis MS, Brandi L. Bowers PharmD, BCACP, Jaime Gnau MS, RDN/LD, CHES  
Faculty Advisor: Jaime Gnau

Low-income, food-insecure populations face unique barriers in meeting recommendations for nutrient intake, increasing risk for cardiovascular disease, diabetes, and other nutrition-related health conditions. Registered dietitian nutritionists (RDNs) provide individualized evidence-based interventions and accommodate economic limitations. Despite access to RDNs at MSU Care—a charitable clinic serving low-income, uninsured adults—nutrition services are underutilized. Understanding nutrition risk and barriers to RDN encounters in this population is vital to prevent and manage chronic health conditions. The aims of this study were to identify nutrition risk factors in MSU Care patients; examine discrepancies between patient-reported, provider-reported, and actual nutrition risk; and determine barriers to patient consult with the RDN team. Patients (n = 150) and providers (n = 5) completed validated surveys assessing diet quality, nutrition risk, and food insecurity. Spearman correlations and multiple linear regressions will be utilized to describe relationships between patient- and provider-reported nutrition risk and the importance of RDN encounters.

#### **5. Enhancing siRNA Knockdown Protocols to Study the Effect of SPTBN1 on HIV Replication**

Hannah Matheney, Amy E Hulme  
Faculty Advisor: Amy Hulme

Knockdown (KD) of protein expression by siRNA matching a target gene is used widely to study the effect of that gene on a cellular process. Effective KD is important to see a response within the process, in this case the effect of the actin associated protein SPTBN1 on HIV-1 infection of microglial cells. KD percentages of GAPDH and SPTBN1 target genes were calculated by qRT-PCR of RNA samples. Two qRT-PCR kits were compared and a primer efficiency was determined with the most efficient kit. The iTaq Universal SYBR Green One-Step Kit was more sensitive, amplifying the RNA sample earlier than the SsoFast kit. With the qRT-PCR protocol established, two siRNA KD protocols were compared using RNAiMAX as a transfection reagent. The new KD protocol achieved an over 90% decrease in expression of SPTBN1 compared to a 30% decrease with the old KD protocol. After the siRNA KD was performed with both protocols, the cells were infected with HIV-1 virus. Using the old KD protocol, decreased expression of SPTBN1 also decreased HIV-1 infection. The new KD protocol decreased SPTBN1 expression significantly but caused a varied response in HIV-1 infection.

#### **6. Cyclophilin A Facilitates HIV-1 Capsid Uncoating in CHME3 Cells**

Emma Wise, Amy E Hulme  
Faculty Advisor: Amy Hulme

To assist in viral replication, HIV-1 uses cellular factors, like Cyclophilin A (CypA). CypA binds to viral capsid proteins (CA) to influence the uncoating step of replication in some cell lines. I hypothesize that CypA assists with HIV-1 infection and proper uncoating kinetics in CHME3 microglial cells. To study how this interaction affects uncoating, the in situ uncoating assay was performed in the presence and absence of the drug Cyclosporin A (CsA) which blocks the interaction of CypA and CA. In this assay, CHME3 cells are infected with dual labeled virus, fixed 0 to 4 hours post infection, and stained

with antibody for CA. This virus has dTomato labeling in the viral membrane and GFP labeling in the viral core. These labels are used to identify virions that have fused with the cell. All samples are then imaged using a confocal microscope and analyzed using an overlap intensity plugin for ImageJ. Each sample was analyzed for the mean maximum CA signal to signify the amount of uncoating and percent of viral fusion. In preliminary experiments, lower amounts of CA were found in conditions with CypA binding compared to the absence of CypA. This result suggests that CypA assists with uncoating in CHME3 cells.

### **7. Tissue and Sex-Specific Changes in RNA Editing During Induced Acute Inflammation**

Claire Nichols, Kelsey Kendrick, Bridgette Macander, Christian Rivas, Randi Ulbricht PhD  
Faculty Advisor: Randi Ulbricht

A-to-I RNA editing is a process where adenosine (A) nucleotides are deaminated by an editing enzyme, ADAR1, to become inosines (I), which can affect the sequence of the encoded protein. ADAR1 plays a role in regulating innate immunity and is upregulated during inflammation. Current data on the effects of increasing ADAR1 on RNA editing is limited, and studies only include male mice. We are interested in expanding RNA editing data to include females. Lipopolysaccharide (LPS) was used to induce acute inflammation and increase ADAR1. Organs were dissected four hours after LPS injection and RT-PCR was used to amplify regions around editing sites. The amplicons were sequenced and analyzed for the amount of nonedited nucleotides and edited nucleotides. Inflammation was verified in LPS injected mice through qRT-PCR of ADAR1 and TNF-alpha. The increased levels of ADAR1 did not affect levels of RNA editing. There was also no difference in editing between sexes. However, our analysis revealed a difference in editing between the heart and brain, indicating tissue-specific regulation of RNA editing. Overall, this work helps us understand how effects of inflammation are regulated to minimize damage and unwanted physiological consequences.

### **8. Sex-Dependent Role for P2Y2R in Glucose Metabolism and Inflammation**

Christian Rivas, Hailee Marino, Jianjie Wang, Randi Ulbricht  
Faculty Advisor: Randi Ulbricht

The P2Y2 receptor plays an important role in the inflammatory responses. Activation of P2Y2R potentiates inflammatory responses by producing pro-inflammatory cytokines and mediators, such as IL-6 and TNF-alpha. P2Y2R potentiates insulin resistance, as well as pathogenesis of obesity. These findings suggest that P2Y2R activation during inflammatory responses increase insulin resistance, affecting glucose metabolism in a negative way. A factor that plays an important role in inflammation and glucose metabolism is sex. Females have lower fasting glucose levels and are able to metabolize glucose faster than males. During inflammation, females have a more robust innate immunity response compared to males. In order to investigate the compounding effects of sex, inflammation and P2Y2R on glucose metabolism, we subjected mice to glucose tolerance testing to see how well they metabolized sugar in the presence of inflammation. Our findings show that LPS treated mice had lower blood glucose. However, P2Y2R knockout affected blood glucose in inflamed male animals, but not in females. This study demonstrates a need to consider sex when designing studies or treatments for controlling blood glucose levels during chronic or acute inflammation.

### **9. Role of P2Y2 Receptor in Modulation of Blood Glucose**

Derrick Marshall, Zach Heick, Dana James, Sofia Orlando, Tai Le, Randi Ulbricht; Jianjie Wang  
Faculty Advisor: Jianjie Wang

This study is focused on the role of P2Y2R on blood glucose in inflammation. Hyperglycemia is linked to poor prognosis in critically ill patients with sepsis or bacterial infections. We used lipopolysaccharide (LPS)-induced inflammation in murine model, wild type (WT) and knockout (KO) of P2Y2R, female mice to study the role of P2Y2R in the regulation of blood glucose. We found fasting glucose levels did

not change in KO mice compared to WT mice in the absence and presence of UTP (10<sup>-4</sup> M). When given LPS (2mg/kg) and 10<sup>-4</sup>M UTP the fasting glucose levels were lower for both WT (87.1± 6.1, n=8, P<0.05) and KO (90.3 ± 5.3, n=8, P<0.05) mice compared to corresponding saline groups (114.0± 6.4, n=6 for WT; 105.6± 2.9, n=6 for KO mice). In glucose tolerance test (GTT), the basal glucose tolerance did not change in KO mice relative to WT mice over 90 minutes. When treated with UTP only, glucose tolerance was impaired in KO mice relative to saline group (P<0.05). GTT assay revealed blood glucose levels were lower for both WT and KO mice challenged with LPS+UTP compared to their counterpart saline groups. The findings demonstrate that P2Y2R is not involved in the regulation of fasting glucose nor glucose tolerance.

### **10. Influence of Lipopolysaccharide on Blood Glucose**

Gabrielle Ramos, Jianjie Wang  
Faculty Advisor: Jianjie Wang

Glucose metabolism is mediated by a complex network of pathways in the blood, liver, and tissues that are all regulated by insulin. Modifications of glucose metabolism can result from varying concentrations of insulin secreted from the pancreas, hinderance of glucose uptake by the skeletal muscle and adipose tissues, and altered glucose production by the liver. Endotoxin, lipopolysaccharide (LPS), is a cell wall component in gram-negative bacteria. LPS can induce insulin resistance and hyperglycemia in humans by increasing MCP-1 release and hindering glucose transport. LPS has been demonstrated to induce release of ATP and UDP from macrophages, activating purinergic receptors via an autocrine mechanism. UDP activates the P2Y6 receptor and induces MCP-1 release. Other evidence shows that ATP stimulates P2X7 receptor to decrease insulin signaling through induction of inflammatory cytokines, such as IL-6. In contrast, some evidence shows that hypoglycemia in mice is induced by LPS through the TLR4 pathway in the liver by inhibiting glucose synthesis. Based on the literature, we conclude that the effect

of endotoxin LPS on blood glucose level is species- and tissue-dependent.

## **COMMUNICATION SCIENCES AND DISORDERS**

### **11. Efficacy of Manual Communication for Children With or Without a Hearing Loss: Perspectives of Teachers and Parents in the Home and School Context**

Kinsley Block

Faculty Advisor: Christopher Craig

Teachers of young students intermittently use manual communication (starting in kindergarten) to promote language development (DiCarlo et al., 2001). While this has been shown to work effectively with Deaf and hard-of-hearing students, there is a need to know more about the use of this approach in the home and school setting from the perspectives of both teachers and parents. The following qualitative study was designed to get an insight from teachers and parents on their child's language development when exposed to a manual communication. The results concluded that the use of a manual communication can be beneficial as a visual tool, in social interactions, or at future jobs.

### **12. Factors Influencing the Early Literacy Development of Children Who are d/Deaf or Hard of Hearing**

Jacquelyn Evans

Faculty Advisor: Christopher Craig

A review of the professional literature on the literacy level of those with significant hearing impairments reveals generally low attainment of reading proficiencies in the primary grades. For that, there is a need for models to facilitate a foundation of future success in reading for this population. The purpose of the study was to better understand models for use in classrooms and in the homes of children who are d/Deaf or Hard of Hearing to lay the foundation for future success in reading. Findings of the present study suggest that there is a lack of consistency of the use of curricular materials

for this population. The findings point to differences in resources among larger and smaller school districts, as well as point to activities that could be used in the home to support literacy development.

### **13. A Study of the Vestibular System Among Children Who are Deaf and Hard of Hearing: Practical Implications and Interventions**

Michelle Fainter

Faculty Advisor: Christopher Craig

The professional literature provides an overview of the studies of the impact of hearing loss (HL) and the relationship to balance or vestibular impairments. Generally, these studies analyze HL in terms of degree of loss, use of hearing aids, and cochlear implants (CI). While there still remain gaps in the research on the impact of HL on the vestibular system, there is even a greater need to understand the practical implications when teaching DHH students in a classroom or school setting. The purpose of this qualitative study was to describe the current practices for working with DHH students in educational settings with respect to interventions or modifications to address associated vestibular or balance impairments. This project illustrates how factors such as age, comorbidly, and development impact the vestibular system among children.

### **14. Social Skills Intervention for Children who are d/Deaf or Hard of Hearing: The Impact of Communication Modality and Degree of Hearing Loss**

Kyra Jordan

Faculty Advisor: Christopher Craig

Social skill development is an important piece of overall development that leads to the ability to communicate, regulate emotions, and form relationships with other people (Nair & Fahimirad, 2019). Due to factors including, but not limited to, communication/language barriers, and cultural differences, d/Deaf and Hard of Hearing students often do not have the same opportunities for social skill development as their hearing peers (Cawthorn et al., 2018). The present study sought to understand

the social skill interventions utilized for d/Deaf and Hard of Hearing students, as well as the degree to which communication modality and degree of hearing loss tend to be determinate factors in this selection. The results of a short survey revealed that professionals considered communication modality an important consideration when selecting a social skill intervention, while also being split on whether or not degree of hearing loss was an important consideration. All respondents agreed, however, that considering the needs of each individual child was a key factor in selecting a social skill intervention method or methods.

### **15. A Longitudinal Study of Code-Switching in English-Instructed Spanish-English Bilingual Children**

Molly Gasior, Lindsey Hiebert

Faculty Advisor: Lindsey Hiebert

Bilingual individuals are a growing population in the U.S., and these individuals may code-switch. Current literature has inconsistencies regarding code-switching, its change over time, and its potential relationship to language loss. This study will track the change in code-switching in English and Spanish narrative retell language samples in English-instructed bilingual children across 6 semesters. Thirty-seven Spanish-English bilingual preschoolers provided narrative samples. Code-switching (non-target language words) was marked to analyze percentage of code-switched words over time. Paired sample t-tests and effect sizes estimated in each language revealed non-significant changes and small effect sizes. Code-switching in English decreased after the first year. Code-switching in Spanish varied across waves. Although participants did not experience significant change in code-switching within each language, percentage of code-switching vastly differed between languages. Systematic input of English in school may have influenced a shift from more Spanish use to more English.

### **16. Tips for Successful Grant Writing in Missouri**

Savannah Gomez, Mary Catherine White, Lindsey Hiebert

Faculty Advisor: Lindsey Hiebert

**Purpose:** For speech-language pathologists, grant writing is not covered at the collegiate level, yet it is a skill that is important. To help them apply for grants and avoid concerns the following questions were asked: “What does research/current literature say are important components for composing a grant?” and “What are available grants in Missouri/Southwest Region of Missouri?”

**Method:** The terms “grant writing,” “speech therapy grants,” and “how to write grants” were searched on various electronic databases (e.g., Google Scholar, PubMed).

**Results:** The literature search yielded seventeen citations and eight met eligibility criteria for an analysis of synchronous key components to be included for successful grant writing. The final analysis resulted in twelve key components for grant writing that were shared. Fourteen resources specific to grant access and Missouri grants were provided. Of the fourteen, four were on federal grants, six were local and/or state grants, and four on miscellaneous resources.

**Conclusion:** Out of the twelve key components identified, four key components were shared by four out of the eight citations. A total of fourteen resources were provided on federal, state, and local grants.

### **17. Inflectional Morphemes and Complex Verb Forms on Language Attrition in Bilingual Spanish-English Children**

Niki King, Camryn Deke, Lindsey Hiebert

Faculty Advisor: Lindsey Hiebert

Research has shown that children in bilingual environments may experience some amount of language attrition. Gender agreement, verb morphology, and syntax have been identified as being vulnerable to attrition. Verb construal differences have been found to be greatest between Spanish-English speakers. The purpose of this study is to investigate the effects complex verb forms have

on the rate of Spanish growth or attrition and to evaluate the relationship between various Spanish grammatical markers and language attrition in bilingual children. Participants consisted of 14 typically developing, Spanish-English bilingual preschoolers enrolled in an English immersion school. Across 4 academic semesters, Spanish narrative retell language samples were collected and then coded to identify grammatical errors such as gender agreement and number of complex verb forms used including verb correct and incorrect, and future and past tense. All language samples were recorded, transcribed, and coded by trained bilingual research assistants using Systematic Analysis of Language Transcripts software. Preliminary analyses show that there was an increase in errors of inflectional morphemes in Spanish throughout the progression of the study.

### **18. The Predicted Effect of a Parent-Led, Science-Based Preschool Intervention Program on Tier 2 Vocabulary: A Pilot Study**

Molly Shannon, Karissa Massey, Lindsey Hiebert  
Faculty Advisor: Lindsey Hiebert

The present study will investigate the potential of a science-based preschool intervention program to increase children’s use and understanding of higher-level vocabulary. Previous research has shown that parent training and parent-led interventions can improve the quality of language input for children. Science-based activities are also useful for language growth and academic readiness. These factors were combined to develop a program to improve the language skills of at-risk, bilingual preschool children. The program intends to target vocabulary growth through the PEEP Family Science App. Tier 2 vocabulary was chosen as a valid target based on research detailing the correlation between vocabulary and language outcomes. It will consist of one group of parent-child dyads (n = 16) with children ages 4;0-5;0. Parents will be trained once a week for four weeks and observed completing PEEP activities bi-weekly. The training will be designed to increase parental use and elicitation of higher-level vocabulary, while PEEP activities will provide opportunities to implement these skills. Researchers

hypothesize that through these measures use and understanding of tier 2 vocabulary will increase for both the children and their parents.

### **19. Parents Who Have Had Negative IEP Experiences: A Qualitative Analysis**

Anne Baker, Kozlowski, Alana

Faculty Advisor: Alana Mantie-Kozlowski

Individual Education Plan (IEP) meetings bring together professionals and parents who ideally collaborate on generating a specialized plan that will help the child meet their individual education-related needs (IDEA, 2019). Parent dissatisfaction with the process has been reported. This study sought to learn more of the experiences of parents who characterized their meeting as negative, in order to better understand how to create an optimal experience for the child's support system. Interviews were conducted with three mothers of children who reported a negative experience. Themes collected from the interviews reflected several aspects of the IEP, including a lack of information about the process, and poor cooperation with team members in the parent experience; inappropriate language and misguided focus within the written content; and dissatisfaction with the IEP team's performance. All participants expressed that their experience did not reflect the idea that parents are key members of the team. Recommendations will be discussed based on findings.

### **20. CSD Clinical Supervisors' Perceptions of the Value of Student Feedback**

Alye Darter, Lauren Jones, Alana Mantie-Kozlowski

Faculty Advisor: Alana Mantie-Kozlowski

Graduate students in Audiology and Speech Language Pathology (SLP) programs at MSU are asked to provide clinical supervisors with feedback about their performance in the role of clinical mentor and educator. This role for students is often unique. While there is a great deal of literature devoted to training clinical supervisors on how to provide sensitive and constructive feedback to their students, the reverse is not the case. The primary

objective of this project was to collect information on clinical supervisors' perceptions of the value of the feedback they receive. The secondary objectives was to determine strategies that can be implemented to strengthen student feedback collection processes for overall improved program function.

### **21. Utilizing Consumer Feedback for Programmatic Change: A Comparison of MSU SLP Practice with "Best Practice"**

Jenna Eisterhold

Faculty Advisor: Alana Mantie-Kozlowski

Consumer feedback can provide organizations with a wealth of information for service improvement. While "university-student-as-consumer" is controversial, this study accepts that students' perspectives may add insight into how a university program may be strengthened. However, the timing, probes, and buy-in of the process may influence the quality of feedback students provide. This study reviews current opportunities graduate MSU Speech-Language Pathology (SLP) students have to offer constructive feedback. These are compared to "best practice" methods from peer-reviewed literature. Recommendations follow for how to enhance the timing, frequency and quality of feedback to support continuous programmatic improvements to support student development in SLP at MSU.

### **\*22. Mental Health Initiative**

Madison Bay, Katelyn Rogers

Faculty Advisor: Sarah Lockenvitz

The purpose of this study was to examine the effects mental health-related events on campus have on overall improvement in mental health of college students. This project focused on undergraduate and graduate students at Missouri State University who participated in mental health sessions and workshops that built awareness and provided strategies for improving student mental health. Students were administered a pre and post survey to assess effectiveness of the workshops and sessions. In attendance were 35 participants (aged 18-24) with

a majority being female (26) and seniors at the college level. According to post-survey results, the mental health events yielded an improvement in mental health for the majority of students. All participants reported a desire to attend future events, if offered. Findings support that on campus mental health events benefit student mental health status and knowledge of resources.

### **\*23. The Relationship Between Phonological Awareness on Phonetic Transcription Training**

Morgan Ladyman, Katie Dankelson  
Faculty Advisor: Sarah Lockenvitz

In this study, an online survey was given to undergraduate students studying Communication Sciences and Disorders at Missouri State University, first-year graduate students studying speech-language pathology at Missouri State University, and professional speech-language pathologists in the Springfield/Branson area to gain knowledge on phonetic transcription training backgrounds and to assess phonological awareness skills. We predicted professionals within the field of speech-language pathology with more training in phonetic transcription would score higher compared to graduate and undergraduate students. The online survey consisted of tasks including segmenting, blending, deleting, and substituting sounds, counting sounds, and matching sounds with International Phonetic Alphabet symbols. The results of our study showed a difference between the groups, suggesting that the training in phonetic transcription increased the person's phonological awareness skills. Professional speech-language pathologists in the field scored with the highest average of 94.2%, indicating the importance of continuing education for speech-language pathologists in the field to maintain phonological awareness skills.

### **\*24. Resource Development for Phonetics Course and Transcription Competency**

Tara Long, Hannah Modzinski  
Faculty Advisor: Sarah Lockenvitz

Understanding phonetics and phonetic transcription is a vital skill in the field of speech-language pathology. Both phonetics and phonetic transcription are crucial for accurate assessment, diagnosis, and treatment of individuals with communication disorders. Because of its importance, speech-language pathology graduate students are required to pass a transcription competency during their graduate career. The purpose of this research project is to develop resources to aid graduate students in their development of transcription skills and completing the required transcription competency. Resources include phonetics activities inspired by previous literature that were created to aid in thinking critically about how each sound is specifically articulated. Phonetic transcription videos were developed to practice transcribing how others produce sounds. In these videos, children with and without speech errors produce words and phrases, which were developed using a combination of phonetically balanced as well as common words and phrases, to incorporate authentic material for transcription.

### **\*25. Understanding the Stigma Surrounding Motor Speech Disorders and the Need for Self-Advocacy**

Peyton Price, Laynie Oehlschlager  
Faculty Advisor: Sarah Lockenvitz

The purpose of this study is to determine what stigmas patients with motor speech disorders (e.g., apraxia and/or dysarthria) are facing and how self-advocacy can help. After referencing other studies on stigma surrounding motor speech disorders, the highest mentioned commonalities amongst them were collected and used as a basis for this research. These commonalities included isolation, withdrawal, and alienation. In order to apply that to our research, we created a survey to determine which of the common issues they have personally faced and which of the potential self-advocacy solutions they believe would be helpful for them and others with this diagnosis in the future. The results of this survey provided a better idea of client perceptions of the stigma surrounding their diagnoses and ways in



which self-advocacy tools including public education, clinician support, and education of counselors could be used to ease the burden of these stigmas for individuals in this population.

### KINESIOLOGY

#### **26. What is the Relationship Between Physical Activity and Obesity in Autistic Children?**

Cody Mullins

Faculty Advisor: Rebecca Woodard

Research has found autistic children to be 40% more likely to be obese compared to their neurotypical (NT) peers. Reduced physical activity (PA) is thought to be a contributing factor to the increased prevalence of obesity in autistic children. This will be the first study to investigate the PA behaviors of autistic children during an adapted physical education (APE) class using accelerometry. The purpose of this study is to examine the PA of autistic children and determine the relationship between PA and obesity. Participants were recruited from a local autism resource center and participate in a once-weekly APE class at a large Midwest university. PA will be measured by wearing an accelerometer during the one-hour visit. Height and weight information will be gathered through direct measurement. A correlation analysis will be used to determine the relationship between PA and BMI score. A simple linear regression analysis will be used to determine the predictability of BMI score based on PA. Results of this study will provide much needed insight into the relationship of PA and obesity in autistic children, as well as provide information on the efficacy of APE classes for autistic children.

### NURSING

#### **27. Implementation of an Evidence-based Quality of Life Assessment Tool Among Community Hospice Patients**

Malayla Bradford, Rita Million

Faculty Advisor: Rita Million

Purpose: QOL is not routinely measured in practice. This quality improvement (QI) study implemented the Missoula-Vitas Quality of Life Index-R (MVQOLI-R) among hospice patients to assist the interdisciplinary team (IDT). Method: An IRB approved quasi-experimental QI project was implemented in three community-based hospice programs. Pre-/post questionnaires and implementation surveys were administered to the IDT with educational sessions being completed prior to administering the MVQOLI-R via telephone with patients the first week of admission and two weeks later for reassessment over a three-month period. JASP was used for statistical analysis. Results: IDT educational attendance was 75.86% (n=22). Paired t-test identified a significant increase ( $p < 0.001$ ) in IDT's knowledge of QOL assessment and a significant increase ( $p = 0.010$ ) in the IDT's attitudes toward QOL assessment helping them complete their jobs. Over 12 weeks, 5% of hospice patients (n=4) were assessed with global QOL scores decreasing slightly ( $M=18.85$ ,  $SD = 6.31$ ;  $M=17.625$ ,  $SD = 6.183$ ). Conclusion: Education of the IDT improved QOL assessment knowledge. Despite low participation, QOL assessment should be routinely performed in practice with future studies needed.

#### **28. Implementation of an Evidence-Based Cultural Competence Protocol for Inpatient Nurses**

Brittany Lanham, Dr. Melissa Penkalski, DNP, APRN, CPNP-PC, AE-C

Faculty Advisor: Melissa Penkalski

Introduction: Cultural competence (CC) is a required component of quality, equitable, and evidence-based (EB) healthcare. There is a need for CC protocols within hospital settings to promote equitable care delivery. Project goals included improved CC awareness, knowledge, and practices, CC self-evaluation, and increased use of translation services among nurses. Methodology: An IRB-approved QI project was implemented with a sample size of 18 inpatient nurses at an acute care hospital. A quasi-experimental study design was utilized, and outcome measures were performed through analysis

of pre-post surveys. Statistical analyses included reliability analyses, paired sample t-testing, and correlations.

Results: Analyses revealed significant differences in subjects' reported CC skills ( $p=.010$ ), perception of organizational support ( $p = .003$ ), and use of cultural resources ( $p=.028$ ) following implementation. The use of translation services demonstrated a slight, but overall increase. Discussion: Implementation of a CC protocol effectively improves CC skills, knowledge, and use of EB guidelines among nurses. Future protocol expansion with larger sample sizes would be beneficial to further support the impact and transferability of the protocol.

### OCCUPATIONAL THERAPY

#### **29. Fieldwork Educators' Use of Therapeutic Use of Self: Relationships with Level II Occupational Therapy Students**

Brooke Carter, Taylor Cissell, Autumn Garvey,  
Lacey Godfrey  
Faculty Advisor: Tara Boehne

Objective. Therapeutic Use of Self (TOS) plays a key role in the relationship between an occupational therapy fieldwork educator and their Level II student.

Methods. This relationship was explored through a Qualtrics survey completed by fieldwork educators meeting inclusion criteria. Researchers used snowball sampling to gather data through quantitative and free-response questions.

Results. Participants reported confidence in using the six therapeutic modes. Results were mixed in respondents' ability to recognize and manage interpersonal events that occur with students. Four themes on the meaning of TOS emerged: 1) building rapport, 2) building therapeutic relationships, 3) adapting to needs, and 4) using personal skills to progress through therapy. Conclusion. Although participants reported confidence in their abilities, the findings suggest that more attention needs to be given to the therapeutic relationship and that there is a need for more education and training of TOS.

#### **30. Gentle Movement Therapy: A Therapeutic Tool for Infants Experiencing Withdrawal Symptoms**

Hannah Cantrell, Mallory Harper, Katie Parsons,  
Kyra Treible  
Faculty Advisor: Ashlea Cardin

The opioid epidemic has caused a rise in infants diagnosed with Neonatal Abstinence Syndrome (NAS) at birth. NAS results in withdrawal symptoms that disrupt an infant's suck organization. The purpose of this study was to determine if Gentle Movement Therapy (GMT), a vestibular-based sensory intervention, was an effective treatment to increase non-nutritive and nutritive suck organization in infants with NAS. To compare responses across treatment conditions (horizontal rocking, gentle bouncing, holding still) within a subject, an A1-B-A2-C repeated measures design was used. Descriptive statistics were used to analyze data collected from two participants using the nFant® Feeding Solution System. Visual analysis of line graphs showed positive effects following horizontal rocking for Participant One and gentle bouncing for Participant Two. These findings add to the discussion that vestibular-based sensory interventions could be used by occupational therapists to address suck organization.

#### **31. Which Variables Influence Length of Stay (LOS) and Time-to-Full Oral Feeding (TTFF) for Infants in a Level III NICU?**

Ashley McDonald, Emily Kapp, Kallie McWilliams  
Faculty Advisor: Ashlea Cardin

Objective: Occupational therapists help infants learn to feed. Identifying factors that influence length of stay (LOS) and time to full oral feed (TTFF) in the neonatal intensive care unit can inform healthcare professionals involved in feeding.

Methods: Researchers used stratified sampling to conduct a retrospective chart review on infants who met inclusion criteria. University statisticians conducted multiple linear regressions and a Pearson correlation.

Results: Twenty-three charts were reviewed. Of 9 predictor variables, 3 variables that most impacted

LOS were days on high or low flow nasal cannula (HFNC or LFNC) and gestational age (GA). Four variables that most impacted TTFE were levels of respiratory support (days on room air, HFNC, or LFNC) and GA. LOS and TTFE ( $r = .57$ ,  $p = .004$ ) were positively correlated.

Conclusion: Pilot study generated initial data for continuation in phase two. Occupational therapists may use data to inform feeding plans and potentially influence LOS and TTFE.

### **32. Feeding in the Neonatal Intensive Care Unit**

Logan Meyr, Molly Korte, Gerrit Montgomery  
Faculty Advisor: Ashlea Cardin

**Problem:** Feeding is a complex occupation for infants admitted to the neonatal intensive care unit (NICU). Researchers sought to understand the lived experience of medical professionals helping infants learn to feed.

**Aims:** Explore healthcare professionals' perspectives on roles, feeding culture, and skillful feeding using focus groups.

**Participants:** COVID barriers limited group participation; thus, researchers concentrated on refining focus group questions through targeted conversations with interdisciplinary NICU content experts.

**Methods:** Researchers conducted two conference calls. Participants gave feedback on the content and tone of the focus group questions.

**Findings:** Researchers identified seven points for refinement and modified focus group questions for clarity.

**Implications:** Stakeholder-informed focus group questions can increase participant engagement and investment, thus strengthening the authenticity of findings. Future completion of this study will allow for a better understanding of roles, feeding culture, and skillful feeding across disciplines in the NICU.

### **33. Exploring Opportunities for Occupational Therapy in an Amish Schoolhouse Through a Culturally Sensitive Approach: A Continuation Study**

Hailee Pedersen, Maysa Mansfield, Sophia Thomas

Faculty Advisor: Ashlea Cardin

In 2020, occupational therapy (OT) students served in a consultative role for an Amish community by developing an evidence-based teaching guidebook to promote student occupational performance in Amish schoolhouses. In 2021, the aim was to continue guidebook development while expanding OT student understanding of cultural humility. Existing literature was reviewed to become informed on the community's beliefs and values. Using community feedback, researchers developed additions to the previous guidebook. To afford the community an extended guidebook trial, mock survey data was analyzed in Fall 2021 to meet Master's project timelines. Using descriptive statistics, teachers reported the book was useful and helpful in the community. The mock data also indicated content gaps, but teachers had an overall positive impression. Current limitations of this project include the small sample size that limits transferability and generalizability, as well as the use of mock data. This research shows the potential effectiveness of OT in a consultative role serving marginalized communities.

### **34. Impact of Lack of Access to Early Intervention Therapy Services: A Scoping Review**

Gabriel Purdy, Madeline Blunier, Keri Walter, Meghan Zengel

Faculty Advisor: Sapna Chakraborty

**Objective:** Early intervention (EI) services refer to therapy services provided to children aged 0-3 to address developmental, cognitive, or physical delays. The purpose of this review was to identify the barriers to receipt of EI and the long-term impacts of limited access to EI for the child, the family, and the community.

**Methods:** PRISMA-ScR guidelines were used to identify relevant literature that met inclusion criteria. Data were analyzed, organized into themes, and triangulated between researchers.

**Results:** Four themes emerged from the data regarding EI: 1) lack of access for certain groups, 2)

identifiable barriers, 3) effects of lack of access, and 4) importance of occupational therapy (OT) in EI. Conclusions: Personal, familial, and systemic factors can impact receipt of EI services. Policy changes in the eligibility, referral, and screening processes may improve participation in EI. Further research is needed to identify the long-term effects of lack of access to EI.

### **35. The Effect of Use of an Adapted Guitar on Post-Stroke Rehabilitation**

Grace Reeves, Kylee Kuecker, Ellie Lane Murphy, Myles Stafford  
Faculty Advisor: Traci Garrison

**Objective:** Examine the effects of a novel adapted guitar intervention compared to current best practice for post-stroke rehabilitation.

**Methods:** Researchers planned to conduct a randomized controlled trial with 20 adults with hemiparesis to assess arm function, motivation, quality of life, and practice time. Due to COVID-19, researchers used mock data for the Action Research Arm Test (ARAT) and Cognitive Linguistic Quick Test (CLQT). Data collection of other outcome measures did not occur.

**Results:** A 2 x 2 mixed ANOVA found a statistically significant difference between ARAT scores and time ( $p < .001$ ). A Pearson  $r$  correlation found a positive and significant association between ARAT post-test scores and CLQT scores ( $p = .005$ ).

**Conclusion:** Based on mock data analysis, adapted guitar use did not improve ARAT scores.

Participants with higher ARAT post-test scores tended to have higher CLQT scores. Future research will determine if the adapted guitar is a useful post-stroke intervention.

## **PHYSICAL THERAPY**

### **36. The Effects of Wii Fit for the Treatment of Urinary Incontinence**

Samantha Lindsley, Katherine Wolf, Charles Adams, Kate Foster  
Faculty Advisor: Patricia Cahoj

**Purpose:** This study was used to determine if virtual reality is an effective intervention to improve symptoms and frequency of urinary incontinence (UI).

**Material and Methods:** One participant had symptoms of UI for 23 years. Exercises were performed while seated on the Wii Fit® balance board. Three specific balance games were used totaling thirty minutes, three times a week for six weeks. The International Consultation on Incontinence Questionnaire Urinary Incontinence-Short Form (ICIQ-UI SF), International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB), and King's Health Questionnaire (KHQ), were scored for pre- and post-testing to assess the impact on quality of life. **Results:** Although use of the Wii Fit® as a form of biofeedback for treatment of UI showed minimal improvements objectively, subjectively the participant reported increased awareness which correlated to improved quality of life.

**Conclusion:** Only small improvements in post-test measures could be due to the minimal UI symptoms experienced initially. Future studies with participants who experience more leakage are indicated to determine if this would be an effective treatment option for UI.

### **37. Physical Therapy Treatment for Post-COVID-19 Syndrome: A Systematic Review**

Shannon Wagner, Jon Arconati, Logan Lynch, Edyn Tarkany  
Faculty Advisor: Patricia Cahoj

#### **Introduction**

Post-COVID-19 Syndrome (PCS) occurs in 10-14% of those positive for COVID-19. Common symptoms include fatigue, myalgia, and impaired cognition. The literature supports functional improvements with physical therapy, but patients are failing to return to norms and their prior levels of function. In this systematic review, we seek to determine the best physical therapy treatment recommendations for adult patients with PCS.

#### **Methods**

A systematic review of Medline and CINAL was conducted. Three hundred and sixty-nine articles

were found. After an abstract screen and full text screen, 13 articles were included in the review.

### Results

In the 13 articles that were included, aerobic and resistance training were most often recommended. Breathing exercises, functional training, and energy conservation techniques were also suggested.

### Conclusion

PCS impairments may be due to cardiovascular, pulmonary, and/or immunological dysfunction. To appropriately treat patients with PCS, one must treat the primary impairment. More research is needed on unique physical therapy treatment protocols for the variety of PCS presentations.

### **38. Conservative Management of Posterolateral Rotary Instability of the Knee: A Systematic Review**

Maame Abena Agyeman-Prempeh, Megan Shook, Don Tufarelli, Jeanne Cook, James Hackney, Scott Wallentine, Andrew Ward  
Faculty Advisor: Jeanne Cook

### Objective

To determine effective conservative treatments in patients with grades one and two posterolateral rotary instability of the knee (PLRI).

### Design

Systematic review

### Literature Search

EBSCOhost, PubMed, Cochrane Library, and Google Scholar were searched for studies evaluating conservative treatments and outcomes in patients with PLRI.

### Selection Criteria

Two reviewers assessed studies for inclusion and quality. We included studies in which the injury was grade one or two, without surgical intervention on PLC structures. Animal studies, those older than 20 years, and lower than level III evidence were excluded.

### Data Synthesis

Available data was synthesized via meta-analysis where possible; data that could not be pooled was synthesized qualitatively. Interpretation was guided by the Grading of Recommendations Assessment.

### Results

Four studies were identified. Moderate credibility and low certainty evidence indicated that certain exercises and bracing can be used to conservatively treat grades I and II PLC injuries.

### Conclusion

Conservative management may be effective in the treatment of PLRI of the knee. However, further research is needed to establish the effectiveness of the use of non-surgical physical therapy interventions

### **39. Effectiveness of Eccentric Nordic Hamstring Exercise in Preventing Hamstring Strains Among Rugby and Soccer Athletes: A Systematic Review**

Jackson Dang, Bret Jaegers  
Faculty Advisor: Jeanne Cook

Abstract: Hamstring strain injury (HSI) is common in international athletic competitions (11.4%) and represents 6% to 12% of injuries in rugby players. Background: This systematic review examined eccentric Nordic hamstring exercise in preventing hamstring strain injuries among rugby and soccer athletes.

Methods: Searches were conducted using JSTOR, Nexis Uni, Project Muse, and SIRS Researcher. Keywords were Nordic leg curl OR hamstring eccentric exercise OR hamstring injury prevention programs OR bodyweight hamstring curl OR glute-ham curl. The timeline included studies published from May 2015 to October 2021. The initial search resulted in 4418 articles which were filtered to 6 articles that met the inclusion criteria.

Results: HSI is multifactorial and difficult to predict. Previous injury increases HSI rate. NH exercise alone or in combination with injury prevention programs is effective reducing HSI rate. NH exercises have demonstrated reduced risk of HSIs injury in rugby and soccer players.

Conclusion: Eccentric hamstring strength was not a consistent measurement parameter for preventing HSIs. NH exercise could be used to reduce muscular imbalance and increase eccentric strength, but additional research is needed.

### **40. The Impact of Physical Activity on Depression in Children Ages 6-12: A Systematic Review**

Kylee Study

Faculty Advisor: Jeanne Cook

**Context:** Few studies have been completed to determine the impact of physical activity on depression in children, especially in children ages 6 to 12 years old.

**Objective:** To determine the impact of physical activity on depression in children ages 6 to 12 years old.

**Data Sources:** Data sources included Medline, APA PsychInfo, and Biological Abstracts.

**Study Selection:** We selected articles in which authors reported the effectiveness of physical activity on the depressive symptoms in children ages 6 to 12 years old from 2016 to July 2021.

**Results:** Two articles and one pilot randomized controlled trial of children ranging from 6 to 12 years old with symptoms of depression were selected for the final systematic review. The articles indicate there is a positive correlation between children's physical activity level and their symptoms of depression.

**Limitations:** There has been little research completed on depression and physical activity in the age group of 6 to 12 years old.

**Conclusions:** These findings indicate that physical activity has a positive impact on depression in children ages 6 to 12 years old.

### **41. Effect of Reduced Stiffness Dance Flooring on Lower Extremity Muscle Recruitment During a Ballet Jump**

Amy Potthast, Gerard Harker, SPT, Jasmine Crawford, SPT, Chris Schlotzhauer, SPT, James Hackney, PT, PhD, Sara Wilcoxon, MFA

Faculty Advisor: James Hackney

Force absorbing flooring may help decrease the risk of dance injuries from jumping and leaping. Our purpose was to investigate the effect of floor stiffness upon muscle activity during the sauté (a ballet hop).

We observed muscle activity with EMG from 18 active dancers (12 women, age  $20.7 \pm 2.2$  years) while they performed repetitive sautés on a low stiffness and a hard floor of bilateral vastus lateralis, medial gastrocnemius, and soleus.

The soleus showed significantly lower maximum intensity under the hard floor condition and the gastrocnemius was almost significantly less. There were no significant differences between floor conditions for any muscle group in average intensity.

With the hard floor, the maximum amount of energy was returned to the dancers' legs, compared to the low stiffness floor which absorbed some of the energy of landing the jump. Therefore, muscles needed to contribute more energy to maintain the same jump amplitude.

The moderate effect sizes for three of the comparisons involving soleus and medial gastrocnemius ( $d > .5$ ) suggest that there may be a clinically significant effect. If the dosage of the offending task is high, then even a small effect could make a difference over a rehearsal or season.

### **42. Within-Subjects Effects of Impacting Vision, Dulling Foot Pressure, and Spinning on Reproducing Trunk Position**

Bryce Brown, Tyler Waterway, Jason Jarrel,

Ashleigh Waltz, James Hackney

Faculty Advisor: James Hackney

Three postural control systems to maintain balance are somatosensory, vestibular, and visual. We compromised the ability of young, healthy adults to use these systems to assist in reproducing the trunk-pelvis sagittal plane angle (our construct for trunk proprioception). We examined the within subjects' effects of participants' ability to reproduce trunk angle given compromised vestibular, somatosensory, and visual input.

Fifteen healthy young adults (Age:  $23.5 \pm 1.54$  years) were tested for their ability to reproduce an original, upright trunk posture after five repetitions of bending the trunk to comfortable end-range in forward, backward, and sideways left and right without sensory constraints (Condition 1), with vision blocked (2), with vision blocked and foot

pressure dulled through standing on a foam block(3), and with the previous conditions plus vestibular impairment achieved through 60 seconds of passive rotation(4).

We compared the difference between the original trunk angle and the post-movement trunk angle. The greatest difference was observed between conditions 1-4, 2-3, 2-4:  $p \leq 0.037$ .

In our study, dulling of the sensation of foot pressure was the single factor that caused the greatest impairment in trunk proprioception.

### **43. Can the Use of Old-Age Simulation Suits Impact Student Perceptions and Empathy Towards Aging Individuals?**

Zuzanna Fraczak, Leah Coughenower, Kristina Hiatt, Rachel Hold, Kaitlynn Preston, Danielle Quesnell, Jaci Wickham, Mercedes Allen, Payton Curley, Alex Keller

Faculty Advisor: Marcia Himes

**Purpose:** To create a geriatric simulation activity exposing first-year Doctor of Physical Therapy students to limitations experienced by older adults. **Methods:** The UCLA Geriatrics Attitudes Scale (UCLAGA) was completed before and immediately following simulation activities. To begin the simulation, a mobility activity was completed sans impairments. Participants then donned a geriatric simulation suit and completed the same mobility course, as well as several Instrumental Activities of Daily Living (IADL) activities (taking medications, etc.).

**Results:** A 2 (Group; males vs females) X 2 (Test; pre vs post) ANOVA revealed significant differences between pretest and post-test scores ( $F(1,37) = 11.44$ ,  $p = .002$ ;  $\eta^2 = .24$ ). There was a significant increase from pretest to post-test (Mean: females 51.80-53.9; males 49.07-51.86).

**Conclusion:** The simulation activity resulted in higher post-simulation scores on the UCLAGA, indicating a more positive attitude toward aging. As participants continue to develop professionally, this activity could promote better engagement and communication with older adults, as well as change student perceptions related to working with the

geriatric population and create a more empathetic practitioner.

### **44. Use of Eccentric Muscle Contraction of the Rotator Cuff to Increase Muscle Activity**

Allison Turner, Kristopher Bird, Dyanmond Parker, Morgan Finley

Faculty Advisor: Sean Newton

Rehabilitation programs for shoulder issues generally focus on isotonic concentric contraction, but recent attention has been given to eccentric exercise. The use of eccentric muscle training for rotator cuff tendinopathy is relatively recent, and the literature is controversial. Jonsson et al., (2006), a pilot study with 9 patients diagnosed with long standing subacromial pain underwent painful (most likely maximal) eccentric muscle training of the supraspinatus and deltoid muscles with five of the nine subjects expressing a greater satisfaction, lower scores of pain on the visual analog score and increased function on the Constant-Murley score after 12 weeks of therapy. Patients with subacromial pain syndrome and decreased external rotation were placed on a 6-week protocol of eccentric training and demonstrated improved strength, pain perception, and function over the general exercise controls (Chaconas et al., 2017). However, the mechanism(s) for this effect is not completely known. Therefore, the following research question is proposed. Can the use of eccentric contraction exercises change the pattern of muscle contraction of lateral shoulder rotators as measured by the Noraxon surface electromyography (sEMG)?

### **45. Normative Values of Multidirectional Perturbations Using the BalanceTutor Treadmill with Healthy Young Adults**

Aubrey Wanamaker, Wyatt Tindall, Kathryn Cheatum, Kennedy Willenborg, Kylie Wilson, Parker Matteson, Haley Schroeder  
Faculty Advisor: Barbara Robinson

Many falls occur after a loss of balance following an unanticipated event such as a slip or trip.

Perturbation treadmill training may improve an individual's ability to control their center of mass. The purpose of this study was to establish normative values for young adults during all directions of perturbation training while standing and walking on the BalanceTutor perturbation treadmill.

Young adults ( $n = 38$ ) between the ages of 20 to 30 years participated in this study.

Participants completed a two-minute warm up walk and were assigned to begin with the static or dynamic perturbation condition. There were six intensity levels during each condition. Directional perturbations were randomized at each level every 15 seconds. Thresholds for balance reactions were determined for five balance reactions.

Summary statistics (normative analyses) of dependent variables were determined for directional perturbations in both conditions. Established normative values for the BalanceTutor may be used to elicit desired balance reactions according to a patient's impairments. For example, a young adult recovering from knee surgery may benefit from treatment that elicits a crossover step in order to return to recreational activities.

### **46. Establishing a Reliable Strength and Range of Motion Procedure for Further Research on Posterior Hip Instability**

Mackenzie Smith, Ali Bennett, SPT, Kate Brncich, SPT, Bayli Griffin, SPT, Eva Ramey, SPT, Taylor Thompson, SPT, Emily Tran, SPT, Taylor Wassi, SPT, Samantha Bollinger, SPT, Jade Hahn, SPT, Nathan Pierce, SPT, Angela Vanderpluym, SPT, Zachary Chapis, SPT, Kirstin Hayes, SPT, Katelynn Schimsa, SPT, Christopher Viehmann, SPT, Julia Roundtree, SPT, Tyler Battles, SPT, Collin Drummond, SPT, Grace Hoemann, SPT, Skylar Law, SPT, Sabrina Wright, SPT, Jacob Storms, SPT  
Faculty Advisor: Andy Ward

**Purpose:** This study assessed the best methods of measuring hip strength and range of motion (ROM) in asymptomatic participants. The motions assessed were hip flexion (HF) strength, HF ROM, and hip internal rotation (IR) ROM. In future studies, these methods will be used to measure symptomatic participants with posterior hip instability (PHI).

**Background:** This ongoing research study's goal is to validate the posterior relocation test in identifying PHI. **Subjects:** There were 10 subjects with a mean age of 24.1 years. Participants were screened for no past/current hip pain. **Methods:** ROM measures were taken through the participant's available range. HF strength was measured with a hand-held dynamometer. Trials were repeated 3 times.

**Analysis:** The results were statistically significant suggesting that the methods are reliable for measuring the dependent variables when performed by a single tester. **Conclusion:** This study demonstrates that the specific methods of measuring HF strength and ROM and hip IR ROM can be performed with small measurement error. Future studies can utilize these methods to assess a change in hip strength or ROM with different intervention techniques.

### **47. Time-of-Day Differences in Dynamic Standing and Walking Postural Control**

Cassidy Crouch, Austin Holland, Abigail Schiltz, Tia Williams, Kylee Dillon, Courtney Lahue, Lauren Shipley, Kate Worley, Elizabeth Williamson  
Faculty Advisor: Elizabeth Williamson

**Purpose:** Balance adjustments depend on the integration of reliable sensory feedback to plan and execute appropriate motor responses (Stokes, 2017). In younger adults, static, standing postural balance is better in the morning than the evening (Gribble et al. 2007). This study examined if these findings apply to dynamic standing and walking balance.

**Methods and Materials:** Participants completed a baseline protocol around mid-day on the Balance Tutor in which they completed a randomized dynamic standing and walking protocol at 2.47mph with increasing amplitude and randomized directions. Each participant then completed one morning and evening session following the same protocol. A series of Mann-Whitney U Tests compared differences in morning and evening performance. The dependent variable was the multistep perturbation threshold.

**Results:** There was no significant difference in dynamic standing or walking between the morning and evening for any direction ( $p < 0.05$ ).



Conclusions: Our findings were inconsistent with Gribble (2007) findings. We found no significant difference between time-of-day with postural stability in standing or during walking. The difference between studies finding is likely due to different testing methods.

### PSYCHOLOGY

#### **48. Teaching Overlapping Life Tasks Remotely Using Components of the LIFE Curriculum**

Maggie Adler, Jordan Belisle, Raymond Burke, Steve Taylor, Dana Paliliunas, Lindsey Dennis  
Faculty Advisor: Jordan Belisle

COVID-19 provided an opportunity to develop technologies that could be used for remote instruction with opportunities for vocational training within and beyond the pandemic. With the use of remote instruction, training can occur in home or in vocational job placements. The LIFE Skills Emergence System (Dixon, 2021) provides an assessment of domestic and vocational skills that can improve independence and quality of life for individuals with disabilities. In a series of two studies, we evaluated a series of programs from the LIFE curriculum with adolescents and young adults with autism using a remote training format. The first series of studies evaluated the training of vocational cleaning skills in a multiple baseline across skills design. The second study replicated the first with a health skill with a new set of participants. Results of both studies demonstrate that remote instruction can efficaciously establish the skills in locations where performance of the skills is likely to take place, moving behavioral instruction into the future with the use of technology in applied settings. Moreover, the procedures illustrate the potential flexibility of the LIFE curriculum.

#### **49. Nutritional Discounting and the Multiple Influences of Price and Delay on Health-Related Choices**

Emily Hermann, Amanda Middleton, Kaitlyn Hui, Kaylee Liley, Ryan Moser, Jordan Belisle, Dana Paliliunas

Faculty Advisor: Jordan Belisle

The present study extended on existing research on health-related choices from a behavioral economic framework as well as research on multiple contextual control (Belisle, Paliliunas, et al., 2018). Participants were presented with a series of hypothetical choices between a more nutritional hamburger meal and a less nutritional hamburger meal. Taste of both options was constant. In a first block of questions, we manipulated the delay or waiting time to receiving the more nutritional meal. Nutrition was expressed in terms of calories, protein, fats, and carbohydrates. Results showed that participants were more likely to select the healthier option with lower delays and that the probability of selecting the less nutritious meal increased as the delay to the healthier meal increased. We then manipulated the price of the healthier option ranging from \$10 to \$50. Selecting the less nutritious meal increased as the price of the healthier option increased. Finally, we evaluated the results using a non-linear multiplicative hyperboloid equation that provided a strong fit for the data compared to other available models. These results support that delay and price are two economical factors that influence health related decision making.

#### **50. Using PEAK Relational Training to Teach Individuals Flexible Relations of Gender**

Lauren Hutchison, Jessica Hinman, Jordan Belisle, Jenna Huskey

Faculty Advisor: Jordan Belisle

Dense and rigid relational networks surrounding gender in adulthood can have profound effects on those who meet certain gendered stereotypes and previous research has shown that children too, have perceptions of gender discrimination (Brown & Bigler, 2004). In this study, appropriate use of gendered pronouns were taught to three participants using the PEAK Relational Training System. A multiple probe design across participants was used with a pre- and post-test measure of a multidimensional scaling (MDS) procedure. PEAK program T-9B COR: Pronouns in a Story was adapted to include images of individuals with

various gender expressions and identities. Results showed that the participant was not able to correctly identify images during baseline, however once training was implemented the participant was able to respond using appropriate pronouns and expression labels as well as derive the correct pronoun given an image. The MDS results showed that the participants changed how they related to the stimuli following training. This study has implications for teaching diversity in a clinical setting as well as the MDS procedure as a measure of generalization and finally, it demonstrates the flexibility of the PEAK curriculum.

### **51. Measuring the Effects of Meditation on Impulsivity Through Various Noise Contexts**

Mamata K C, Jaelyn Compton, Amanda Middleton, Emily Hermann, Kaylee Liley, Jordan Belisle, Dana Paliliunas

Faculty Advisor: Jordan Belisle

Stress can affect a person's health both physically and mentally. Increased rates of stress may lead to higher rates of hypertension, unhealthy habit formation, and even changes within brain structure and connectivity (McEwen, 2008). Meditation has been shown to change brain processes and provide better consistent attentional focus, enhanced sensory processing, and reflective awareness of sensory experience (Kilpatrick, 2011). The purpose of the current study is to identify if feelings of stress and impulsivity due to noise conditions can be decreased following mindfulness meditation. Participants will complete a go/no-go task through a stressful noise context, then will complete the go/no-go task again during a peaceful noise context. Participants will then be randomly placed in a control group or intervention group. The intervention group will receive ten minutes of mindfulness meditation. The participants will complete the go/no-go task in both contexts again. The results of this study will evaluate if meditation serves as tool to reduce impulsivity. If so, people may benefit from incorporating meditation into their day-to-day life to combat the stress they experience from everyday noise conditions.

### **52. The Evaluation of Self-Compassion and Mindfulness Training on Personal and Academic Wellbeing**

Jessica Venegoni, Dana Paliliunas, Jordan Belisle  
Faculty Advisor: Jordan Belisle

University students experience elevated levels of stress and lower levels of wellbeing comparatively (Paliliunas et al., 2018). This study evaluated the efficacy of a series of six self-compassion and mindfulness trainings embedded in undergraduate classes on reported levels of psychological flexibility (AAQ-II and CompACT) and self-compassion (Self Compassion Scales). Activities were roughly ten minutes in length and at-home practice was encouraged. Participants provided weekly social validity ratings related to psychological and academic wellbeing throughout the study. The program was evaluated using a cross-over design, where half of the participants completed the training and the others received study tips. After six weeks, the groups reversed, the initial group received study tips and the other received the training. Results suggested that mindfulness and self-compassion interventions increased the students' overall self-compassion and psychological flexibility. Both groups reported similar levels of academic wellbeing. Only the mindfulness and self-compassion trainings appeared to support psychological wellbeing. These results have implications for supporting flexibility and self-compassion with undergraduate education.

### **53. Relational Frame Theory: An Evaluation of Bias Formation Through Arbitrary Creatures (Arbitraliens)**

Elana Sickman, Jordan Belisle  
Faculty Advisor: Jordan Belisle

Utilizing Relational Frame Theory (RFT) to analyze implicit biases has been a growing area of interest for the field of Applied Behavior Analysis. Relational frames may contribute to implicit biases that operate within nested contingency systems. The present study attempts to explore how self-organization of arbitrary stimuli, pre-existing

relational frames and learning history may attribute to bias. The first phase of the study was a relational training procedure where the participants were divided into two groups and trained that one arbitrary creature was “good” while the other was “bad,” and the other half were trained the flipped creatures better cohered with “good” and “bad.” To examine potential bias formation, this was presented in the context of a hypothetical narrative about the creatures, their planet, and their characteristics. To test the interaction between the story and the features, participants in the second phase of the study were asked to relate 16x16 relations between eight creatures with mixed features and eight adjectives, previously found in Implicit Relational Assessment Procedure (IRAP), Implicit Association Test (IAT) studies. Results show differences in the formation of biased frames as shown within the geospace.

### **54. Self-Compassion and Procrastination in College Students**

Lydia Needy, Emma Sparks, Samantha Woemmel, Cassidy Leighty  
Faculty Advisor: Christie Cathey

Self-compassion is a self-attitude that entails treating oneself with warmth and understanding in challenging times and recognizing that making mistakes is part of being human (Neff, 2003). Past research has shown that self-compassion interventions can enhance student learning and reduce procrastination tendencies (Scent & Boes, 2014). The goal of this pilot study was to examine the relationship between self-compassion and procrastination among MSU students and to identify the extent to which students believe procrastination negatively influences their own lives. One hundred six Introductory Psychology students completed self-compassion and procrastination measures and answered questions about their experiences with procrastination. Consistent with previous research, we found a negative correlation between self-compassion and procrastination ( $r = -.23, p < .005$ ), and students’ responses suggested that they would appreciate and would benefit from a procrastination intervention. We will discuss results in relation to

our plans for designing and implementing a future procrastination intervention.

### **55. The Bullies and the Bullied: Who Do Bullies and Bully-Victims Target in Middle School?**

Abby Holt, Mattis Koch, Cassidy McCann, Ashley Hall, and Dr. Leslie Echols  
Faculty Advisor: Leslie Echols

Bully-victims are individuals who get bullied by others and perpetrate bullying themselves. They suffer from more behavioral and emotional disorders than bullies and victims alone (Schwartz, 2000). In fact, bully-victims are the most dysfunctional group of all youth involved in bullying (Dukes et al., 2009). Previous research has examined the channels bully-victims use (i.e., physical, verbal, relational, cyber) but has not yet examined who the targets of bully-victims are. The purpose of this study was to examine who the targets of bully-victims are and to gain a better understanding of this high-risk group. We hypothesized that bully-victims would be more likely than bullies to target their friends to increase their social status. Participants in our sample consisted of 304 students from a rural middle school in the Midwest who completed a peer nomination protocol as part of a larger study on friendships. Based on peer nominations, there were 24 bullies, 13 victims, and 13 bully-victims in the sample. Contrary to our hypothesis, participants targeted bullies more than their friends. In subsequent analyses, we will examine the association between targets of bullying and the social adjustment of bully-victims.

### **56. The Broad Autism Phenotype and Cross-Modal Recognition of Emotion**

Peyton Brownlee  
Faculty Advisor: Melissa Fallone

The current study explored the relationship between the broad autism phenotype and cross-modal emotion recognition of anger, sadness, and happiness. Students enrolled in psychology courses at Missouri State University ( $N = 83$ ) completed the Broad Autism Phenotype Questionnaire (BAPQ;

Hurley et. al., 2007). Then, participants were presented with 30 trials in which they matched vocal emotional information (sound clip) to facial emotional expressions (photographs) in an online study. Accuracy and response latency were recorded for each matching trial. Participants were categorized into two groups based on BAPQ scores. Participants in the high-scoring group ( $n = 32$ ) exhibit characteristics associated with the broad autism phenotype while participants in the low-scoring group ( $n = 51$ ) do not exhibit characteristics of the broad autism phenotype. Accuracy and latency were examined with 2 (BAPQ group) x 3 (emotion) ANOVAs. There were no significant effects involving BAPQ groups in terms of accuracy. However, a main effect of emotion was found ( $p < .001$ ). Regardless of BAPQ group, participants responded most accurately on the matching trials for anger followed by sadness then happiness.

### **57. Examining Academic Help-Seeking Behaviors**

Lauryn Hall

Faculty Advisor: Melissa Fallone

The following study examines student academic help-seeking behaviors to determine how response speed, perceived competence, convenience, and the associated threat of the help source interact to influence student help-seeking behaviors. Introductory psychology students ( $N=289$ ) completed an online survey. Results indicate students find emailing professors the most helpful and least threatening and significantly prefer this method to asking questions in class, using other professional sources of help, attending office hours ( $p < .001$  for each comparison) and contacting other students ( $p = .033$ ). Students reported avoiding speaking with professors individually and in-class, perceiving these behaviors as the most threatening. However, student intentions to use professor office hours ( $p > .001$ ) and ask questions in class ( $p = .027$ ) increased for a scenario involving a positive office hours experience suggesting positive experiences may influence student face-to-face interactions with their professors. Future research could directly examine the influence of positive interactions with

professors on help-seeking threat to determine if there is an observed increase in student-professor interactions when assistance is needed with coursework.

### **58. Attitudes and Beliefs Toward Visible Self-Injury Scarring**

Jasmine Woods

Faculty Advisor: Melissa Fallone

The present study aimed to investigate general attitudes and beliefs toward self-injury scarring at different levels of severity and visibility (placement). This information was sought in order to contribute to the general knowledge base around nonsuicidal self-injury (NSSI) as well as to assess how mental health stigma impacts specifically those who engage in NSSI. Participants ( $N = 88$ ) for this 2 (severity) x 2 (visibility) between-groups factorial design were randomly assigned to one of four conditions and asked to read a short vignette describing an individual with visible self-injury scarring. Following this, they filled out a survey to assess if they understood the scars were from NSSI behaviors, their current specific emotional reaction to the vignette, and if they had prior experiences/knowledge regarding NSSI. Participants did not express any particular emotions strongly enough to draw any clear conclusions. However, this study does provide a starting point for further developments in reliable research in NSSI and mental health stigma.

### **59. Development and Validation of Implicit Measures for Power Motivation**

Timothy Luke Amadore, Donald Fischer

Faculty Advisor: Donald Fischer

Power motivation, defined as the desire to influence the behavior or emotions of another party to achieve certain goals, has often been measured as a global construct. However, there are emerging measures of power motivation as a multi-dimensional construct. Some have distinguished between personalized and social power (McClelland, 1973). Others posit that power motivation can be further decomposed into

three autonomous constructs: dominance, prestige, and social power (Sussenbach et al., 2019). This research used Implicit Association Test and Stroop Task methods to develop implicit measures for power according to the three-factor model. The construct validity of the implicit measures was evaluated using a multitrait-multimethod (MTMM) design, including explicit measures with a sample of college students (N = 189). The hypothesized CFA model included two method factors (implicit and explicit) and three latent trait factors (dominance, prestige, and social). Results show some support for the convergent and discriminant validity of the measures for the factors in the hypothesized model.

### **60. Validation of an Internet Search Strategies Assessment**

Joseph Wansing

Faculty Advisor: Donald Fischer

The internet has become the go-to place for those seeking information. The strategies that people employ when seeking information differ (Tsai, 2005), and critical thinking is related to these differences (Zhang et al., 2015). Although people use different strategies to find information on the internet, there are virtually no formal, easy to use tools for assessing these differences. Wansing and Wood (2020) developed the Internet Search Strategies Assessment (ISSA) for this purpose. A preliminary study revealed that the scale had four factors as hypothesized, but the measure did not correlate as well as expected with other theoretically related scales. This study used a multitrait-multimethod (MTMM) design with undergraduate college students (N=126) to further explore convergent and discriminant validity evidence for ISSA. A combination of implicit and explicit measures were used. Results showed that there was some convergent validity for two of the factors. However, the other two factors did not correlate well with any of the measures in the study.

### **61. Superhero or Evil Villain: The Role of Parental Supportiveness in Children's Subsequent Personality**

Weston Phipps, Brooklynn Cook, Amber Massey-Abernathy, CaSandra Stanbrough

Faculty Advisor: Amber Massey-Abernathy

While previous research has suggested that all types of parenting might be beneficial when context is accounted for, a large body of literature has shown that warm parenting has the most beneficial outcomes for children (Richman & Mandara, 2013). Additionally, because of the variable role fathers often play, it is even more important to study the outcomes related to their parenting styles (Geary & Flinn, 2001). The current study seeks to investigate relationships between parenting styles and development of children's personality traits, specifically, development of Machiavellianism and conscientiousness. The results suggest that fathers who employ warm parenting styles showed significant effects on the development of children's personality traits. Moderation results showed an enhancing effect that as children's conscientiousness and warm fathers increased, children's Machiavellian personality scores decreased. Children with high warm fathers and high conscientiousness scores had the lowest level of Machiavellian personality scores. It is possible that the child's personality evokes responses from the parent, or that the father impacts both Machiavellian and conscientiousness levels of child. Further research is needed.

### **62. How Does Reactivity to Social Connectedness Affect Personality Traits and Mediate the Relationship Between Trauma and Resilience?**

Emily Schnarr, Amber Massey-Abernathy

Faculty Advisor: Amber Massey-Abernathy

This research seeks to explore the relationship between trauma and resiliency while analyzing how personality traits and reactivity to social connectedness mediates this relationship. The current study was created in order to address several main considerations: (1) Do trauma experiences impact levels of resiliency developed in individuals?

(2) Do certain personality characteristics, specifically extraversion and neuroticism, affect the relationship between traumatic experiences and resiliency? (3) Does an individuals' level of extraversion or neuroticism affect their reactivity to social connectedness? (4) Does reactivity to social connectedness mediate the relationship between trauma and resilience? The findings from the current study could help identify how social connectedness and personality traits can alter the way trauma affects resilience. The outcomes can determine how one's reactivity to social connectedness could be a factor that determines one development of resiliency after a trauma experience. These results can help provide information about protective factors against trauma, as well as help target interventions that include social support for trauma populations.

### **63. Overcoming the Odds: The Effects of the Relationship Between Childhood Adversity, Lifetime Trauma, and Resiliency on Empathy and Conscientiousness**

Victoria West Staples, Dr. Amber Massey-Abernathy

Faculty Advisor: Amber Massey-Abernathy

This research sought to understand the connection between trauma and the development of resiliency while examining the effects of that relationship on empathy and conscientiousness. Specifically, this study was created to answer four main questions: Does early childhood adversity predict later life trauma? Does childhood adversity and cumulative lifetime traumatic experiences impact the development of resiliency and its subconstructs? Is empathy impacted by the relationship between trauma experiences and resiliency, specifically examining the effect on cognitive versus affective empathy? Is conscientiousness impacted by the trauma/resiliency relationship in a curvilinear way? There is a debate in the literature regarding if resilience is developed and strengthened after trauma exposure. The participants' cumulative lifetime trauma and number of adverse childhood experiences were compared to their subsequent total resiliency scores and resiliency subconstructs to determine if traumatic backgrounds are related to the

development of resiliency and its subconstructs. Additionally, physiological and self-report empathetic response and conscientiousness scores were used to determine how traits were impacted by resiliency and trauma.

### **64. Infant Visual Discrimination: Changes in Learning and Visual Shift Rate as a Function of Pretraining Experience**

Katelyn Jones, Lyric S. Arvizu, Chandler Zimmerman, D. Wayne Mitchell

Faculty Advisor: Wayne Mitchell

Four-month-old infants' visual discrimination learning was assessed via an 8-trial synchronous reinforcement task. Infants were assigned randomly to one of three pretraining groups: A Control, Contingency, or Habitual group. Infants in the Contingency group received a simplified visual discrimination task so to acquire reinforcement experience with the discriminative cue (the least salient stimulus component) employed on the subsequent synchronous visual discrimination task. Infants in the Habitual group received 20s of familiarization time with the most salient stimulus components. Infants in the Control group received no pretraining experience. Overall, the Contingency group displayed greater visual attention to the S+ compared to the Habitual and Control groups. The number of shifts (visual comparisons between the S+ and S-) decreased significantly and the number of shifts were proportional to responses to the S+. These findings support the hypotheses that Contingency and Habitual Experience (1) guide and organize perception scanning patterns and (2) increase visual scanning which in turn increases the probability of successful visual discrimination.

### **65. Examining the Relationship Among Measures of College Students' Self-Reported Psychological Well-Being Using Ecological Momentary Assessment**

Madeline Caughron, Chynna Frizell, Breanna Lee, Dana Paliliunas

Faculty Advisor: Dana Paliliunas

This study utilized Ecological Momentary Assessment (EMA) to examine the relationship among participants' reports of well-being, values-driven (i.e. well-being and school-related) behaviors, stress, psychological flexibility, emotional- and self-regulation, and academic performance (as measured by reported GPA). Student participants (N = 52) were recruited using the psychology participation research system. This study involved two components for participants: 1) Following provision of informed consent, participants were given instructions to download the ExpiWell mobile data collection app and access materials. Each day for one week, participants were notified through Expiwell to open and respond to the study questions twice daily. A brief number of questions were presented to the participants, assessing their current stress, psychological well-being, and behavior. 2) At the end of the week period, they were required to complete a one-time series of questionnaires which collected their responses on standard measures of stress and psychological well-being as well as their current GPA. EMA data was aggregated for each participant and statistical analyses were used to examine the relationships among the various dependent variables.

### **66. Evaluating the Influence of Relational Behavior on Climate Discounting of the Point of No Return**

Isabel Donovan, Jenna Huskey, Jaelyn Compton, Mamata K C, Breanna Lee, Dana Paliliunas, Jordan Belisle

Faculty Advisor: Dana Paliliunas

The present study extended on behavioral economic discounting research on public policy preferences related to climate change (Belisle et al., 2021) and relational consumer behavior (Matthews et al., under review). In this study, we presented choices between two policies, A and B, where A included restrictions on high emission behaviors and B imposed no restrictions. Option A carried a delay to the climate point of no return (i.e., point of climate non-recoverability) and Option B ensured a point of no return in 15 years based on current estimates. In

addition, Option A was presented in the color Purple and Option B was presented in the color Pink as arbitrary choice point features. Pretest results established that participants were more likely to select Option A when greater delays to PNR were the result of the restrictive policy. We then conducted a respondent-type relational training procedure to pair pro-climate stimuli with the color Purple and anti-climate stimuli with the color Pink and re-administered the climate discounting task. Results showed lower rates of climate discounting following the relational training. These results have implications for promoting climate policy as we approach non-recoverability.

### **67. Measuring Gender-Related Biases and Evaluating a Defusion Approach to Diminish Bias**

Chynna Frizell, Breanna Lee, Madeline Caughron, Dana Paliliunas

Faculty Advisor: Dana Paliliunas

Gender-related bias is an important area of empirical attention in the United States due to social challenges related to prejudice, stereotyping, and discrimination. The purpose of this study is to evaluate potential bias related to binary and nonbinary gender using a measure of relational responding rooted in Relational Density Theory (RDT; Belisle & Dixon, 2020). Mass and volume of networks in terms of gendered stereotypical relations are assessed to examine binary-gendered stereotypes and to examine relations of nonbinary genders in the context of traditionally masculine and feminine labels. Implicit biases regarding male and female genders have been examined; less research on nonbinary gender biases exist. Using this approach, gender stereotypes are expected to tightly cluster, but the relations may become less dense using an Acceptance and Commitment Therapy (ACT) technique to weaken stereotypical relations that create bias. A defusion procedure was utilized to elaborate relational networks, using an approach adapted from previous research (Belisle, Paliliunas, Dixon, & Speelman, 2018). An empirical investigation measuring the effects of a defusion

procedure on gendered stereotypical relational responding will be reviewed.

### **68. Supporting LGBTQIA+ College Students: Psychological Flexibility and Promoting Verbal Behavior of Support and Inclusion**

Breanna Lee, Chynna Frizell, Madeline Caughron, Dana Paliliunas  
Faculty Advisor: Dana Paliliunas

LGBTQIA+ youth consistently report lower levels of psychological well-being, often as a result of external stressors (Smithies & Byrom, 2018). The degree of available social support from members of local communities, such as students and faculty on a university campus, as well as the implicit biases of those individuals have the potential to influence the experience of LGBTQIA+ students in college, either positively or negatively. First, the relationship between psychological flexibility, self-compassion, and perceived social support reported by LGBTQIA+ college students will be explored. Second, a Relational Density Theory framework will be utilized to explore biases related to sexuality among college student participants and a relational task designed to defuse relations will be evaluated to examine the effectiveness of targeted interventions to reduced implicit biases regarding sexuality. Avenues for behavior analytic approaches to both supporting wellbeing among LGBTQIA+ college students and reducing bias and increasing social support on campuses will be discussed.

### **69. Examining the Effects of a Self-Compassion Intervention on Academic Burnout**

Ryan Moser, Kaitlyn Hui, Jenna Huskey, Isabel Donovan, Breanna Lee, Dana Paliliunas, Jordan Belisle  
Faculty Advisor: Dana Paliliunas

College students are a population high at risk for developing burnout (Caballero & Bresó, 2015). It is proposed that a self-compassion intervention could relieve some of the stressors related to burnout. The current study sought to examine the effects of an Acceptance and Commitment Therapy (ACT)-

consistent self-compassion intervention on experiences of academic burnout in undergraduate students. Participation included a ten-week intervention and three questionnaires administered at Weeks 1, 4, and 10. Questionnaires measured burnout and self-compassion. Weekly quiz scores were collected to measure academic performance. All participants viewed videos pre-recorded by researchers each week and interacted with relevant discussion questions. The experimental group interacted with videos and activities related to self-compassion, while the control group engaged in a study tips intervention. Participants interacting with the self-compassion intervention experienced lower rates of academic burnout and higher quiz scores compared to the control group. Results of this study can provide insight in how universities can prioritize mental health and incorporate brief self-compassion exercises into course content to improve feelings of burnout.

### **70. A Black Feminist Youth Participatory Action Research Photovoice Exploration of Black Girls and College Women**

Whitney Akalugwu, Dr. Ashley Payne, Megan Harty  
Faculty Advisor: Ashley Payne

Utilizing a Black feminist and Black girlhood studies theoretical lens, the purpose of this study is to explore how 9 Black girls (14-17) and 7 women (18-22), who are part of a youth participatory action research (YPAR) mentoring program, Black Girl Talks: Hip Hop, Social Media, and Empowerment, express their gendered racial identities and gendered racial experiences through their participation in a YPAR photovoice program. This qualitative research study utilized three types of data: photovoice photographs, corresponding narratives, and recorded photovoice focus group discussions. Themes are identified utilizing a thematic analysis approach (Saldaña, 2015) through a synthesis of photographs, narratives, and photovoice focus group discussions. Preliminary results from 15 photovoice narratives illuminate 4 themes: (1) experiencing challenges at PWIs: stereotypes, doubts, beauty standards, and gendered racism (2) identifying as



“queens in real life:” identity and empowerment through individuality, culture, confidence, and strength (3) pushing for activism, inclusion, and accountability: creating solutions for predominately white institutions and (4) survival at PWIs: coping mechanisms, motivation, and comfortability.

### **71. Hip Hop, Social Media, and Identity: A Study on Black Girls’ and Women’s Identity**

#### **Development**

Arica Lee-Anderson, Emily Lohrbach, Jenna Morelock, Ashley Payne  
Faculty Advisor: Ashley Payne

The purpose of this study is to explore the role of hip hop and social media culture on the psychosocial development of Black youth and college students involved in an after school program designed for at risk Black girls., the following research questions will be addressed: (1) How does hip-hop influence Black girls’ and women’s social media identities and representation of those identities? (2) How does hip-hop inform how Black girls and women’s navigate their social media spaces? This study is part of a larger, qualitative, youth participatory action research (YPAR) where researchers recruited Black college women mentors (N=6) from a public local university and Black high school mentees (N=8) from a local high school to participate in an 8-week mentoring program focused on the exploration of Black girls and womens’ experiences at PWIs. Preliminary results from 12 pre- and post-program mentor interviews emphasize (3) themes: (1) Hip Hop is the blueprint for social media representation for Black girls and women (2) Hypersexualization and objectification in Hip Hop and social media impacts body image of Black girls and women (3) Using social media platforms to change the narrative of Black girls and women in popular culture.

### **72. Personality and Self-Regulation**

Olivia Baron, Erin Lowder  
Faculty Advisor: CaSandra Stanbrough

The goal of the current study is to determine the relationships between conscientiousness and

abilities to self-regulate body temperature. Self-regulation has been studied for many years, the most notable research being that of the marshmallow experiments done with children, carried out by Mischel et al. (1974). More extensive research concluded having a higher ability of self-regulation correlated to a higher-grade point average, less binge eating and alcohol abuse, more secure attachment, and better interpersonal and social skills (Tangney et al., 2004). Several of these outcomes also overlap with the personality trait of conscientiousness. Baumeister & Tierney (2011) suggested that self-regulation is like a muscle that could be strengthened over time. In the current study, participants completed questionnaires to determine their level of conscientiousness and self-regulation prior to and after a series of temperature regulation training sessions. These sessions consisted of taping a thermometer to their finger and repeating and visualizing the statement “my right hand is warm”. The current study is useful in understanding how increased self-regulation might impact the trait of conscientiousness.

### **73. How Parental Warmth Affects the Physiological and Affective Reactions to Moral Shame**

Lauren Smith, Dr. CaSandra Stanbrough, Dr. Amber Abernathy  
Faculty Advisor: CaSandra Stanbrough

This project explores a connection between parental warmth and physiological as well as affective reactions to moral shame. The study will provide a deeper understanding of why young adults react differently when morally shamed. Participants answered questionnaires regarding their childhood experiences with parental warmth and responded to Kohlberg’s (1981) moral dilemma. After participants completed the questionnaires, the researcher read scripted feedback that shames the participant’s moral identity. Salivary cortisol was collected to identify a physiological response. Positive and negative affect were also measured following moral shaming. Levels of parental responsiveness were examined in relationship to moral shaming using multiple regression. This

research aims to identify causes for certain reactions to moral shame and indicate areas that might improve the atmosphere for discussing moral issues in society.

### **74. Examining the Relationships Between COVID-19, Perceived Organizational Support, Employee Outcomes, Communication, and Intent to Quit**

Whitney Combs

Faculty Advisor: Michelle Visio

This research examines the relationship between COVID-19 and various employee outcomes, organizational communication, perceived organizational support (POS), and intent to quit. A small amount of research has shown that COVID-19, and organizational communication during this time, has negatively impacted employee outcomes. A multitude of research has found that POS has a strong positive relationship with employee outcomes and a negative relationship with intent to quit. This research aims to explore how COVID-19 has affected employee outcomes and to understand the relationship between POS, employee outcomes, communication, and intent to quit in one organization. Employees of the organization were asked to complete an online survey that consisted of measures of these various employee attitudes. Results showed that COVID-19 largely did not affect employee outcomes. The results did show, however, that all employee outcomes and communication were positively correlated with POS, and that intent to quit was negatively correlated with POS. Additionally, communication and most employee outcomes were negatively correlated with intent to quit, with the exception of two types of work engagement.

### **75. Sensory Processing and Broad Autism Phenotype Traits Across Sensory Modalities**

Salma Muslim, Mary Vonarx, Grant Denison, Mykah Doolin, Brennan Cohn, Brooke N. Watson, Carly Yadon

Faculty Advisor: Carly A. Yadon

Sensory processing is a broad term that refers to sensitivity to stimuli (being over or under responsive) or sensory gating, which is how sensory information is prioritized by the brain in terms of inhibiting and orienting to sensory information appropriately (Hurley et al., 2006). Sensory processing is part of the diagnostic criteria for autism spectrum disorder and may be related to autistic traits in the general population. Studies have shown that first-degree relatives of individuals with autism may experience phenotypic similarities of symptoms that are characteristic of ASD. Limited research suggests that differences in sensory processing may be related to autistic traits in the general population (Robertson & Simmons, 2013). The present study aims to replicate past findings and expand upon them using additional sensory scales, including a measure of sensory gating. Broad Autism Phenotype Questionnaire (BAPQ) along with several sensory processing questionnaires were completed by 149 participants and data were collected through SONA. Moderate positive correlations were found between every sensory scale and the BAPQ. Additional analyses and interpretations will be presented.

### **76. The Relationship Between Mindfulness, Empathy, and Openness to Diversity on Discriminatory Behaviors and Psychological Distress**

Brooke N. Watson, Samantha Bumgardner, Ashley Hall, Dr. Carly A. Yadon, Dr. Adena Young-Jones  
Faculty Advisors: Carly A. Yadon, Adena Young-Jones

Racism, prejudice, stereotyping (Rehfeldt & Hayes 2000), and implicit biases (Lueke & Gibson, 2014) negatively affect individuals' physical and mental health. Research has demonstrated the value of mindfulness in reducing negative physical and psychological symptoms (Graham et al., 2012). This study sought to explore the effects of mindfulness on levels of openness to diversity and empathy, as well as the effect on the physiological stress of discrimination to those impacted. Participants (N = 126) completed the M-GUDS, FFMQ, DASS-21, and Questionnaire of Cognitive and Affective

Empathy Scale. A Pearson product-moment correlation explored the relationship between mindfulness and psychological distress and revealed a significant negative correlation,  $r(124) = -.31, p < .001$ . A Moderation analysis examined the effect of cognitive empathy on the relationship between openness to diversity and mindfulness,  $F(1,122) = 4.20, p = .04, 95\% \text{ CI}[0.01, 0.28]$ . These results suggest that cognitive empathy and mindfulness are related to the reduction of symptomology associated with psychological distress and may minimize implicit biases and prejudice.

### **77. The Role of Perceived Advising Support and Psychological Distress on College Students' Resilience**

Samantha Bumgardner, Dr. Adena Young-Jones, Dr. Carly Yadon, Ashley Hall, Brooke Watson  
Faculty Advisor: Adena Young-Jones

The advisor-student relationship is a crucial contributor to students' academic and professional success in college (Ferris et al., 2012). Student success is significantly related to key factors (e.g., advisor accountability, advisor empowerment, student self-efficacy, student study skills, and perceived support) within the advisor-advisee relationship (Young-Jones et al., 2012). Limited research exists exploring the link between academic advising, psychological distress, and resilience. This research sought to better understand the impact of perceived advisor support and psychological distress on resiliency. Participants completed a confidential online survey accessed through the SONA system, linked to Qualtrics. The survey included the Connor-Davidson Resilience Scale (RISC-10), Perceived Advisor Support Scale, Depression/Anxiety/Stress Scale-21 Item (DASS21), and demographic questionnaire. A hierarchical multiple regression was conducted ( $N = 126$ ) and found as a student's perceived advisor support increases and psychological distress decreases, levels of resilience also improve.

### **78. Assessing the Valuations of Eyewitness Outcomes by Legal Actors**

Olivia Parks, Lauryn Hall  
Faculty Advisor: David Zimmerman

We surveyed judges about their valuations of eyewitness lineup outcomes, eyewitness science, and methods of quantifying the utility of identification procedures. The data indicates that although judges consistently view accurate suspect IDs as positive outcomes, they are less likely to view correct rejections as positive. Overall, judges viewed accurate positive identifications about 1.2 times more valuable than accurate lineup rejections, and mistaken identifications of innocent suspects about 4.5 times as negatively as missed identifications of guilty suspects. However, judges positively weighted correct IDs of guilty suspects 1.4 times more heavily than they negatively weighted incorrect IDs of innocent suspects.

### **\*79. Dance Dance Revolution: Demonstrating Flexibility in Dance Utilizing LIFE Skill Emergence System**

Shelby Blecha, Claire Zuch, Jordan Belisle, Becky Barron, Mark Dixon  
Faculty Advisor: Jordan Belisle

Behavior analysis programs based exclusively on discrete trial training arrangements and with relatively fixed topographies of responding can lead to rigid patterns of behavior. The LIFE Skill Emergent System (LIFE; Dixon, 2021) provides an alternative training strategy to promote more complex behavior operants through direct instruction, programming for generalization, and the development of verbal and performance flexibility. The present study evaluated the training structure of LIFE in the context of a dance program that was adapted from the LIFE curriculum. Phase 1 involved direct training of verbal relations between physical dance moves and words that described the dance move. Phase 2 introduced the chained task with the sequenced dance moves and evaluated the PEAK scoring of each move within the task analysis. Phase 3 extended the task analysis by extending the dance twice to novel counts and adding a freestyle task to

the task analysis where participants created their own dance moves. Finally, phase 4 involved resequencing the dance moves to the same song to demonstrate flexible control over the dance sequence. Results with two typically developing boys (6 and 8) supported the efficacy of this programming across all phases.

### **\*80. Relational Frame Theory, Relational Density Theory, and the Climate Crisis - Oh My!**

Meredith Matthews, Jordan Belisle, Lauren Hutchison

Faculty Advisor: Jordan Belisle

We developed a series of studies aimed at understanding the influence of relational behaviors and climate change and purchasing of pro-climate commodities over high-emission commodities. The first study targeted pro-environmental purchasing behaviors by using relational training procedure to establish arbitrary symbols as either climate-helpful or climate-harmful. A purchasing task was presented to participants before and after the relational training task. Six of the 7 participants showed a consistent increase in spending for the climate-helpful products with individual differences observed within each of the participants' data. The second study extended on the first by graphing the development of these relational frames at a population level using a Multidimensional Scaling (MDS) procedure. Results show that once relational training is introduced arbitrary symbols can merge with the pro-climate stimulus classes, thus have the potential to obtain functions that may produce greater patterns of pro-climate purchasing. Taken together, these studies show that relational behavior does influence purchasing that has the potential to contribute to behavioral solutions to the climate change crisis.

### **\*81. A Comparative Study of Disability Stigmatization in Relational Frames Related to Autism: Utilizing the Theoretical Relational Density Framework**

Claire Zuch, Shelby Blecha, Jordan Belisle, Jessica Hinman

Faculty Advisor: Jordan Belisle

The neurodiversity movement has and currently advocates for a change in the way that the world views neurodiverse individuals. The present study attempted to explore the difference in relational frames surrounding Autism when using person-first language versus identity-first language. It also evaluated the language both previously and currently used to refer to the diagnosis of autism in the DSM. A 14-item multi-dimensional scale was used to model a two-dimensional geometric space representing the relational frames surrounding Autism in 20 behavior analytic staff and 40 untrained college students. Results indicated that participants working in the behavior analytic field relate the terms "Person with Autism", "Autistic Person", "Low Functioning", and "Requiring Very Substantial Support" with more positive terms whereas in college student participants the "Average Person", "High-Functioning", and "Requiring Support" is seen as associated with more positive terms. Both participant population groups displayed minimal differences in relational frames regarding person first and identity-first language. The multidimensional scaling procedure gives us figures to evaluate the shared relational frames of a community, organization, or group.

### **\*82. Restoring Mental Exhaustion: The Impact of Environment on Academic Success**

Emily Lohrbach, Whitney Akalugwu, Dr. Adena Young-Jones, Dr. Ashley Payne

Faculty Advisor: Adena Young-Jones

Academic environments are proven to relate to academic success. Specifically, Mirrahimi et al. (2013) found that the inclusion of natural lighting can lead to enhanced learning environments and mental health. Additionally, the incorporation of plants and/or windows into academic environments improve students' concentration, study motivation, test scores, and overall academic performance while simultaneously decreasing self-reported stress (Donovan et al., 2020; Kaplan & Kaplan, 1989; Kuo et al., 2018). The present research examined the impact of various environmental factors within collegiate academic environments on students'

overall academic success as determined by motivation, basic needs, test-taking anxiety, and mental exhaustion. Researchers hypothesized that classrooms with natural environmental conditions via foliage and natural lighting would increase students' self-reported levels of mental exhaustion, test anxiety, and stress. We anticipate the results from this study to guide educators on how to improve test-taking environments at the collegiate level.

### **83. The Bogus Pipeline Method: Exposing Hidden Prejudice**

Sophia Wolken, Erin Travis, Joshua Slater, Jenna Morelock, Emily Lohrbach, Dr. Adena Young-Jones  
Faculty Advisor: Adena Young-Jones

To promote truthfulness and expose implicit prejudice, researchers utilized the Bogus Pipeline Method (BPM; Jones & Sigal, 1971) which induces truthful responding through imitating a collection of physiological data (Thornton & Gupta, 2004). The purpose of this study was to explore implicit bias employing the BPM regarding sexual orientation prejudice, ethnic prejudice, and ability prejudice. Each of the three prejudice categories consisted of an experimental and a control group. Participants in control groups completed a consent form, pre-test, and pre-screen. Then, a questionnaire packet with specific scales based on the prejudice variable they were randomly assigned, followed by a demographic form, and post-screen. Participants in experimental groups were given the BPM intervention amidst answering their questionnaire packet. We hypothesize our results will show increased mean scores for experimental groups and a significant difference in self-reported prejudices between control and experimental groups. These results can provide insight into prejudice unencumbered by self-report biases when honesty is induced. Results can also be applied to further test the efficacy and continued use of the BPM in research settings.

## **SPORTS MEDICINE & ATHLETIC TRAINING**

### **84. What are the Perceptions of Athletic Trainers on Managing Anxiety with Sports-Related Concussions?**

Abigail Bjerken, Finessa Rassal, Jeremy Hostetler  
Faculty Advisor: W. David Carr

Research demonstrates that when anxiety is present in concussion patients, it alters the prognosis and can delay recovery. Our purpose was to assess the utilization of anxiety assessments and treatments by athletic trainers as well as opinions of potential barriers to applying anxiety interventions to sports-related concussion patients. A survey comprised of 20 questions was distributed to the participants through the National Athletic Trainers' Association Research Survey Service. A total of 133 certified Athletic Trainers in the collegiate setting were surveyed. T-tests, ANOVAs, correlations, and descriptive stats were used to determine the relationships between topics. Most participants agreed anxiety influences concussion recovery and anxiety treatment is a valuable tool in concussion protocol. However, only 47% of ATs reported screening for anxiety. We found that 66% of ATs refer when anxiety is suspected, and 59% of ATs employ anxiety treatment strategies. Collegiate athletic trainers support anxiety treatment measures benefiting concussion recovery outcomes and welcome further education on the topic.

### **85. How and Why Collegiate Athletic Trainers Use Cupping Therapy**

Himawari Tsuchiya, Jordyn Vrba, Dillon Davis  
Faculty Advisor: W. David Carr

Cupping therapy is a manual treatment utilized by many athletic trainers throughout the United States. However, there are no existing studies of how and why athletic trainers use cupping therapy and how they were educated. The purpose of our study was to determine how and why certified athletic trainers in the collegiate setting choose cupping therapy as a treatment for their patients and how were they educated to use the therapy. Participants completed

an online questionnaire sent via the National Athletic Trainers' Association (NATA) Survey System. A total of 5,666 random emails were distributed to NATA members. A sample of 651 (8.7%) participants completed the survey instrument. The survey instrument utilized sixteen items (gender, age, years of certification, level of college athletics, reasons to use cupping therapy, most utilized cupping type, duration of treatments, frequency of treatments, and cupping education). The hypotheses are: 1) the majority of participants use skin color reaction as a treatment indicator/constraint, and 2) the most common reason to apply cupping therapy is to treat muscle hypertonicity/trigger points. Results from this study are pending analysis. Education opportunities may be discovered.

### **86. Confidence Levels of Recent Athletic Training Graduates in Telemedicine**

Alexandra Woody, Jared Saylor, Jihyun Oh, Savannah Jochem, David Carr, McCall Christian  
Faculty Advisor: McCall Christian

The COVID-19 pandemic has created an increased demand for the use of telemedicine within healthcare. A lack of formal education and level of confidence in the modality are the most significant barriers to implementing telemedicine into patient care for athletic trainers (AT). For our study, we recruited participants who were practicing athletic trainers who graduated from an accredited program between 2016 and 2021 (n=520). Our results showed that there was a significant difference in confidence levels between those who had the education to develop a home care plan and those who did not ( $t(104) = 4.03, p < .001, d = 1.28$ ). Our results also showed that there was a significant difference in confidence levels between those who were taught to deliver a diagnosis and those who were not ( $t(105) = 4.35, p < .001, d = 1.18$ ). There was also a positive, significant relationship between confidence in delivering a diagnosis ( $r(107) = .26, p = .01$ ) and years of experience. Education in telemedicine can lead athletic trainers to be more confident in their telemedicine skills. Providing telemedicine experiences by utilizing live patient

scenarios can better prepare for telemedicine encounters.

### **87. The Presence of Asymmetry in the Bottom of Lunge Shape**

Zachary Kersten, Bailee McAfee, Hayley Pfitzinger, Seth Stegeman  
Faculty Advisor: Tona Hetzler

Asymmetry is a lack of exactness across an axis. Asymmetry in human movement is often identified as a contributing factor to an injury. No published literature has examined if asymmetry is common in uninjured individuals. This study aimed to determine if asymmetry is present in the bottom of the lunge. Participants (n=110) were active, uninjured 18-25-year-old individuals. Each participant performed the bottom of the lunge on the right and left sides. Participants were evaluated by an investigator and given a pass/fail for each leg based on criteria established by Movement Outlaws. The same outcome (pass/pass or fail/fail) between sides represented symmetry, different outcomes (pass/fail) between sides represented asymmetry. In the population studied, 74.545% of participants presented with symmetry, while 25.455% presented with asymmetry. Preliminary results indicate that asymmetry can be present without injury for some individuals. Additional research is needed to establish how common asymmetry is in human movement. This research will assist clinicians in understanding if asymmetry should be addressed during rehabilitation.

### **88. Perceived Barriers of Athletic Trainers About Obtaining BOC Specialty Certification: A Qualitative Study.**

Nicolas Helin, Robert Shifrin, Luis Bailon, Edgardo Soto Ramirez, Eva Frank, Michael Hudson  
Faculty Advisor: Michael Hudson

The Board of Certification (BOC) offers one specialty certification to certified athletic trainers (AT), the orthopedic specialty. This specialty is new; there is not enough information about barriers to ATs earning their orthopedic specialty credential.

The objective of our study was to answer the following research question: What barriers prevent certified athletic trainers from earning a BOC specialty certification? We used a qualitative phenomenological research design and a semi-structured interview guide to conduct our interviews. Once participants were interviewed, we read each transcript and applied open coding processes. We recruited participants from previous research and personal contacts. Participants were ATs who have been certified within the last 12 years. We sought six participants that have been certified for less than 7 years and six participants who have been certified 7-12 years. We are still collecting and analyzing data, from which two preliminary themes have emerged: financial barriers and time constraints.

conscious of their sleep hygiene regardless of work setting.

### **89. Collegiate Athletic Trainers Have Lower Sleep Hygiene Scores Compared to Clinic and Secondary Athletic Trainers**

Abigail Castillo, Jacob Hawkins, Colten Morgan, Ross Seitter  
Faculty Advisor: Allan Liggett

Athletic trainers work in settings with factors contributing to poor sleep hygiene, such as traveling and irregular schedules. Studies have been conducted on the negative effects of poor sleep hygiene in other healthcare professions. Current research of this topic with athletic trainers is limited. The aim of our study was to examine sleep hygiene of athletic trainers in various work settings within district five of the National Athletic Trainers' Association (NATA). Participants included full-time athletic trainers in the clinic, collegiate, and secondary settings who were members of the NATA. The Sleep Hygiene Survey, which consisted of 15 questions and three sub-scales, was sent to 4,000 subjects. Data collection occurred over a 6-week period from November 2021 to January 2022. A one-way ANOVA of 276 surveys was completed to find the tendencies among each work setting. The results showed all athletic trainers had poor sleep hygiene, with the collegiate setting showing a statistically significant lower overall sleep hygiene score. As a result, we recommend all clinicians to be