



**Missouri
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**Welcome to
the 23rd Annual**

McQueary College of Health and Human Services

***Student
Research
Symposium***

Plaster Student Union Thursday,
May 2, 2019 3:00 - 5:00 P.M.

McQueary College of Health and Human Services

Student Research Symposium

Welcome to the twenty-third annual McQueary College of Health and Human Services Student Research Symposium. The purpose of the symposium is to promote student research as well as provide a forum for students to gain experience presenting their scholarly activities. This is an opportunity to celebrate our students' outstanding work and to acknowledge the faculty members who serve as mentors.

McQueary College of Health and Human Services (MCHHS) faculty, staff and students join me in thanking you for attending this year's symposium. Our students appreciate your interest in their work, and look forward to discussing their projects with you.

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

Dr. Ashlea Cardin, Occupational Therapy

Dr. Christie Cathey, Psychology

Dr. Melissa Fallone, Psychology

Dr. James Hackney, Physical Therapy

Dr. Tiffany Havlin, Social Work

Dr. Michael Hudson, Sports Medicine and Athletic Training

Dr. Anne Marie Hunter, Biomedical Sciences

Dr. Wafaa Kaf, Communication Sciences and Disorders

Dr. Bogdan Kostic, Psychology

Dr. Ruth Walker, Psychology

Dr. Jianjie Wang, Biomedical Sciences

Ms. Jacqueline Patterson, Executive Assistant

Ms. Carly Totsch, Executive Assistant

Dr. Letitia White-Minnis

Interim Dean, McQueary College of Health and Human Services

ORDER OF PRESENTERS (First Author)

1. Hailee Marino
2. Megan Berry
3. Kirsten Grier
4. Kimberly Korff
5. Zachary Ingram
6. Fati Khamissi
7. Drew Bowers
8. Reece Stutzman
9. Mikaylan Sickle
10. Abigail Houchin
11. Darren Cox
12. Spencer Thomas
13. Christaney Townsend
14. Baylee Reller
15. Anna Guboglo
16. Amanda Boswell
17. Anna Laffoon
18. Gabriela M. Farabee
19. Kyle DeMint
20. Kaylee Mathiason
21. Kaylene Bramwell
22. Reece Stutzman
23. Caroline Finnell
24. Jacob Klessens
25. Justin Lawson
26. Kaylin Dobbs
27. Brittany Knebel
28. Sara Pivac
29. Bethany Herron
30. Kristen Saale
31. Jennifer Badovinac
32. MaKenzie R. Johnson
33. Rebekah 'Michele' Casteel
34. Macy Ellis
35. Heather M. Felske
36. Rachel Frisch
37. Bailey Whitworth
38. Jessica Saunsaucie
39. Kaitlyn Long
40. Paige Baker
41. Emily Kinkade
42. Kayla L. Dahms
43. Katie Tinklepaugh
44. Elizabeth Slinkard
45. Ali Waites
46. Andrew Mudd
47. Makayla Sexson
48. Lorenzo Tomasiello
49. Randi Montgomery
50. Victoria Surratt
51. Valerie Sindel
52. Mackenzie Ikemire
53. Cassandra Waite
54. Riley Lekarczyk
55. Marshall Gevers
56. Nick Mataya
57. Amy Potthast
58. Reilly Bennett
59. Anna Bocek
60. Danielle Williams
61. Danielle Farmer
62. Gabby Atwater
63. Katie Brinkmeyer
64. Rylee Cornelius
65. Dallas Robinson
66. Emily Heinlein
67. Logan Griffin
68. Tabetha Hopke
69. Kaylee Rucker
70. Lydia Needy
71. Juliana Ferrara
72. Erin Walker
73. Mason Gaspard
74. Celeste Unnerstall
75. Breanna Lee
76. Elana Sickman
77. Chynna Frizell
78. Nathan Burgstahler
79. Tyler Jay Swearingin
80. Reiley Snavelly
81. Mason Todd
82. Annalise Giamanco
83. Taylor Lauer
84. Trista Shrock
85. Cameron Koob
86. Isabella Fryman
87. Mercedes Robinson
88. Kristen Hoffner
89. Alexandra Light
90. Jamie Weeda
91. Autumn E. Houser
92. Kristine Drane
93. Brianna Hutchins
94. Ryan Clements
95. Ashley M Boyle
96. Matt McClanahan
97. Hailey Jahnle
98. Kelsey Jones
99. Michael Bradley
100. Dalton Burke
101. Rachael Wendelbo
102. Anna-Grace Eubanks
103. Shawn Artz
104. Collin Gilmore
105. Ariana Fakeri
106. Julia Galloway
107. Jordan Devenney, ATC
108. Lindsay Hampton, ATC
109. Alexandra Jahnke
110. Kaitlynn Preston
111. Fiona Lefresne
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Abstracts

1. Role of the P2Y2 Receptor in Glucose Tolerance

Hailee Marino, Spencer Thomas
Faculty Advisors: Randi Ulbricht, Jianjie Wang

Nucleotide receptor P2Y2R is important in mediating vascular inflammation. Recent studies suggested P2Y2R involvement in high fat diet-induced metabolic abnormality. However, physiological role of P2Y2R remain unknown. In this study we investigated P2Y2R's role in glucose metabolism under physiological conditions. Glucose tolerance testing was performed in C57BL/6 and P2Y2R^{-/-} mice. Mice fasted for 5 hours and blood was obtained from the tail to assess glucose levels using a glucometer and test strips. Mice received an intraperitoneal injection of 20% dextrose (2 g/kg body-weight). Glucose levels were measured at 0 (fasting), 10, 20, 30, 45, 60, 75, and 90 min after dextrose injection. We found no significant difference in fasting blood glucose levels between WT and P2Y2R^{-/-} mice for males and females. Sex-specific difference in fasting glucose level was found in WT mice (113.8 ± 8.4 males vs. 88.9 ± 5.7 female; $P < 0.05$) while the sex-specific difference was not observed in P2Y2R^{-/-} mice. Glucose tolerance was comparable in WT versus P2Y2R^{-/-} mice and males compared to females. Overall, the findings indicate sexual dimorphism of fasting glucose in WT mice is P2Y2R-dependent. Corresponding insulin levels under the same conditions remains to be determined.

2. A Problem Knowing No Bounds: Addiction Among Healthcare Professionals

Megan Berry, Kirsten Grier, Nathan Johnson, Joshua Vogel
Faculty Advisor: Amanda Brodeur

No one questions that substance abuse is a prevalent problem in healthcare. Unfortunately, the at-risk populations most often thought of are those impacted by poverty. However, there is another at-risk population that doesn't seem to get enough attention: healthcare professionals. Studies have shown that approximately 10-15% of U.S. healthcare professionals deal with drug or alcohol addictions. The goal of this poster is to raise awareness of this problem and propose potential alternatives for treating health care professionals dealing with addiction. Our poster will give an overview of how addiction works on a molecular and cellular level, showcase the prevalence and potential ramifications of healthcare professionals practicing while dealing with addiction, and review current and future directions of treatment specific to healthcare professionals.

3. A Review of Interstitial Cystitis: Defining and Exploring Mechanisms of a Common but often Misdiagnosed Urologic Condition

Kirsten Grier
Faculty Advisor: Amanda Brodeur

Interstitial cystitis (IC) is a common urological condition that affects 4 to 12 million people in the United States, yet, it is a condition that is not talked about often nor is it well understood. IC is a disorder of the bladder, where symptoms include urinary discomfort, pressure or pain in the bladder, urinary frequency, and nocturia. Hence, awareness of how to recognize and diagnose patients who present with these symptoms correctly is imperative. There are other urological conditions with similar presentation, such as bladder cancer, radiation cystitis, genitourinary infections, and gynecological diseases. Furthermore, the biological mechanisms of IC are poorly understood. Some hypothesize that high potassium concentrations, glycosaminoglycans, uroplakin III, and tumor necrosis factor-inducible gene 6 protein (TSG-6) play a role. It is important to discuss and explore the potential ways that IC affects the bladder, to better design treatments and predict prognosis. Diagnosis, pathobiology, and future treatments for this disorder will be explored in this presentation.

4. ANTHROPOMETRIC MEASURES, BLOOD PRESSURE, TASTE PREFERENCE, AND FOOD BEHAVIORS AMONG INTERNATIONAL STUDENTS

Kimberly Korff
Faculty Advisor: Anne Marie Hunter

Objective: This study examined the impact of dietary acculturation on international student preferences and behaviors related to food and nutrition at Missouri State University during the school year 2018-2019. Participants: 33 international students of various degree programs, ages, and nationalities completed this study. Methods: Participants completed three parts: a food behavior and beliefs questionnaire, a sensory evaluation of students' detection and preference for sweetness, saltiness, and spiciness on a 5-point Likert scale, and an anthropometric assessment of weight, height, and blood pressure. Data was collected at 2 time periods for each participant: the first groups (22 participants) responses were taken at 19 weeks apart, and a second groups (11 participants) responses were taken at 6 weeks apart. Changes in questionnaire responses, taste preference, anthropometric measures, and blood pressure between the initial and second evaluation were evaluated to determine whether any significant correlations existed. Results from this study can provide a unique insight into the wide scope of influence on lifestyle,

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taste, and changes in body measurements, and exemplify the transience of preference.

5. **CYCLOPHILIN A ENHANCES HIV-1 REVERSE TRANSCRIPTION IN MICROGLIAL CELLS**

Zachary Ingram

Faculty Advisor: Amy Hulme

During cytoplasmic transit viral RNA reverse transcription initiates uncoating. Uncoating, the disassembly of the viral capsid, is necessary for nuclear import. The capsid also acts as an interface for host proteins that facilitate these events. Cyclophilin A (CypA), a proline isomerase, binds capsid and alters infectivity in a cell dependent manner. Disruption of CypA-capsid interaction by CsA treatment enhances these steps in microglia. Interplay between reverse transcription, uncoating, and nuclear import suggests CypA may impact multiple steps. We found that reverse transcription was reduced when CypA-capsid binding was prevented. 2-LTR circles, a nuclear import marker, decreased at 12 and 24 hpi upon CypA-capsid disruption. Nuclear import is downstream of reverse transcription. Results suggest that CypA enhances reverse transcription for efficient replication in microglial cells. Elucidating CypA function in HIV replication will provide understanding of these replication events.

6. **Evaluation of Synthetic FBS Alternates' Effect on HIV-1 Production & Infectivity in 293T cells**

Fati Khamissi, Joshua Vogel

Faculty Advisor: Amy Hulme

Human immunodeficiency virus 1 (HIV-1) is the causative pathogen in HIV/AIDS, a global epidemic that has resulted in 35 million deaths. HIV-1 is studied using mammalian cell culture, which requires expensive medium components like fetal bovine serum (FBS). Our experiments examined the effects of using synthetic FBS in cell culture medium on HIV-1 infectivity in two human cell lines (293T and TCN14). Regular or synthetic FBS (NuSerum or EquaFetal) was used in cell culture medium both for virus production and infection. For each cell line, a plate of control cells was grown in medium with FBS, while a separate plate of cells was grown in medium with NuSerum or EquaFetal for a minimum of two weeks. Cells grown with synthetic FBS grew with similar kinetics to those grown in regular FBS. Virus produced and infected in 293T cells grown in NuSerum had similar infectivity results as cells in regular FBS. However, virus produced and infected in EquaFetal medium failed to show significant infectivity. These results have led to ongoing experiments comparing the infectivity of TCN14 cells in grown in regular FBS and NuSerum medium. This study may identify a more effective way of culturing

cell lines commonly used to study HIV-1 replication.

7. **Examining Expression of Microtubule-Associated Proteins in Response to HIV-1 Infection in Two Cell Lines**

Drew Bowers, Joshua Vogel

Faculty Advisor: Amy Hulme

HIV infection is a complicated molecular process that involves various host cell proteins. Upon fusion of HIV with the plasma membrane of a host cell, the viral capsid is deposited into the cytoplasm. The viral capsid must disassemble by the process of uncoating for import of the viral genome into the nucleus to establish a lasting infection. Previous experiments have shown that there are differences in uncoating between Owl Monkey Kidney (OMK) cells and human microglial cells (TCN14). We hypothesized that the activity of host cell proteins known to interact with capsid may be involved with the differences in uncoating between OMK and TCN14 cells. KIF5B, Dia1, Dia2 and NUP358 are cellular proteins that could account for these differences. To investigate the gene expression levels of these proteins, OMK and TCN14 cells were infected with HIV-GFP pseudotyped virus and RNA was extracted 2 hours post infection. The amount of various protein transcripts was quantified by quantitative PCR using cDNA created with the collected RNA. Determining expression levels of these protein factors is important to better understand how cellular factors influence HIV capsid uncoating in both cell lines.

8. **Using a Fluorescent Microscopy Assay to detect HIV-1 Uncoating in Microglial Cells**

Reece Stutzman, Zachary Ingram, Caleb Likens

Faculty Advisor: Amy Hulme

HIV-1, the virus that causes AIDS, continues to affect more than 35 million people worldwide. Although effective drug therapies exist, there is still a need for an HIV vaccine. Therefore, more research is needed on the important steps in the HIV-1 replication cycle. One such step is uncoating, in which the conical capsid disassembles and the viral genome is released for integration into the host cell genome. To delineate the kinetics and dynamics of uncoating, HIV-1 is studied in a cell culture system using a virus labeled with the fluorescent proteins GFP-Vpr and S15-tomato. The GFP-Vpr label identifies the viral complex in infected cells. The S15-tomato label identifies cytoplasmic virions. When this labeled virus is combined with antibody staining for the viral capsid, one is able to visualize the process of uncoating in infected cells. We have generated a viral stock with greater than 90% overlap of the GFP-Vpr and S15-tomato labels. This viral stock is being tested for its functionality in human microglial cells using the conditions of the antibody staining protocol. These

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adjustments in virus production and antibody staining are necessary for future use of the in situ uncoating assay to study uncoating in human microglial cells.

9. The Limitations and Acceptability of Plant-based Yogurts

Mikaylan Sickle, Rebecca Maloney, Ceira Fields

Faculty Advisor: Lisa Wade

Consumption of dairy, and therefore calcium, is a concern for the growing population of people following vegan and plant-based diets. The purpose of this project was to observe the product produced when plant-based milks are cultured like typical dairy yogurt to achieve similar taste, aroma, and texture/mouthfeel. Observational study was completed with tools including: viscometer, spread test, and pH meter. Sensory evaluation was conducted using 30 untrained panelists who rated the taste, aroma, and texture/mouthfeel of the samples on a seven-point hedonic scale. Data were analyzed using repeated measures ANOVA statistical analysis. Our null hypothesis stated the change in the milk would have no effect on the acceptability of the yogurt product, therefore the preference would be evenly distributed between people in the study. The results indicated strong evidence against the null hypothesis (p value < 0.05) with a p value of 0.002 for the soy milk yogurt indicating the soy milk was by far the least preferred. The coconut milk yogurt ($p=0.085$) and almond milk yogurt ($p=0.121$) were the most preferred plant-based yogurt and the most similar to dairy yogurt.

10. Assessing the Suitability of CD105 as a Marker for Murine Endothelial Cell Isolations

Abigail Houchin, Tess Harmon

Faculty Advisor: Jianjie Wang

The P2Y2 receptor is a purinergic receptor that is of great interest in the field of microvascular research, particularly its role in altering vascular permeability during inflammation. Murine endothelial cell (MEC) cultures serve as effective research models due to their ability to be grown in vitro with rapid reproduction. In order to isolate the MECs from a tissue sample, a compatible antibody, such as CD31, is used to coat a magnetic bead that will then bind the cells of interest to separate them from other cells in the sample. Because we used CD31 to isolate the cells, it would be most prudent to use a different antibody as a positive control in future analysis of these cell cultures. We evaluated the suitability of CD105 as an alternative to CD31 as a marker for MECs by searching for similarities and differences in cell population and fluorescence data obtained by immunohistochemistry and flow cytometry techniques. The CD105 antibodies produced data that was consistent with endothelial cells stained with

CD31. Thus, it can be concluded that CD105 is a suitable alternative for identifying and labeling endothelial cells derived from murine tissue.

11. Influence of Passage Number of Cultured Endothelial Cells on Expression of P2Y Receptor

Darren Cox, Julie Whitten

Faculty Advisor: Jianjie Wang

The P2Y2 Receptor (P2Y2R) has been found to play a role in mediation of vascular inflammation and leukocyte migration (immune-regulating functions). The P2Y_x receptors are purinergic G-coupled protein receptors that are activated by ATP and UTP, and lead to a second messenger response. The aim of the study was to investigate the effect of passage number of primary cultured microvascular endothelial cells (MEC) on the transcript expression of the seven P2Y R isoforms. MEC were derived from skeletal muscle of wild type (WT) and P2Y2 R knockout (P2Y2R^{-/-}) mice. The cells were cultured with passage numbers ≤ 8 (low passage number) and > 8 (high passage number) for comparison of P2Y receptor transcript expression. RNA was extracted from the cells with low and high passage numbers, respectively, and converted to cDNA by reverse transcription (RT). After the cDNA was obtained, the expression of the seven P2Y R isoforms was tested through real-time PCR. We expected that the expression levels of P2Y R might be altered in the cells with high passage number compared to the cells with low passage number for both WT and P2Y2R^{-/-} MEC. The student's t-test will be used for statistical analysis.

12. P2Y2 Receptor-dependent Changes in Microvascular Leukocyte-endothelial Interaction

Spencer Thomas, Sharon Sheravina, Hailee Marino, Randi Ulbricht

Faculty Advisor: Jianjie Wang

Extracellular nucleotides (UTP, ATP) released into the vasculature act on purinergic receptors to promote inflammation. A hallmark of inflammation is increased leukocyte recruitment. The purinergic P2Y2 receptor (P2Y2R) has been implicated in pathological inflammation. We hypothesized that leukocyte rolling and adhesion is dependent on UTP-induced P2Y2R activation. Leukocyte-endothelial interaction and microvascular hemodynamics were assessed by intravital microscopy using a semi-automated leukocyte tracking methodology. Under basal conditions, P2Y2R-deficient mice (P2Y2R^{-/-}; $n=7-12$) exhibited increased leukocyte rolling (2-fold) and adhesion (1.5-fold) compared to WT mice (C57BL/6; $n=12-19$). UTP-treatment (10 μ M) of WT mice increased leukocyte rolling (2.2-fold) and adhesion (2.7-fold). Contrarily, P2Y2R-deficiency abrogated the UTP-induced leukocyte rolling but did not affect leukocyte adhesion, mirroring that of WT+UTP mice.

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Collectively, these data suggest that under normal physiological conditions, P2Y2R down-regulates leukocyte-endothelial interaction, and although leukocyte rolling and adhesion were induced by UTP, only leukocyte rolling is P2Y2R-dependent. Further investigation into the observed duality is necessary.

13. Fat-Frying vs. Air-Frying

Christaney Townsend, Rebecca Milton,
Nojoud Alshathry
Faculty Advisor: Lisa Wade

The use of fat-frying has become highly prevalent among the typical American diet, which has led to significant increases in chronic diseases such as cardiovascular diseases and obesity. This has produced a demand for healthier cooking methods that create a similar product to fat-frying. Within the past few years, air frying has become a popular cooking method to replace fat-frying. Previous research has shown that the fat content was reduced by 45-50% using air-frying compared to fat-frying. This research was a blinded study to determine whether air-frying or fat-frying was preferred based on the sensory evaluation of 44 participants. Objective testing was used with a penetrometer to determine the tenderness of the samples comparatively. For sensory evaluation, the study analyzed the color, crispiness, oiliness, tenderness, and flavor of each sample. Results demonstrated that the majority of participants preferred the fat-fried sample compared to the air-fried sample. The objective test outcome displayed that the air-fried sample was more tender than the fat-fried sample. Air-frying could be used as an alternative cooking method for consumers who want a similar fried product without the high-fat content.

14. Food Appearance Affecting Preference

Baylee Reller, Olivia Ott, Mikayla Mctigue
Faculty Advisor: Lisa Wade

Visual appearance of food is a trending topic, in part due to rising popularity of social media and blogs. Research shows that the appearance of food influences if a consumer will choose the food, the perceived taste, and amount of money they are willing to spend. This study tests the hypothesis: If you alter the appearance of food in an atypical way, then it also alters the consumer's preference. We conducted a 9-question survey with 53 subjects. The participants received three muffins with the same ingredients but presented differently. Sample 396 looked like a typical muffin, Sample 109 was dyed green, and Sample 252 was crumbled. The participants ranked their preferences regarding taste, appearance, willingness to purchase, and explained their answers. Sample 396 appeared to be the most appetizing by 77% of participants because it looked the most "normal". When asked which muffin participants

would spend the most money on, 64% selected Sample 396. However, when looking at taste preference, Sample 396 had an 11% preference, Sample 109 had a 43% preference, and Sample 252 had a 24% preference. The data supported the theory that visual appearance influences the food preference of consumers.

15. Gluten-free Flour Options in Chocolate Chip Cookies

Anna Guboglo, Taylor Purvis, Kayla Pinkley
Faculty Advisor: Lisa Wade

Research shows that 1% of the population suffers from celiac disease and even more suffer from gastrointestinal distress caused by gluten. There are limited options for grains that do not contain gluten. The objective of this experiment was to determine the likability of different gluten-free flour options including traditional gluten-free flour (sample 739), buckwheat flour (sample 612), and quinoa flour (sample 352) in the form of chocolate chip cookies. A preference test was conducted on 43 panelists to compare appearance, mouthfeel, and overall taste. Volume and tenderness were also tested using the seed displacement method and the penetrometer. Results indicated that 612 had the greatest volume (30 cm³) but was the least tender (82.7 mm) while 352 took up the least volume (18.7 cm³) and 739 was the most tender (110.6 mm). Sample 352 was preferred for overall taste and mouthfeel. However, an ANOVA was done to examine differences in appearance between the three samples. Results revealed a significant difference in the appearance for the three samples where panelists rated 739 as more appetizing than 352 (M=4.744, SD=0.441). Results imply that there is a niche in the food market for more nutrient dense gluten-free flour options.

16. Palatability of Vegan Gelatin Products

Amanda Boswell, Cindy Parker, Sarah Polk
Faculty Advisor: Lisa Wade

This food science experiment examined the palatability of vegan alternatives to gelatin products. The gelatin alternatives tested were pectin (from fruit), agar-agar and carrageenan (from seaweed). As veganism is an increasingly popular lifestyle choice, the research conducted was relevant for development of alternatives for animal based products. Samples were made using constant ingredient values. The solutions were heated to 165 degrees Fahrenheit for two to three minutes, and cooled until solidified. Objective measurements were conducted to determine gel strength, viscosity, and tenderness. Blind sensory evaluations were conducted on 35 untrained individuals through a survey which assessed appearance, flavor, tenderness, and mouthfeel using a 1-5 hedonic scale, where 1= hate and 5= love. The

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mean values were calculated for each of these sensory tests. Objective testing revealed that agar-agar was the most similar texture to animal-based gelatin, although the sensory survey results concluded that the fruit pectin sample was the overall preference due to its sweet flavor. Future research is needed to develop more palatable vegan gelatin products for food production.

17. **Substituting Aquafaba for Egg Whites in Angel Food Cake**

Anna Laffoon, Randy Santel, Amanda Schwab
Faculty Advisor: Lisa Wade

Aquafaba, often seen in the vegan community, is the viscous liquid leftover from cooking chickpeas. Often discarded, this liquid has become useful in recipe modification, particularly in baked goods. With comparable characteristics to egg whites, aquafaba can contribute to texture, color, and stability. The purpose of this study was to determine if aquafaba gives the same qualities as egg whites in the production of angel food cake. Forty-one randomly selected participants from three classrooms participated in a survey consisting of four questions to identify the participants' sensory preference related to color, aroma, texture, and overall favorite. Each sample had one variable slightly different when using aquafaba in the recipe modification process. Samples were measured objectively to evaluate the differences in volume and viscosity. Results from subjective testing resulted in a higher preference in all categories for the angel food cake made with egg whites. Results from objective testing showed a decrease in volume, viscosity, and overall quality in the modified recipes. Results of this study indicate the use of aquafaba in baked goods does not have the same qualities as egg whites in the production of angel food cake.

18. **A Study of Serotonergic 5-HT4 and 5-HT6 Receptors in Respect to the ASD model of Gut-Brain-Microbiome Axis**

Gabriela Farabee
Faculty Advisor: Lyon Hough

The role of post-synaptic serotonin receptors in autism spectrum disorder (ASD) is not yet fully understood, but they have been observed in areas of the brain that are crucial for development in areas such as motor learning, social skills, risk aversion, memory, and more. G-coupled serotonin receptors 5-HT4 and 5-HT6 have also been indicated in several comorbidities associated with ASD, including gastric disorders, anxiety, OCD, schizophrenia and neurodegenerative diseases such as Alzheimer's and Parkinson's. The goal of this project is to develop a protocol to specifically isolate and tag these receptors for microscopic imaging and image analysis to expand our understanding of current ASD animal

models of interest specifically related to the gut-brain-microbiome axis. The receptor protocol explored in this project was conducted using brain tissue harvested from rats exposed to high levels of the serotonin agonist 5-Methoxytryptamine throughout development. Tissue was sectioned using a Cryostat, and treated with rat-specific antibodies. Our hope is to move forward with these studies as a way to further our understanding of ASD and the role serotonin plays in its varied pathology.

19. **Individualized Rat-Specific 5-HT4R and 5-HT7R Immunohistochemistry Assay**

Kyle DeMint
Faculty Advisor: Lyon Hough

Autism spectrum disorder (ASD), a neurodevelopmental disorder, is characterized by elevated systemic levels of serotonin. Activation of specific Gs-linked serotonin receptors, 5-HT4R and 5-HT7R, activate the Protein Kinase A (PKA) pathway that has downstream effects associated with cognitive functioning. To further study the links between 5-HT4R and 5-HT7R and ASD, these receptors must be visualized within the nervous tissue of the brain. Pre-made detection assays can be expensive and unreliable for rat-specific models, thus individualized protocols should be employed. Using immunohistochemistry, primary antibodies specific for these receptors in rats will be used with fluorescently labelled secondary-antibodies for visualization under a confocal microscope. The development of these personalized model-specific detection assays will enhance the ability to effectively study the connection between these receptors and ASD.

20. **MANIPULATING RNA-EDITING OF CALCIUM-DEPENDENT ACTIVATOR FOR SECRETION 1**

Kaylee Mathiason, Andrew Mackey
Faculty Advisor: Randi Ulbricht

Adenosine deaminases acting on RNA (ADAR) are a family of enzymes that bind to double stranded RNA and modify adenosines to inosines. Inosine is read as guanosine during translation, and thereby potentially alters the sequence of the resulting protein. ADAR1 edits the RNA encoding calcium-dependent activator for secretion 1 (CAPS1) to alter one amino acid within the domain that interacts with secretory vesicles. This RNA editing of CAPS1 increases the release of peptides and hormones, such as insulin, secretory vesicles. CAPS1 RNA is edited with a 40% frequency in mammalian pancreatic tissue. The pancreatic beta-cell line, INS-1, expresses CAPS1, but not ADAR1, therefore CAPS1 RNA remains non-edited in these cells. We attempt to increase RNA-editing of CAPS1 in these cells by transfecting with

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ADAR1. We will analyze RNA editing by RT-PCR and sequencing, but also measure insulin released into the media with an immuno-assay. These experiments will determine if ADAR1 levels regulate secretion of insulin, or if there are other cellular factors that influence the editing frequency of CAPS1.

21. CALCIUM DEPENDENT ACTIVATOR OF SECRETION 1 RNA EDITING IN INFLUENZA A INFECTED MICE.

Kaylene Bramwell, Grace Hammack,
Samantha Stadts, Sydney Farris
Faculty Advisor: Randi Ulbricht

The post-transcriptional process of adenosine-to-inosine RNA editing is catalyzed by adenosine deaminase acting on RNA (ADAR). ADAR1 has two isoforms; constitutively-expressed p110 and inducible p150. Using a viral agent, activation of the interferon pathway results in induction of the p150 isoform. Both isoforms can edit the RNAs encoding calcium-dependent activator of secretion 1 (CAPS1), altering amino acids within the vesicle binding domain, respectively. We determine if increasing levels of ADAR1 by an acute inflammatory response will increase RNA editing in CAPS1 transcripts. Past studies focusing on brain tissue in mice showed that increasing ADAR1 p150 doesn't cause editing changes. In this study, we examined RNA from the brain and heart of influenza A infected mice. The uninfected tissues only contain the ADAR1 p110 isoform and the infected tissues contain both isoforms. Our findings determine that editing is regulated differently in brain and heart tissues, and acute inflammation can regulate protein function through RNA editing in the heart.

22. Air pollution: Connections to cancer

Reece Stutzman, Sydney Zupan, Ashley Rorman,
Alicia Willard
Faculty Advisor: Richard Garrad

The air we breathe is now considered a cancer causing agent by the International Agency for Research on Cancer (IARC). Many years of unregulated pollution have injected into our air dangerous particulate matter that has the ability to infiltrate our lungs and even our bloodstream. With a wide variety of pollutants and pollution sources to combat, reducing air pollution may seem daunting. Yet, the reality faced is that over eighty percent of the world's population lives in areas with dangerous levels of particulate matter, reinforcing the need for solutions. To reduce air pollution and attenuate associated adverse health effects, both aggressive, wide-reaching global interventions and comprehensive education regarding personal pollution reduction behaviors are essential. Emerging molecular therapies directed at halting pollution-linked epigenetic alterations also represent

promising defenses against disease. Air pollution as it relates to cancer is explored here to help bring awareness to this problem, to educate others on how air pollution affects the lives of billions, and how you as the individual can help foster change.

23. Acceptability of Tart Cherry Juice Concentrate Gummies Among College Athletes

Caroline Finnell, Margaret Goss, Hannah Yates
Faculty Advisor: Sarah Murray

Studies show that drinking tart cherry juice concentrate after workouts has been proven to boost athletes' recovery. Antioxidants help recovery by decreasing the oxidative stress caused by an intense workout. This study tested the acceptability of tart cherry juice concentrate gummies as an alternative to drinking a therapeutic dose of the concentrate on its own. The survey was conducted by providing Missouri State University female collegiate athletes with blind samples of a store-bought cherry gummy, a homemade tart cherry gummy with 1/2 teaspoon of cornstarch, and a homemade tart cherry gummy with no cornstarch. The athletes tried the samples and answered questions about the samples with a Likert scale. Results showed that there was not a significant difference in satisfaction levels among subjects that had tried the concentrate before and those that had not. A Spearman Rho correlation showed that there was a significant relationship ($p < 0.001$) among all samples between satisfaction and likelihood to consume the sample if there are known recovery benefits. Overall, satisfaction levels were high among all samples concluding that the tart cherry juice concentrate gummies are an acceptable alternative for consuming the concentrate.

24. The Addition of Protein to Brownies and its Effect on Likability and Tenderness.

Jacob Klessens, Ian Washington
Faculty Advisor: Sarah Murray

Many people are in search of new ways to increase their protein intake. One way of doing so is through the addition of protein in baked goods. In this study, brownies were prepared with the addition of two protein powders: pea extract and whey concentrate. Three batches of brownies were made, the first batch (sample 581) was the original batter, the second batch (sample 326) contained whey concentrate, and the third batch (sample 901) contained pea extract. Samples 2 and 3 only varied from sample 1 by the addition of 25g of protein. A blind panel consisting of 30 participants performed sensory evaluations to assess texture, flavor, aroma, and appearance. The brownies were scored on a 1-3 scale, 1 being most preferred and 3 being least preferred. Tenderness was measured using a penetrometer. Results showed that sample 581 was most preferred in all categories.

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Sample 326 had the lowest ranks for texture and taste. Sample 901 had the lowest ranks for aroma and appearance. The tenderness of each sample from most to least tender were: 581, 901, and 326. Results concluded that the addition of protein to brownies does not have the most desirable characteristics compared to the original recipe.

25. Persistence of Exercise Training Effect on Amyloid Pathology

Justin Lawson, Julia Larson, Kalyn Dobbs,
Jordan Jensen, Benjamin Timson
Faculty Advisor: Scott Zimmerman

Early life aerobic exercise training (ET) reduces amyloid beta plaque load and improves cognition in transgenic mouse models of Alzheimer's disease. Many people are physically active into early adulthood, but unlikely to continue lifelong ET. It is unclear if the benefits of early ET persist. In this study, 3 groups of male APP/PS1 mice ran on a treadmill at 20 m/min 5 days a week for 12 weeks at different times during their first year of life; 3-6 months (3/6), from 6-9 months (6/9), and 9-12 months of age (9/12). A fourth group did not exercise train to serve as sedentary controls (SED). At 12 months, all groups underwent Novel Object Recognition (NOR) and Morris Water Maze (MWM) testing. Brain hemispheres were stained for plaque and soleus muscles were assayed for citrate synthase activity (CS). There was significantly lower plaque load in 6/9 and 9/12 groups. CS was significantly higher the 9/12. There were significantly lower latencies in MWM in the 6/9 and 9/12 groups, and increased time in target region in the 9/12. The 9/12 group also demonstrated a greater novel investigation time in NOR. There are significant cognitive benefit of ET, but little persistence once ET is discontinued in APP/PS1 mice.

26. Sex differences in the effect of chronic isolation stress on amyloidogenesis in exercise trained APP/PS1 mice

Kaylin Dobbs, Jordan Jensen, Joseph Lipoff,
Ben Timson, Carla Yuede
Faculty Advisor: Scott Zimmerman

The APP/PS1 transgenic mouse model exhibits robust production of neurotoxic amyloid beta monomers (A-beta40-42) and plaque formation as seen in early onset Alzheimer's disease pathology. Plaque aggregation is strongly correlated with cognitive decline, specifically in memory and learning ability. Extraneous factors, such as social stress, have been shown to exacerbate disease progression in humans. In contrast, recent research has suggested exercise training as being correlated to the reduction or delay in the severity of cognitive decline. We used behavioral analysis of APP/PS1 mice to evaluate the largely unexplored relationship between exercise

training (ET) and stress, and answer whether ET can counteract the effects of stress. Furthermore, differences in the ET stress paradigm between sexes were also evaluated. Preliminary analysis of behavioral data revealed a trend ($p=0.10$) of better overall learning in socially housed versus isolated animals and in male compared to female mice. Assessment of brain proteins related to neural toxicity are forthcoming.

27. Using an accelerometer for the assessment of nasality compared to perceptual, acoustic, and nasal airflow related strategies

Brittany Knebel, Erin Nichols, Michelle Borgerding
Faculty Advisor: Klaas Bakker

The purpose of this project was to evaluate the effectiveness of an alternative accelerometric assessment procedure for nasality following three independent strategies. A second year speech-language pathology graduate student produced a series of speech utterances with different levels of nasality. Nasality, recorded with an accelerometer, was also evaluated perceptually by a group of participants, acoustically, and finally with a nasal airflow related procedure. Results indicated that perceptual ratings of speech utterances correctly identified the intended nasality with 88% accuracy. There was less of a difference between the accelerometer and acoustic signals of hypernasal quality when compared to non-nasal quality. Lastly, a positive association emerged between signals detected with an accelerometer placed on the external nares compared to the intensity of nasal airflow, and intensity of the acoustic signal. These findings provide preliminary support that use of accelerometers provides speech-language pathologists with a valid, objective, and cost-effective measure for assessing nasality in speech.

28. The Importance of Student Learning - Undergraduate Students' Perceptions of working with PWD

Sara Pivac
Faculty Advisor: Alana R Mantie-Kozlowski

The purpose of this study was to compare undergraduate students' perceptions of working with people with dementia (PWD) prior to and after working with PWD. The findings were used to aid in determining how to enhance teaching students about working with the PWD population. Fourteen female undergraduate students participated in "facilitator" roles with ten PWD. The students were in their fall semester of senior year. All students were pursuing a degree in Communication Disorders, with intentions of pursuing graduate school. Each student completed pre and post perception surveys along with self-reflections after each 70-minute session. Students

participated in five sessions. Pre and post survey responses were compared to gather information regarding student perception. Additionally, a follow-up focus group was conducted to solidify developments that had been identified from the survey, and to expand upon participants' perceptions. The surveys and focus group revealed students gain more understanding and confidence when provided with hands-on learning experience. This information helps demonstrate the importance of providing students the opportunity to not only gain academic knowledge, but also provide hands-on experience.

29. The Challenges of Creating an Online Lipping Support Group

Bethany Herron, Morgan Highfill
Faculty Advisors: Alana R Mantie-Kozlowski,
Sarah Lockenvitz

Organized and facilitated support groups have provided a variety of benefits for those with a communication disorder. Professionals working with this population utilize resources for disseminating information about social groups designed to support individuals with similar diagnostic profiles. As of fall 2018, there were no publicized affiliations for people with a lisp (PWL); however, in-person and online groups for other communication disorders have established accessible channels of group support. Education and anecdotes shared in these groups can provide a sense of community spanning across all ages; therefore, a support group for PWL was commenced. Considering the prevalence and incidence data of lipping, the online format was piloted as it seemed most accessible. The title of the page, rules/guidelines, and posts were thoughtfully composed to draw viewers to join the Facebook site. Low recruitment numbers from sharing the information through posted flyers in the Springfield, Missouri community resulted in a stagnant progression of the page named "Let's Talk Lisps!". The development of an online lipping support group may benefit from working closely with online marketing professionals or exploration of information transfer.

30. The Effect of Auditory Acclimatization on the Acceptable Noise Level in Females

Kristen Saale
Faculty Advisor: Clay Franklin

The purpose of this research is to determine the effect of auditory acclimatization on the acceptable noise level (ANL) after being exposed to multi-talker babble presented at 75 dB HL for thirty minutes. Participants were twenty-one normal hearing females age 18-35. Results compared pre and post ANL measures and found no statistically significant change in ANL; however, ANL did decrease after exposure to

background noise indicating that auditory acclimatization may affect ANL. This research also found a statistically significant difference in the uncomfortable listening level and the most comfortable listening level pre and post noise exposure. This indicates that auditory acclimatization occurs for these processes. Clinically, these measures are used more frequently than ANL and may provide important insight into routine audiological testing.

31. Resonance of Different Forms of Alaryngeal Speech and Perceived Social Acceptability

Jennifer Badovinac
Faculty Advisor: Klaas Bakker

This study explored the effectiveness of three different sources of alaryngeal phonation in producing speech resonance. The features of resonance explored in this study were analyzed to determine their impact on the social acceptability of various methods of alaryngeal speech. Six recordings of alaryngeal speakers, including speakers utilizing esophageal, tracheoesophageal, and Electrolarynx speech, were analyzed. For each recording, the same vowel was isolated, and its intensity was determined. Acoustic power for Formants I and II (F1 and F2) were also determined. The impressions of nine participant listeners were evaluated to explore the impact of a source's power of resonance on the speaker's intelligibility and social acceptability. Results indicated that the acoustic strength of F1 is a stronger predictor of acceptability than that of F2. Moreover, there does appear to be a correlation between the strength of resonance of F1 and subjective acceptability ratings. While results indicate that measuring strength of resonance has the potential to be an effective tool for determining a source's effectiveness of triggering F1 and F2 and subsequent effects on perception, this hypothesis needs further support from future study.

32. Assessment of an Intergenerational Easter Egg Hunt

Makenzie Johnson
Faculty Advisor: Lisa Hall

Research shows that there are many benefits of intergenerational interaction. In order to improve quality of life at a skilled nursing facility (SNF), an intergenerational Easter egg hunt was implemented and assessed. This project occurred in three phases: (1) six girls from a service organization, between the ages of 10 and 18, were randomly paired with an SNF resident for the purpose of exchanging letters, (2) the pairs interacted in person at the Easter egg hunt, and (3) semi-structured interviews were conducted with residents to assess their experience. Field notes, from participant observation of these phases, were coded and analyzed. Thematic findings include affect, verbal

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and non-verbal interaction, and reminiscence, which will be discussed. Challenges of this project include time constraints and limited funding, as well as initial low levels of interest and inability of some older adults to participate. If replicated, researchers should anticipate a slow start-up and design multiple contact points before the in-person event. In the future, intergenerational programming for community dwelling adults should be compared and contrasted to intergenerational programming for institutionalized older adults.

33. Benefits of Gentle Yoga

Rebekah 'Michele' Casteel
Faculty Advisor: Lisa Hall

Mercy Seniors is an education and activity resource for those fifty-five years of age and older, sponsored by Mercy Hospital in Springfield, Missouri. Gentle yoga, offered every Tuesday morning, is one of many activities that is well attended. Each class has an average of sixteen students. The purpose of this study is to discover the observable and perceived benefits of gentle yoga for older adults, particularly the deep breathing and stretching aspects. Participant observation methods and a pre-post survey were used to collect data over a 16-week period. Findings include improved breath control and improved perceptions of overall health and well-being, body image, and cognitive function. These findings are significant in that breath control is linked to healthy heart rate and brain function. Suggestions for future research include collecting data on more measurable data points such as heart rate and blood pressure before and after each session, as well as before the first class and after the last class. Future studies could also include additional pre-post assessments on cognitive function, memory and problem solving.

34. Friendly Visiting: Addressing Loneliness in a Senior Living Community

Macy Ellis
Faculty Advisor: Lisa Hall

Isolation and loneliness are two of the most common risk factors for older adults after admission to a senior living community. After weeks of observation in an independent living facility, a lack of interest in activities participation for some residents was noted. Such residents spent more time alone in their apartments than in the social environment. To investigate, twenty-minute friendly visits were conducted with 20 older adults to discover whether they discussed any aspects related to feeling lonely or isolated. The methods used to collect data in this study included participant observation and one-on-one semi-structured interviews. Field note data were analyzed using the constant comparative method. Findings show that half of participants reported

experiencing isolation and/or loneliness to varying degrees and within particular nuances. While friendly visiting is associated with many benefits, researchers must realize it is time consuming and ideally accomplished only at the convenience of the participants. A suggestion for future research is to pre-screen residents for isolation and loneliness before the friendly visits begin.

35. Horses Offering Veterans Hope Project

Heather M. Felske
Faculty Advisor: Lisa Hall

Cognitive stimulation is necessary to assist older adults with physical, social, emotional, and cognitive (SEC) goals. Observation of residents in a skilled nursing facility (SNF) revealed the need for motivation in these four domains. Pet therapy has been practiced in SNFs for over 30 years for these purposes. Fourteen residents, who are veterans, agreed to participate in this study of Animal Assisted Therapy in which two miniature horses, a miniature pig, and a standard poodle were used. Before therapy was implemented it was predicted that residents' goals would increase weekly from baseline. Evaluation consisted of measuring physical distance, social reactions, emotional reactions, and ability to recall past experiences. The methods used to assess these effects included the coding of field notes from observation of the therapy sessions and a follow-up survey with the participants. Findings from five cases, for whom the most data were collected, will be shared. Challenges encountered during this study include participant attrition due to death, discharge, and lack of alertness, and too few data collectors. A team of four is recommended for accurate observation and documentation of all four domains.

36. Impact of Personal Attitudes Towards Aging on Senior Center Participation

Rachel Frisch
Faculty Advisor: Lisa Hall

Research shows that attitudes about aging and old age impact the aging experience. Interactions between participants at a senior center were observed and resultant field notes were coded using the constant comparative method. Preliminary analysis led to the creation of a survey that attempted to investigate how attitudes of one's aging experience impacted their participation at senior centers. The survey included both multiple choice items and open-ended questions. Sixty surveys were completed and the results were analyzed. Findings suggest that seniors who spent time with others while at the center had a more positive aging experience and were interested in getting more involved; however, seniors who spent more time alone had a more negative experience and had little interest in getting more involved. The center

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is working to make the atmosphere more welcoming to combat the imbalance in participation. Future studies could be improved by conducting in-depth follow-up interviews to yield richer data.

37. Increasing Engagement Among Assisted Living Residents With Dementia Through One-On-One Activities

Bailey Whitworth

Faculty Advisor: Lisa Hall

Symptoms of dementia, such as apathy and depression, put individuals with dementia at a particularly high risk of experiencing a lower motivation to participate in activities. Additionally, residents in the later stages of dementia may not be able to fully participate in the group activities that are commonly seen in long-term care facilities. The purpose of this study was to measure the effects individualized one-on-one activities have on the engagement among assisted living residents with dementia. Weekly individualized one-on-one activities were conducted with four residents living with varying stages of dementia at an assisted living facility. The effects of the activities were measured by observing changes in engagement and mood. Observations were recorded in field notes, which were then coded and analyzed using the constant comparative method. The findings include an increase in mood and levels of engagement during the individualized one-on-one activities. Such findings suggest that one-on-one activities could be especially beneficial to residents in memory care units.

38. Integrity and Death: Life History Review with Hospice Patients

Jessica Saunsaucie

Faculty Advisor: Lisa Hall

People at the end of life sometimes struggle with feelings of inadequacy, unfinished business, or regret. Research suggests that reminiscence work, such as life history review (LHR), can relieve some of these stressors - especially for those nearing the end of life. LHR facilitates understanding, meaning-making, and resolution. Four current hospice patients (3 men, 1 woman) over the age of 65 participated in this LHR project. An average of three 45-minute interviews were conducted with each participant over a five-week period and were audio recorded. Data were transcribed, coded, and analyzed using the constant comparative method. Post visits were made to participants for an evaluation interview and responses were coded and analyzed. Current findings suggest LHR may not be effective in decreasing end of life stressors for those with dementia. Although an abridged and modified LHR questionnaire was used, it proved to be too rigorous for participants with dementia. Any activity that potentially interferes with

the goals of palliative care, which are comfort and peace, should not be attempted with hospice patients.

39. Satisfaction Levels of Direct Care Workers in the Aging Field

Kaitlyn Long

Faculty Advisor: Lisa Hall

Previous research indicates that poor pay and a lack of adequate training are the main reasons for job dissatisfaction among direct care workers in the aging field. After observing frequent rates of turnover in an assisted living facility in Missouri, a direct care worker job satisfaction questionnaire was facilitated. A twenty-item Likert scale questionnaire was completed by five Certified Medication Aids who volunteered to participate in the study. Participants were encouraged to provide written explanations for each of their responses. The Likert items were averaged; open-ended responses were coded and analyzed. Findings will report direct care workers' satisfaction levels in the work place, as well as any emergent themes. This study faced challenges because the researcher was an employee of the site and personally experienced role conflict. Also, participants were hesitant in volunteering out of concern of repercussions. This experience indicates the need for more evaluation programs like the Gerontology Workforce Enhancement Program.

40. Purpose: A Bible Study for Women in Skilled Nursing

Paige Baker

Faculty Advisor: Lisa Hall

The goal of this project was to implement an activity in a skilled nursing facility (SNF) that could increase residents' sense of responsibility and purpose, as many experience loss of such when daily living tasks are provided by staff. Sense of purpose is indicated through connectedness to deeper values, satisfaction with one's life, willingness to put forth effort, development of relationships, and increased social participation. After three weeks of observation, a study of women attending a Bible study was chosen because the events most attended at this SNF were related to spirituality and religion. Research shows that religiosity is most prevalent in later life. Participant observation of the women's Bible study sessions was used to collect data in the form of field notes, which were then analyzed using the constant comparative method. Unstructured interviews and a questionnaire were also used to gather residents' satisfaction with the study. Findings and limitations of this project will be discussed. Suggestions will be made for improved evaluation of religious and spiritual participation and impact.

41. Willingness to Divorce: The Importance of Religious Behaviors and Pro-Divorce Attitudes

Emily Kinkade, Katherine Harrington
Faculty Advisor: Ruth Walker

An individual's willingness to divorce is influenced by many different factors, including religious affiliation and level of engagement in religious behaviors (Amato, 2010; Pew Research Center, 2015). Typically, individuals who engage in religious behaviors hold less favorable attitudes toward divorce. The purpose of this study was twofold: (1) to determine which religious behaviors predict willingness towards divorce, and (2) determine if pro-divorce attitudes mediate the relationship between religious behaviors and willingness to divorce. Participants (N= 624) completed surveys assessing religious behaviors and divorce attitudes. We found that meditation and studying holy writings were the most influential religious behaviors when predicting willingness to divorce. Additionally, pro-divorce attitudes mediate the relationship between religious behaviors and an individual's willingness to divorce. Study implications will be discussed.

42. Static Postural Sway Measures Among Various Stances Used in Balance Assessments

Kayla Dahms, Riley Galloway, Stacy Goddard,
Daniel Wilson
Faculty Advisor: Jacob Gdovin

Introduction: Traumatic brain injuries (TBI) have been shown to adversely affect postural control, and the Balance Error Scoring System (BESS) is a cheap and efficient assessment tool used to evaluate athletes who may have sustained a TBI. Previous studies determined fatiguing exercises negatively impact postural control with balance being restored within 8-13 minutes in trained collegiate athletes. Purpose: The purpose was to (1) determine normative medial/lateral (ML) and anterior/posterior (AP) static postural sway parameters on healthy individuals utilizing the BESS protocol and (2) the time course for balance to return to baseline after fatigue. Methods: Twenty-four participants underwent pre- and post-fatigue balance assessments using the standard BESS test stances (tandem, single-leg, and double leg) while alternating between eyes open and closed at five-minute intervals. Sway velocity and sway root mean square values were recorded for the duration of the balance assessments in the AP and ML directions. Results: Analyses revealed significant condition, time, and condition by time main effects and interactions. Conclusion: Postural sway parameters are restored to baseline values between 0-10 minutes based on the condition.

43. Comparing the Ground Reaction Force Exerted with a Feet Together Stance versus Shoulder Width for Static Jumps

Katie Tinklepaugh, Marissa Tate, Ashton Trueblood,
Bailey Rickett, Breanna Beckman, Darby Joerling,
Erin Griesbauer, Greta Rueschmann,
Kayleigh Verheyen, Keri Walter, Molly Sewester,
Shauna Rinehart, & Sydney Marshall
Faculty Advisor: Daniel Wilson

The objective of this study is to determine whether a stance with feet together or shoulder width apart during a static jump creates larger ground reaction forces. Determining which stance produces greater forces would be a beneficial addition to exercise research as it would allow for optimal performance during vertical jumps and perhaps even back squat performance (Haun et al., 2017). We will collect data on a volunteer sample of three females ranging in age from 19 to 30. Data will be collected utilizing two Bertec force platforms set at 1000 Hz located in the Biomechanics, Exercise and Rehabilitation laboratory in McDonald Arena. Subjects will randomly perform three jumps using each of the two foot positions. The subjects will be instructed to start with their knees slightly bent, while keeping their spine straight and chest lifted. Next, the subjects will be instructed to jump straight up as high as they can. After the subjects have performed all three trials for both stances, we will use the average force at each foot position for each subject to determine which generated the greatest vertical force. It is hypothesized that the shoulder width apart stance will have a greater vertical force production.

44. Effects of Static Stretch Duration on Force Production During a Standing Broad Jump

Elizabeth Slinkard, Chelsey Operle, Emily Dyson,
Collin Portz, Kasey Williams, Makenna Morgan,
Megan Zengel, Olivia Whitson, Shaun Chilton, &
Tyrus Ayers
Faculty Advisor: Daniel Wilson

Stretching is a necessary component of pre-exercise routines. There is, however, evidence to suggest that stretching prior to exercise may hinder muscle force production (Behm, Button, & Butt, 2001). We will investigate the effects of static stretching on muscle force production during the performance of a standing long jump. Voluntary subjects will be required to complete a five minute warm up period on a static bicycle, followed by the performance of a standing long jump for maximum distance. Kinetic variables to be measured include force and the components of the force. Three trials of the pre-test long jump will be completed. Subjects will then be randomly assigned to two groups. Group one will perform a static stretch for thirty seconds targeting their glutes, quadriceps, and calves; the stretches will include modified

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hurdler, prone buttocks kick, kneeling hip extension, and standing straight knee. Group two will complete a similar stretch routine, holding each stretch for two minutes. The standing long jump will be completed immediately following each of these stretching conditions. The kinetic variable to be compared includes force and the components of the force.

45. **Ground Reaction Force Created During a Single Leg Lateral Jump in the Dominate vs Non-Dominate Leg**

Ali Waites, Jimmy Bertken, Ascencion Estrada, Kayla Howard, Molly Korte, Tyler Nielsen, Shane O'Brennan, Grace Reeves, Kayla Treible, Cassandra Waite, Nathan Yocum, Jacob Gdovin
Faculty Advisor: Daniel Wilson

The objective of this study is to determine if there is a difference in ground reaction forces from the dominant or non-dominant leg. We hypothesize that the dominant leg will create a larger ground reaction force during a single leg lateral jump. To evaluate the possible difference in forces generated, we are going to measure the force produced by each leg during a single lateral jump. We will utilize two force plates for our study that will be at a standardized distance of 12 inches away from each other. Having our participant balanced on one leg, they will jump out laterally directly to the other force plate. Each participant will have three trials on each leg, in which we will then collect the mean for each one. Statistical differences between dominant and non-dominant legs will be evaluated using a two-sample T-test. Using a two sample T-test will allow us to compare the means of each leg for our participants, one sample being the dominant leg and the other sample being non-dominant. In previous studies, it has been shown that more ground reaction force was generated in a vertical countermovement jump compared to a lateral or horizontal jump.

46. **Kinesiology/Biomechanics Semester Research Project Spring 2019**

Andrew Mudd, Brittany Forbes, Alexa Simson, Jacob Connolly, Jake Crosby, Jordan Minor, Katelynn Bratcher, Merrich Altis, & Taylor Meyers
Faculty Advisor: Daniel Wilson

The purpose of this experiment is to investigate the total amount of vertical force produced during a countermovement jump when the distance between the feet is increased. Scientific literature suggests the vertical force generated by a countermovement jump is great, and achieves a higher vertical height, than a non-countermovement jump (Bobbert et al., 1996). Other research has shown that the jump height in countermovement jump was attributed to the fact that the countermovement allowed subjects to attain greater joint moments at the start of push-off. This

allowed for greater joint moments though the first part of the range of joint extension in a countermovement jump so that more work could be produced than in a squat jump (Bobbert et al., 1996). The electromyograph (EMG) has revealed details of the timing and magnitude of muscle activation for many muscles powering a variety of types of locomotion. An integrated analysis of EMG, kinematic, and anatomical information can provide an accurate picture of the function of individual muscles during movement (Goslow et al. 1981; Dial et al. 1988; Jayne and Lauder 1993; Gatesy 1997; Stern and Larson 2001).

47. **Strike Force Difference Between Landing on Hindfoot and Forefoot**

Makayla Sexson, Syed Ali, Austin Davis, Kevin Denton, Asher Dicello, Ira Garlett, Eveline Hols, Kealy Hosp, Sammy Ibrahim, Nicole Peterson, Christa Rohrer, Lauren Veselic, Jacob Gdovin
Faculty Advisor: Daniel Wilson

It has previously been shown that various jumping techniques produce different ground reaction forces based upon landing techniques with the most effective being a non-flat bilateral soft landing since it produces the least amount of impact force. However, no study has analyzed force production and landing technique with a horizontal jump. Therefore, the purpose of this study is to determine if various jump landings (i.e. hindfoot and forefoot) produce different vertical (F_z), anterior-posterior (F_y) and medial-lateral (F_x) ground reaction forces after a horizontal jump. Five participants between the ages of 20-26 will begin positioned two feet from the edge of a Bertec 4060A force plate and maximally jump horizontally while alternating landing on their hindfoot and forefoot. Each participant will jump six times with three jumps landing on the hindfoot and forefoot in a randomized order. The average of the three jumps, per different landing technique, will be computed and compared. It is hypothesized that landing on the forefoot will exert a larger F_z force than landing on the hindfoot.

48. **Training load management and injury prevention in Division-I collegiate men's soccer**

Lorenzo Tomasiello, Michael Seabolt, Melinda Novik, Sara Powell, Daniel Wilson, J. Riley Galloway
Faculty Advisor: Jacob Gdovin,

Soccer is a popular sport within the NCAA evidenced by 23,602 athletes participating in Men's soccer as of 2014. The sport's complexity, coupled with the structure of a collegiate season, demands athletes train to improve performance and prevent injuries. Coaches are able to monitor training through the use of global positioning system (GPS) technology to properly prescribe training loads to meet the individual demands for an athlete. By utilizing an acute to

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chronic ratio derived from GPS data, coaches are able to determine whether an athlete is prepared for the workloads they are going to be exposed to during a given week. However, an acute to chronic ratio has yet to be determined for NCAA Division-I men's soccer, which would provide a framework to safely and effectively train athletes. Therefore, the purpose of this study is to investigate if acute and chronic running workloads, and the acute to chronic ratio are associated with subsequent injury risk in NCAA Division-I men's soccer players within the 2018 season. GPS data, including total distance and distances at high intensity, from 24 athletes will be retroactively analyzed along with their injury data to determine the likelihood of sustaining an injury.

49. Correlating Alcohol Consumption, Exercise, and Drunkorexia Behaviors

Randi Montgomery

Faculty Advisor: Melinda Novik

Purpose: In recent years, the term drunkorexia has been used to explain the relationships of alcohol consumption with behaviors such as disordered eating and excessive exercise to compensate for alcohol consumption levels. **Methods:** During the fall 2018 semester, students at Missouri State University and a northeastern university were recruited to complete a survey regarding alcohol use and related behaviors. The students were asked to complete this survey three times throughout the semester. Complete data were collected from 150 students. All students were asked questions related to exercise and alcohol consumption. Those who reported recent alcohol use responded to questions related to drinking motives and behaviors, compensations during an alcohol consumption event, and post drinking compensations. The items in each group were then summed to create a scale score. Pearson Correlations were used to determine relationships between these variables. **Results:** Significant correlations were found at all three times between the three drunkorexia scale scores. A significant correlation was also found between alcohol consumption levels and compensations during an alcohol consumption event.

50. Examining the Effects of Service-Learning on Students' Perceptions of the CHES Responsibilities - A Pilot Study

Victoria Surratt

Faculty Advisor: Melinda Novik

Purpose: The purpose of this pilot study was to evaluate the effectiveness of a service-learning project on students' willingness, confidence, and perceived importance to incorporate the Certified Health Education Specialist Areas of Responsibility (CHES-AOR) into their profession. It was hypothesized that students' participation in a service-learning project in

an undergraduate health and wellness course would be more willing, confident, and perceive it as more important to apply the CHES-AOR within their chosen health profession. **Methods:** Missouri State University students registered in the fall 2018, undergraduate Health and Wellness service-learning course (KIN-350, 001), completed an online survey at the beginning and the end of the semester. Seven questions were structured to assess willingness, confidence, and perceived importance for each AOR. Data were collected from 21 students from both surveys. The results were summed and analyzed using one-sample t-tests to test the pre- and post- mean differences for confidence, willingness, and perceived importance for each of the CHES-AOR. **Results:** Students who took the survey increased their confidence, willingness, and perceived importance from pre- to post-survey.

51. Examining the Trajectory of Drunkorexia Behaviors

Valerie Sindel, Logan White, Randi Montgomery

Faculty Advisor: Melinda Novik

Purpose: Drunkorexia has been referred to the combination of alcohol use, disordered eating, and excessive physical activity. The purpose of this study was to examine trajectory of drunkorexia behaviors across the fall semester. **Methods:** Students from Missouri State University and a northeastern University, predominantly first-year, completed an online survey three times in the fall of 2018. Those students reporting recent alcohol use responded to four drunkorexia sub-scales: drinking motives and behaviors (11 and 12 items respectively), drunkorexia fails (10 items), and during an alcohol consumption event (9 items). The responses to the drunkorexia items were summed to create scale scores. The means of the scores were compared across the three time points. **Results:** The means of drinking motives and behaviors decreased while the means of drunkorexia fails and during an alcohol consumption event increased from August to November. **Conclusion:** This study provided a starting point for understanding the trajectory of drunkorexia. More research is needed to further understand the correlations found between the four sub-scales of drunkorexia as well as related consequences to provide better education about this phenomenon.

52. Characterizing average time spent in physical activity for college age individuals

Mackenzie Ikemire, Cassandra Waite, Amy Potthast, Riley Lekarczyk, Nick Mataya, Sara Powell,
Faculty Advisor: Riley Galloway

Purpose: According to ACSM, adults should engage in 150 minutes of moderate-intensity exercise per week and 10,000 steps/day to receive health benefits.

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This study aimed to determine the amount of time college students spend in moderate to vigorous activity (MVPA) and steps per day. Methods: Participants adhered to their regular PA regimen for a 7 days while logging information related to the PA and wearing accelerometers on their right hip every day to quantify the duration and intensity of each exercise bout (100Hz 60s epoch). Accelerometer counts were converted to minutes of PA in each intensity category. Results: Participants (N=34, age=22.3 ± 2.1 years) engaged in 4.5 exercise bouts throughout the week. The total MVPA for the week was 59.4 ± 19.9 minutes per week, resulting in 6.52% of their total time spent in PA. Participants averaged 7,808 steps per day. Conclusion: Overall, the levels of MVPA did not meet the recommended 150 minutes per week. They spent only 6.52% of PA in MVPA which did not meet the recommended 50% from ACSM. The recommended steps of 10,000 was also not met. These results show that the typical college age individual is at a greater risk for potential morbidity and mortality due to a lack of PA.

53. Determining the Effect of Self Efficacy on Exercise Intensity

Cassandra Waite, Riley Lekarczyk, Mackenzie Ikemire, Amy Potthast, Nicholas Mataya, Sara Powell
Faculty Advisor: Riley Galloway

PURPOSE: The purpose of this study was to observe the relationship of self-efficacy to exercise intensity. **METHODS:** Individuals 18-29 y/o were recruited. Participants performed a VO₂max test, then wore an accelerometer for seven days and logged activity. Levels of exercise self-efficacy were rated through PACO app four times daily. Participants returned for an exercise session at 20% increased intensity. Then participants rated self-efficacy and logged workouts for the next seven days. **RESULTS:** On PACO app, participants ranked exercise self-efficacy on a scale of 1 (not at all confident) to 5 (extremely confident) throughout the day. On average, participants reported high amounts of self-efficacy (MSD 4.20.9). Though self-efficacy was high, exercise intensity was low. The most time was spent in light intensity exercise (5,247.02,047.2 min/wk). Moderate intensity exercise was lower, averaging 302.993.8 min/wk. Vigorous (38.542.2 min/wk) and extremely vigorous (24.039.6 min/wk) intensities were scarce. Although ratings of self-efficacy were high, MVPA was rarely reached 59.419.9 min/day). **CONCLUSION:** While participants had high levels of self-efficacy, this did not motivate them to exercise at a higher intensity.

54. Determining the Relationship Between Exercise Intensity and Duration

Riley Lekarczyk, Cassandra Waite, Mackenzie Ikemire, Amy Potthast, Nicholas Mataya, Sara Powell
Faculty Advisor: Riley Galloway

Purpose: An individual with a higher VO₂ max should sustain higher intensity for longer duration. This study determined the relationship between VO₂max and average exercise intensity and duration. **Methods:** Following a VO₂max test participants engaged in their regular exercise regimen for 7 days. Participants wore an accelerometer to quantify intensity and duration (100Hz 60s epoch). Participants kept an exercise log to record information related to sessions. **Results:** Participants (N=23, age=21.3±1.1 years) averaged a VO₂max of 43.9±7.8 ml/kg/min and spent 90.5±3.1 hours in light intensity, 5.0±4.6 hours in moderate intensity, and 0.6±0.7 hours in vigorous intensity exercise. For analysis, moderate and vigorous intensity were reported together as moderate-to-vigorous physical activity (MVPA). VO₂max was significantly correlated with time in MVPA which is considered higher intensity (r=0.49 p=0.019). VO₂max was also significantly correlated with exercise duration (r=0.51 p=0.012). **Conclusions:** These results show a positive relationship between VO₂max and exercise intensity and duration. This study supports the assertion that increased VO₂max leads to greater ability to sustain high intensity exercise for longer duration.

55. Effects of Single Bout High Intensity Protocol versus Multi Session Protocol on Muscular Strength and Endurance

Marshall Gevers
Faculty Advisor: Riley Galloway

PURPOSE: To compare extreme high intensity interval training exercise, as stated in the book Body by Science (BbS), with conventional exercise recommendations. **METHODS:** Following anthropometric testing, thirteen college female participants completed 1-rep max and endurance tests on five resistance training lifts. Participants then followed either the BbS protocol or a conventional resistance training protocol according to ACSM for 8 weeks. Post-test data were then collected using the same 1-rep max, endurance, and anthropometric tests. **RESULTS:** The BbS group showed weight loss (-2.8±5.3 lbs), decreased body fat (-.43%±1.72), increased 1-rep max in all exercises (25%±14), and increased number of reps in the endurance test (19.4±21.4). The ACSM group also showed weight loss (-.14%±2.6), decreased body fat (-1.8%±1.8), increased 1-rep max in all exercises (23%±14) and increased number of reps in the endurance test (15.9±9.2). **CONCLUSION:** The BbS protocol offers a method of exercise with similar results to the ACSM

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method, but with a very low time commitment. Compliance rates could increase for completing workouts with BbS due to its flexibility with busy and variable schedules.

56. Examining the Influence of Affect on Exercise in College Students

Nick Mataya, Cassandra Waite, Mackenzie Ikemire, Riley Lekarczyk, Amy Potthast
Faculty Advisor: Sara Powell, Riley Galloway

PURPOSE: The purpose of this study was to investigate if positive affective valence during exercise impacts future exercise. **METHODS:** Participants provided affective responses to exercise for 7 days while wearing an accelerometer to record exercise duration and intensity. Next, participants completed an exercise session at a fixed intensity (70-85% of HRR). Immediately following exercise each participant rated self-efficacy, mood, discomfort, and exercise enjoyment. Participants wore an accelerometer for a post seven-day period while rating affective responses. **RESULTS:** During the first 7 days, on a scale of 1-7 (1=more enjoyment), participants reported a high enjoyment level ($M \pm SD$, 2.2 ± 1.5). Discomfort was rated low (5.7 ± 1.2 , scale of 1-7, 7=highly comfortable). Mood was rated positively (6.0 ± 1.1 , scale of 1-7, 7= positive mood). In terms of exercise, participants engaged in an average of 59.4 ± 19.9 min/day of MVPA. **CONCLUSION:** Affective states were positive and discomfort was low although participants engaged in less MVPA than recommended by ACSM for health benefits. Data is still being collected at this time. We expect positive mood and high exercise enjoyment to continue throughout the second week of data collection.

57. Influence of a structured exercise intervention on voluntary exercise engagement

Amy Potthast, Mackenzie Ikemire, Cassandra Waite, Riley Lekarczyk, Nick Mataya, Sara Powell
Faculty Advisor: Riley Galloway

PURPOSE: This study aimed to determine the influence of a structured exercise intervention at higher intensity on future engagement in high intensity exercise. **METHODS:** Participants wore an accelerometer for 7 days to determine average exercise intensity. An exercise intervention at an intensity of 70%-85% of HRR was then administered for each participant. Following intervention, accelerometers were worn for 7 days. During the two 7-day accelerometer periods, participants were required to keep a log related to exercise information. **RESULTS:** For the initial seven days, participants ($N=34$, age= 22.3 ± 2.1 years) spent $93.4 \pm 2.3\%$ in light intensity, $5.5 \pm 1.7\%$ in moderate intensity, $0.7 \pm 0.5\%$ in vigorous intensity, and $6.5 \pm 2.3\%$ in MVPA,

respectively. The percentages for the final seven days will be determined to evaluate any differences between pre and post exercise intervention. **CONCLUSION:** There is an expected slight increase in the percent of time spent in moderate and vigorous physical activity. This may suggest that a structured intervention at a higher intensity than one is accustomed to may reduce barriers, such as a misinterpretation of vigorous intensity exercise, which may increase overall engagement and health benefits.

58. Measuring the Occupation of Play in Children at a Crisis Nursery

Reilly Bennett, Linsey Denney, Courtney Louveau
Faculty Advisor: Ashlea Cardin

Play is a child's main occupation (meaningful and valued daily activity) and has significant effects on development. Occupational therapists help eliminate barriers to play through skilled evaluation and intervention. When children are in crisis, typical play behavior is interrupted. This study identified factors influencing play in children residing in a crisis nursery. Participants aged 11 mo.-12 yrs. were recruited through convenience sampling methods. Researchers observed 15 children using the Test of Playfulness (ToP) and Test of Environmental Supportiveness (TOES). Descriptive and inferential statistics were used for data analysis. ToP results showed no significant differences between typical and atypical children. TOES results indicated a safe and supportive play environment. This study furthers understanding of play in children residing in crisis nurseries. Future occupational therapy studies are warranted to obtain a greater understanding of play in children considered at-risk.

59. The Extent Andragogy is Reflected in Gastrostomy Tube Education: Medical Professional and Caregiver Perspectives

Anna Bocek, Anna Deegan, Kelly Owen, Erica Samuel
Faculty Advisor: Ashlea Cardin

Adult learning theory (andragogy) principles guide adult education. Medical professionals provide education to adult caregivers of children with medical conditions affecting daily activities such as feeding. Of interest to researchers was the extent to which andragogy was reflected in education provided for children requiring alternative feeding methods, such as gastrostomy tubes (g-tube). Using convenience and purposive sampling, researchers emailed a survey to 100 medical professionals and 46 caregivers, exploring perceptions, methods, and knowledge transfer in g-tube education. Twenty-five percent ($N=36$) of surveys were returned for analysis (medical professionals [$n=25$, 69%]; caregivers: [$n=11$, 31%]). Descriptive statistics were used to analyze data.

Results indicated that participants agreed that g-tube education was delivered and received in an andragogic way. Interestingly, caregivers were more accurate than medical professionals when asked specific questions about g-tube care. Future research is recommended to measure the degree to which andragogy is reflected in medical professionals' education to caregivers.

60. Static Versus Dynamic Hand Motion During Fluidotherapy: Comparing Time to Achieve Therapeutic Range

Danielle Williams, Colten Matthews, Cassidy Jones, Ashlea Cardin

Faculty Advisor: Marc Willey

Fluidotherapy is a medical device used as a preparatory method to heat the upper extremity for occupational therapy treatment. Currently, there is limited evidence describing best practice parameters of this modality. The purpose of this study was to investigate the effects of two different hand positions on hand surface temperatures during treatment. Static position required the client to hold their hand in a neutral position, while dynamic motion required the client to hold their hand palm down while opening and closing their fingers. Skin temperature changes were measured prior to and during fluidotherapy treatment to determine effects of each condition to reach a therapeutic temperature using bulb temperature sensors. There was a statistically significant main effect for hand condition ($p=.005$) with participants taking longer to reach therapeutic temperature in static position ($M=178.1s$, $SE=28.4$) than dynamic motion ($M=82.6s$, $SE=16.9$). However, it was determined that the sensors did not accurately measure the skin temperature but measured the temperature of the environment of the fluidotherapy machine. Thus, results cannot conclude that static position vs. dynamic motion effects time it takes to reach therapeutic temperature.

61. Effectiveness of the Interactive Metronome to Improve Older Adults' Cognition, Motor Skills, and Occupational Performance Satisfaction

Danielle Farmer, Sydney Schofield, Samantha Stiles
Faculty Advisor: Sapna Chakraborty

Older adults experience age-related decline in cognitive and motor performance, which could impact their ability to participate in valued daily activities. Occupational therapists address these concerns with a host of interventions, including technology like Interactive Metronome (IM) to enhance cognitive and motor benefits. The purpose of this study was to measure the effects of IM on age-related cognition, motor function, and occupational performance satisfaction in older adults. Three self-identified healthy adults (75-95 years) were assessed pre- and

post-intervention using the Montreal Cognitive Assessment (MoCA-B), the Minnesota Manual Dexterity Test (MMDT), the Canadian Occupational Performance Measure (COPM) and the IM Long Form Assessment (LFA). Participants completed a 6-week program that included 18 IM treatment sessions. Results indicated improved performance within the IM program itself, but gains in cognition, motor function, and occupational performance satisfaction were not statistically significant. The small sample size limited the interpretation of results. More research should be done to explore the use of this intervention in OT practice.

62. Effects of Cognitive Stimulation Therapy (CST) for People with Dementia on Performance of Activities of Daily Living (ADLs) and Cognition

Gabby Atwater, Beth DeLeon, Abby Kosydor
Faculty Advisor: Sapna Chakraborty

Cognitive Stimulation Therapy (CST) has demonstrated benefits in cognition for people with mild to moderate cognitive impairment. This is of interest to occupational therapists. However, little is known about the direct effects of CST on people with dementia and their activities of daily living (ADLs). The purpose of this study was to implement a CST program for persons with dementia living in local memory care units. Five adults aged 55 years and older with dementia were recruited via convenience sampling for this study. CST was administered bi-weekly for a total of 14 sessions. Pre- and post-CST outcome measures were taken using the Barthel Index of Activities of Daily Living and the Saint Louis University Mental Status assessments. Data were statistically analyzed using a paired T-test. CST was not shown to increase ADL performance or cognition in this study. Additional research is needed to explore and compare the use of CST in occupational therapy practice and its effects on ADL performance and cognition in this population across settings with a larger sample size.

63. The Effects of Mindfulness-Based Stress Reduction (MBSR) on Caregivers of Children Affected by Developmental Disability

Katie Brinkmeyer, Hannah Osman, Abby Reed, Christine Wilson

Faculty Advisor: Tara Boehne, Ashlea Cardin

Previous research has shown that caregivers of children with developmental disabilities report higher levels of stress, which affects their occupational adaptation. This study sought to determine the effects of a Mindfulness-Based Stress Reduction (MBSR) workshop on caregivers' perceptions of stress and attention to mindfulness. The workshop consisted of 8 weekly one-hour sessions, conducted in a hybrid format with alternating online and in-person meetings.

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Participants were asked to complete readings and watch videos based on the weekly content of the original MBSR workshop. Three participants (n=3) completed the workshop; all three exhibited an increase in mindfulness as evidenced by the MAAS, while two of three demonstrated a decrease in stress as evidenced by the PSI-4-SF. Results suggest that MBSR has the potential to be an effective intervention in treating parental stress. Further research is needed with a larger, more diverse sample size and an exploration of session format.

64. Learning to love: Connecting with humanity through pictures sets

Rylee Cornelius, Cadence Johnson, Rebekkah Wall, Emily Heinlein, Logan Griffin, Tabetha Hopke, Dallas Robinson
Faculty Advisor: Amber Abernathy

The current study examined connection with humanity and empathetic responding in relation to priming for compassion. The Pictorial Empathy Test (Koirikivi, 2014) was used to stimulate an emotional response. This test consists of pictures of wounded, crying, sick, dying people. The three conditions of the study, guided loving-kindness meditation, audio narration about compassion, and a control group, were used to determine whether it priming impacted connection with humanity or empathetic responding. There was no significant difference between the three groups, showing the priming did not impact connection with humanity or empathy. However, all three groups showed an increase in the Identification with All Humanity Scale after viewing the picture set. It appears the photos, rather than priming elicited understanding, compassion, and greater connection to humanity.

65. My Future Makes Me Sweat: Future-Selves, Personality, & Skin Conductance

Dallas Robinson, Tabetha Hopke, Logan Griffin, Rylee Cornelius, Rebekkah Wall, Cadence Johnson, Emily Heinlein
Faculty Advisor: Amber Abernathy

The current study examined the impact personality traits have on galvanic skin response when imagining positive and negative possible selves for three minutes. Results from two linear regressions revealed high conscientiousness in participants predicted lower skin conductance when describing future positive selves, and a Machiavellian worldview in participants predicted lower skin conductance when describing future negative selves. These findings were examined in relationship to control beliefs (specifically locus of control).

66. Saying Isn't Feeling: Unpopular Report Empathy

Emily Heinlein, Cadence Johnson, Logan Griffin, Rylee Cornelius, Dallas Robinson, Rebekkah Wall, Tabetha Hopke, CaSandra Stanbrough
Faculty Advisor: Amber Abernathy

The purpose of the current study was to determine the impact of social status on empathy. This study specifically looked at differences between popular and unpopular responding. Additionally, resource control strategies were examined in relation to status and empathy. Empathy was assessed through questionnaires, helping behavior, and galvanic skin response to an emotion-inducing video about rejection and bullying. Unpopular individuals self-reported higher levels of empathy but did not display greater galvanic skin responses or more helping behavior.

67. Tell Me Something Good: Priming and Skin Conductance

Logan Griffin, Rylee Cornelius, Tabetha Hopke, Dallas Robinson, Emily Heinlein, Rebekkah Wall
Faculty Advisor: Amber Abernathy

Research suggests society is more receptive to positive statements because of the desire to feel accepted by peers (Fredrickson, 1998). Self-esteem can be considered part of a psychological system known as the sociometer. The sociometer is the way in which individuals read and monitor a social situation, determining their level of acceptance or rejection and impacting their self-esteem (Fredrickson 1998). Individuals seek positive statements and are less affected by negative statements because of the self-serving bias, in which people are more likely to take responsibility for positive or desirable outcomes. In this study, we assessed participants' responses to statements tailored to their self-identified groups to determine if galvanic skin response was affected by priming statements. Results revealed positive statements created the greatest skin conductance response, as supported by previous literature.

68. The Many Faces of Personality: Social Selves

Tabetha Hopke, Rebekkah Wall, Dallas Robinson, Logan Griffin, Cadence Johnson, Emily Heinlein, Rylee Cornelius, CaSandra Stanbrough
Faculty Advisor: Amber Abernathy

Previous research suggests an asymmetry in the accuracy of personality judgments based on role-specific and self-conceptions (Roberts & Donahue, 1994). Individuals have the capability to have an idea of how others view them, called meta-accuracy, and based on social context our behavior could sometimes reflect our awareness of our reputation, therefore having an impact on how we are viewed in social settings (Kenny, 1994). The current study compared an individual's assessment of their own "Big Five"

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personality traits to assessments made by others (including family, friends, and strangers) in order to determine if personality is assessed differently based on role context. Results revealed that strangers' scores were the most similar to self-report scores on all of the big five traits. Additionally, it appears family members scores were significantly different from self-report scores on four of the five personality traits. Similarly, friend scores were significantly different from self-report scores on extraversion and agreeableness.

69. An investigation of foster care transition on attachment, psychosocial well-being, and academic behaviors of children in foster care

Kaylee Rucker

Faculty Advisor: Ashley Payne

Previous research is lacking in the investigation of the impact of the transition among biological, non-kinship, and kinship foster parents. The purpose of this literature review and proposed study is to investigate the perceived attachment behaviors and psychosocial well-being of siblings placed in both non-kinship and kinship foster care. The following research questions will be answered: (1) What are the different attachment behaviors expressed for each foster child in each placement? (2) How does their attachment behavior impact their psychosocial well-being? (3) How does attachment behavior and psychosocial well-being impact academic behavior and success? The participants for this proposed study include a kinship foster parent, a non-kinship foster parent, and teachers of 3 siblings in foster care (N=5). Two semi-structured interviews will be conducted and will reflect questions related to the attachment behaviors, psychosocial well-being, and academic behaviors and achievement of the foster children. Based on previous research, we expect to find that moving from a non-kinship placement to a kinship placement will experience anxious or avoidant attachment behaviors and negative psychosocial outcomes.

70. Attitudes and Beliefs as Moderators to Student Beliefs and Achievement

Lydia Needy

Faculty Advisor: Ashley Payne

Teacher supportiveness, attitudes/beliefs, and personal characteristics (i.e., gender) impact students' academic beliefs and achievement (Murray & Zvoch, 2011; Wentzel et al., 2010). DiVigal (2017) found that teacher gender moderated the relationship between perceived teacher support (PTS) and student math efficacy for female students. Yet, how teacher efficacy and expectations of students might moderate perceptions of teacher support in relation to student beliefs and achievement remains unknown. Thus, we

addressed the following questions: (1) Do math teachers' self-efficacy to teach math and their expectations of students moderate the relationship between PTS and math-related student outcomes? (2) How do these relationships differ for Black and White students? While PTS was a consistent predictor of math beliefs and achievement for both groups of students, the relationship between teacher beliefs and student outcomes and whether teacher beliefs moderated the relationship of PTS with math identity and achievement was different for Black and White students.

71. Don't Sweat the Test: Confronting Test Anxiety with Mindfulness Practices

Juliana Ferrara, Austin Nale, Erin Walker, Raegan Alexander, Bailey Hart, David Heim

Faculty Advisor: Adena Young-Jones

Academic stress pertaining to the testing setting is often referred to as test anxiety; Zeidner (1998) defined this construct as "the set of phenomenological, physiological, and behavioral responses that accompany concern about a possible negative consequences or failure on an exam." Past studies suggest mindfulness meditation (Oman et al., 2008) and expressive writing (Ramirez & Beilock, 2011) reduce test anxiety and improve academic performance. The present study combined these strategies to compare test anxiety interventions. Participants were randomly assigned to either guided mindfulness recording, expressive free write task, or control writing activity which each lasted 10 minutes. Results showed students in the expressive writing condition were more likely to report an increase in positive mood, while those in the control and mindfulness groups reported decreased positive mood. The pre- and post-measure for negative mood indicates that there was a decrease over time for all three conditions. In addition, mindfulness and resilience are negatively correlated with test anxiety. These findings provide support for contemplative practices prior to testing.

72. Unintended Consequences: An Investigation of Microaggressions in Higher Education

Erin Walker, Austin Nale, Mason Gaspard, Henry Novack, Bailey Hart, David Heim

Faculty Advisor: Adena Young-Jones

Microaggressions are described as "subtle forms of discrimination, often unintentional and unconscious, which send negative and denigrating messages to various individuals and groups" (Nadal et al., 2015). The effects of microaggressions are apparent at various levels and can have severe consequences (Hollingsworth et al., 2017; Miller, 2012). Unfortunately, microaggressions against marginalized individuals that commonly occur within society are

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often unnoticed or ignored. This study evaluates the impact of microaggressions on both minority and majority group members. Participants were asked to engage in perspective-taking to rate offensiveness of the microaggressions for themselves and others. Analyses revealed significant results with regard to awareness of microaggressions based on group membership; women, members of the sexual majority, and persons of color were all more aware of microaggressions targeting their respective groups than their majority counterparts. The present results lead us to believe that increased education and empathy training might contribute to a heightened awareness of microaggressions and their offensiveness.

73. Offensive or Opportunistic: Role-Playing to Elicit Empathy

Mason Gaspard, Juliana Ferrara, Kimberly Hettel, Bailey Hart, David Heim, Brad Soza, Colton Franklin
Faculty Advisor: Adena Young-Jones, David Zimmerman

Empathy is the ability of a person to understand and share another's subjective emotional experience (Gruen & Mendelsohn, 1986). A variety of role-playing activities are highly recommended in teacher education to facilitate learning, self-reflection, and social awareness (Kilgour, Reynaud, Northcote, & Shields, 2015). Unfortunately, some view perspective-taking activities as offensive (Silverman, 2015). Therefore, the current study evaluated the impact of role-playing and perspective taking to determine whether such activities help reduce negative perceptions without insulting the disabled community. A majority of participants reported feeling that the role-playing activities positively promoted empathy across all physical and mental disabilities. Strong correlations were shown between general positivity and feeling that these activities promote empathy for people with a variety of disorders and disabilities. Also, participants tended to respond that these simulations did not negatively impact stereotypes; the responses also indicate that the simulation itself was not insulting or degrading towards individuals with the disabilities listed.

74. A Literature Review of Self-Management, Self-Monitoring, and Self-Control Research in Behavior Analytic Journals, 1998-2018

Celeste Unnerstall, Karmen Colley
Faculty Advisor: Dana Paliliunas

Previous research has demonstrated that university students experience high levels of demand in their degree programs, which often results in difficulty maintaining their academic performance and managing their distress. As well, research suggests that values- and acceptance-based interventions may

be beneficial to support academic success of university students. The present study examined the effectiveness of a 6-week values clarification and committed action training program derived from acceptance and commitment therapy (ACT), which has been utilized in previous research with graduate students, to increase academic performance among undergraduate students in a psychology program in a multiple baseline design across groups and participants. The effect of the intervention was measured in terms of academic performance as indicated by participants' performance on weekly classroom quizzes. Results suggest that a values-based intervention may be beneficial for students in an undergraduate setting, and limitations and future directions for research will be discussed.

75. An Examination of the Effect of a Values-Based Intervention on Undergraduate College Students' Quiz Performance

Breanna Lee, Lacie Campbell, Jordan Belisle
Faculty Advisor: Dana Paliliunas

Previous research has demonstrated that university students experience high levels of demand in their degree programs, which often results in difficulty maintaining their academic performance and managing their distress. As well, research suggests that values- and acceptance-based interventions may be beneficial to support academic success of university students. The present study examined the effectiveness of a 6-week values clarification and committed action training program derived from acceptance and commitment therapy (ACT), which has been utilized in previous research with graduate students, to increase academic performance among undergraduate students in a psychology program in a multiple baseline design across groups and participants. The effect of the intervention was measured in terms of academic performance as indicated by participants' performance on weekly classroom quizzes. Results suggest that a values-based intervention may be beneficial for students in an undergraduate setting, and limitations and future directions for research will be discussed.

76. Analyzing Trends in Empirical and Non-Empirical Behavior Analytic Relational Frame Theory Research, 1990-2017

Elana Sickman, Taylor Lauer, Breanna Lee, Annalise Giamanco, Jordan Belisle
Faculty Advisor: Dana Paliliunas

Relational Frame Theory (RFT) provides a contemporary account of human language learning that may have several applications within Applied Behavior Analysis. We reviewed the current state of RFT research that was published in major applied behavior analytic journals from 1990 through 2017.

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The review extends upon prior work by directly comparing the publication of empirical and non-empirical studies within both a stimulus equivalence and RFT account of language development. Our results show that the publication rate for both empirical and non-empirical articles has increased over this time; however, following 2003, the rate of increase for empirical articles has exceeded the rate of increase for non-empirical articles. These journals differ in that JABA has historically been more likely to publish empirical research, whereas TAVB has historically been more likely to publish non-empirical research. The presence of published studies across applied behavior analytic research along with overall rates of increase suggest that RFT and equivalence research is becoming increasingly prevalent and accepted within Applied Behavior Analysis.

77. Development of the Values-Behavior Coherences Questionnaire (VBCQ)

Chynna Frizell

Faculty Advisor: Dana Paliliunas

"Values" are defined as "verbally construed global desired life consequences" (Hayes et al., 1999), meaning that they are ways of behaving that increase the meaning, purpose, or overall quality of one's life; values are a central component of Acceptance and Commitment Therapy. Existing self-report measures of values focus on the identification of specific values in various life domains and the consistency with those values. The current study developed a Values-Behavior Coherence Questionnaire (VBCQ) that measures individual reports of knowing, considering, and acting upon personal values, rather than identifying specific values. The objectives of this questionnaire are to quantify an individual's reported knowledge of values (clarity), reported inclusion of values in decision-making (consideration), and reported values-aligned behavior (coherence). Over 100 participants completed a 45-item questionnaire and a brief demographics survey. An exploratory factor analysis isolated distinct factors that participate in values-behavior coherence. Cronbach's alpha was calculated to eliminate items with low internal consistency. Future psychometric research will evaluate the reliability and validity of this measure.

78. Effect of a Values-Related Arbitrary Visual Stimulus as a Motivative Augmental for Academic Performance of Undergraduate College Students

Nathan Burgstahler

Faculty Advisor: Dana Paliliunas

Values-based interventions have been the subject of increasing conceptual and empirical attention in behavior analytic literature. Relational Frame Theory (RFT), an account of human language and cognition, may provide an empirically-valid account of the

formation of values and the mechanisms through which it affects behavior. The present study sought to measure the effect of an arbitrary symbol related to a values-focused hierarchy as a motivative augmental for academic performance with a sample of undergraduate university students in a classroom setting. The results suggest the presence of a values-related augmental stimulus in the classroom improved on-task behavior, quiz performance, task completion, and self-rating of performance compared to a neutral stimulus in a two-treatment, repeated measures crossover design. The results do not suggest the treatment was effective in changing participants' self-reported valuing behavior. Overall, the results support a behavioral conceptualization of values-driven behavior and provide an avenue for future research on values-driven behavior and provide an avenue for future research on values-based intervention in the classroom.

79. Effects of Autogenic Training on Stress Reduction and Glycemic Control in College Students With Type 1 Diabetes Mellitus

Tyler Jay Swearingin

Faculty Advisor: Dana Paliliunas

It is hypothesized that introducing an autogenic training program, a form of relaxation training, into a sample of college students with type 1 diabetes mellitus (T1DM) will result in those individuals having a reduction in stress and an improvement in glycemic control. The present study consists of 3 participants between the ages of 18-21. Measures of stress include the Diabetes Distress Scale, the Depression Anxiety Stress Scale, and the Problem Areas in Diabetes scale, and glycemic control will be measured using blood glucose levels. A multiple baseline experimental design across participants is used in which participants are introduced to autogenic training at different times. The primary dependent measure is the mean recordings of participants' daily blood glucose levels, and scores from the psychological tests serve as a supplemental measure to indicate changes in stress and well-being. Statistical and visual analysis will be utilized to interpret the results of the study. It is expected that a reduction in stress and mean blood glucose level will be found. Implications include the future use of autogenic training as a promising method to reduce stress and improve glycemic control in college students with T1DM.

80. Comparing Monetary Discounting and Discounting of Climate Change: A Reinforcer Loss Analysis

Reiley Snavelly, Mason Todd, Lacie Campbell

Faculty Advisor: Jordan Belisle

Prior research has supported a conceptual analogue

between delay discounting of reinforcer loss and decisions related to climate change policy (Belisle, Campbell, & Todd, under review). The present study extends the analogue by directly comparing monetary discounting of reinforcer loss to sacrificing access to valued commodities to delay reaching the atmospheric point of no return (PNR). As in prior research, the climate change discounting task required participants to choose between non-restrictive policies that result in PNR within 20 years or policies that restrict access to CO₂, emitting commodities to delay PNR by D delay. The time scale was adapted to meet the obtained P-infinity value reported in prior work. The monetary discounting task was presented along the same time-scale in which participants were required to choose between losing a sum of money immediately or paying a smaller sum of money to delay the larger-later payment. This pay scale structure was similar to interest payments in commercial consumption. Results suggest that hyperbolic discounting was evident in both discounting tasks, and discount rates were comparable when the time-scale was held constant across both tasks.

81. Delay Discounting of Reinforcer Loss Evident in Climate Change Policy Preference

Mason Todd, Lacie Campbell
Faculty Advisor: Jordan Belisle

Unprecedented rises in atmospheric CO₂, and other emissions following the industrial revolution are markedly impacting Earth's geographical and ecological systems. Delay discounting models have traditionally emphasized a hyperbolic decrease in the subjective value of an appetitive commodity over time; however, many outcomes related to climate change may be more appropriately framed as a decrease in the subjective value of reinforcer loss over time. The purpose of the present study was to compare participants delay discounting of climate change (reaching atmospheric point of no return) to monetary discounting of reinforcer loss observed in prior research. We administered a climate change discounting survey and a monetary discounting task to over 300 college student participants. Curve fit analyses suggest that the climate change discounting task produced hyperbolic discounting that resembled and may operate at greater intensity than traditional monetary discounting. We did not observe a correlation between discounting of climate change and monetary discounting, suggesting that trait impulsivity may not provide an appropriate account of behavioral economic factors that could influence or inform policy related to climate change.

82. Relational Density Theory: The Relative Influence of Volumetric-Mass-Density on the Resistance of Relational Classes

Annalise Giamanco
Mason Todd, Lacie Campbell, Taylor Lauer
Faculty Advisor: Jordan Belisle

Relational Density Theory (RDT) provides a behavioral account of higher-order and self-organizing properties of equivalence networks. Similar to behavioral momentum theory, RDT posits that a first self-organizing property is the relative resistance of relational behavior as a product of behavioral mass. In RDT, mass is a function of the competing molar state volume (class size and nodal distance) and density (response strength) of a given equivalence class. The purpose of the present study was to extend upon prior research on RDT with 13 college student participants. In phases 1 and 2, 4 classes were established that differed in size (3-member, 4-member, 6-member, 8-member) in a one-to-many training structure (max. nodal distance = 1 for all classes). In phase 3, a single derived relation within each class was counter conditioned (-x), and changes in relational responding for each class were evaluated in phase 4. We predicted that classes with greater volume would be more resistant given similar obtained density values in phases 2 and 3. Results suggest that greater distance from the counter-conditioned relation was predictive of greater resistance to counter-conditioning, consistent with a first model prediction within RDT.

83. The Complexity of Relational Training Within Empirical Behavior Analytic Studies of Relational Frame Theory and Stimulus Equivalence With Children, 1990-2017

Taylor Lauer, Breanna Lee, Annalise Giamanco,
Elana Sickman, Dana Paliliunas
Faculty Advisor: Jordan Belisle

Relational Frame Theory and Stimulus Equivalence training technologies are being increasingly applied with children with and without intellectual or developmental disabilities. These contemporary accounts of human language emphasize the generativity and emergence of new verbal behavior in the absence of direct reinforcement. We evaluated empirical research published within major behavior analytic journals from 1990 through 2017 to determine the complexity of relational frames and equivalence classes targeted in training. We report the age and mean number of participants in single-subject experimental design research. We also report whether participants have intellectual or developmental disabilities, the types of relations targeted in training (coordination, hierarchical, perspective taking, comparison, distinction, opposition, causality), the level of entailment (mutual entailment, combinatorial

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entailment), and whether researchers typically probe for transfers or transformations of stimulus function. Taken together, the results have implications for understanding the current state of RFT research with children within a behavior analytic model and may be used to extend research in this area.

84. MAKING A TIGER'S DAY: FREE-OPERANT ASSESSMENT AND ENVIRONMENTAL ENRICHMENT

Trista Shrock

Faculty Advisor: Michael Clayton

Problem behaviors occur often in captive wild animals due to stress and boredom. Environmental enrichment is one of the most successful methods to help minimize these types of behaviors in many captive wild animals. The current study investigated preferences of play items and scents for seven adult Bengal tigers in a Tiger Sanctuary using a free-operant preference assessment. Two subspecies of Bengal tiger (*panthera tigris*) are represented. Six of the tigers are *panthera tigris tigris* and one is *panthera tigris altaica*. Three phases were run on each tiger, ultimately establishing a hierarchy of preferred play items and scents for each tiger included in the study. The significance of systematic manipulation of play items and scents (preference testing) with wild animals will be discussed as well as the importance of caring for captive animals. Data will be presented demonstrating the choices made by each tiger in each preference assessment phase.

85. Age Differences in Need for Approval, Interpersonal Sensitivity, & Social Media Use

Cameron Koob

Faculty Advisor: Melissa Fallone

For this study, I hypothesized that the youngest age group of participants would have the highest need for approval and the highest use of social media, while the oldest age group would have the lowest. To test this, participants completed an online survey that was posted to researchers' social media accounts and consisted of demographic questions, social media use questions, Martin-Larsen Approval Motivation Scale (MLAM), and an interpersonal sensitivity measure (ISP). Of these participants ($N=88$), 30 were ages 18-30, 38 were ages 30-50, and 20 were ages 50 and over. The majority were female (85.2%), 12.5% were male, and 2.3% preferred not to answer. The hypothesis was supported for each dependent variable (MLAM, ISP and social media use), $F(2,85) = 12.60$, $p < .001$, $\eta^2 = .23$, $F(2,85) = 19.76$, $p < .001$, $\eta^2 = .32$, $F(2, N = 88) = 7.86$, $p = .02$. The findings of this study help people understand the relationship between age and need for approval and suggest that social media use is a factor that may affect this relationship. The importance of these results for future

research are discussed.

86. Effects Of State Anxiety On Working Memory

Isabella Fryman

Faculty Advisor: Melissa Fallone

Anxiety symptoms have been previously associated with a decreased ability to complete cognitive tasks, including visual-motor planning, response inhibition, and memory capacity. Though past research has focused on correlations between trait anxiety/anxiety disorders and cognitive performance, this study focuses on the potential impact of state anxiety induced throughout a cognitive test. An operation span task was used to assess the working memory of participants in both a control condition and an experimental condition, which exposed the participants to stressors that aimed to increase the amount of anxiety experienced while completing the task. Overall, the hypothesis that increased anxiety would lead to decreased performance was supported. The number of trials correctly completed by those in the control group ($M = 9.4$) was significantly higher, $t(48) = 2.09$, $p = .04$, than the number of trials correctly completed by the experimental group ($M = 7.3$). These findings are important in understanding test anxiety in a classroom setting and the effects of stress on every day cognitive functioning.

87. Perceptions of Risks in Childhood Sports

Mercedes Robinson

Faculty Advisor: Melissa Fallone

This study examined perceived safety risks associated with participation in sports at the collegiate level. Students enrolled in introductory psychology courses ($n = 148$) and collegiate student athletes involved in an NCAA-regulated sports ($n = 81$) at Missouri State University completed an online survey. The survey consisted of questions regarding participants' demographic characteristics and athletic experiences including sports-related injuries. In addition, a 24-item Safety Concern Scale (Romaine, DeFreese, Gukiewicz, & Register-Mihalik, 2016) was used to assess views about the participants' future children playing sports. Because athletes are more likely to experience sports injuries themselves and they are more likely to observe other athletes being injured, I hypothesized that athletes' (especially those involved in contact sports) would show higher levels of concern about their future children playing sports than non-student athletes. These hypotheses were not supported. However, consistent with previous literature (Kontos, 2004), gender differences were indicated, $t(227) = 4.82$, $p < .01$, such that females reported higher safety concerns than males, regardless of athlete status.

88. Correlates of Active Student Engagement: An Internal Replication

Kristen Hoffner, Alexandra Light
Faculty Advisor: Timothy Daugherty

Though being behaviorally active in the classroom is associated with attractive outcomes, many college students are disengaged. This study examines potential correlates of classroom engagement. Across two waves of data collection, with the second wave providing an internal replication challenge, three variables were consistently related to active classroom engagement. Higher self-esteem, less texting while driving, and lower externally oriented thinking predicted self-report of classroom engagement. Together, the three variables accounted for sixteen percent of the variance in engagement. Adding a fourth variable, gender, led to twenty percent of the variance in engagement being explained.

89. Psychosocial and Academic Correlates of Unwanted Sexual Contact

Alexandra Light, Kristen Hoffner
Faculty Advisor: Timothy Daugherty

Experience of unwanted sexual contact (USC) at any point in the lifespan may have negative effects on psychological, physical, relational, and academic well-being. Childhood USC appears to increase the risk of USC occurring during college, and women are more likely than men to experience USC. In the present study, participants completed the Brief Trauma Questionnaire (BTQ). Participants specifically reporting USC were compared to participants who indicated that they had experienced none of the traumatic events listed on the BTQ. As expected, participants identifying as female were more likely than those identifying as male to report USC. Students reporting experience with USC were more likely to report using alcohol frequently and to be motivated more by coping needs in their alcohol use. The USC group reported more anxiety, lower levels of optimism about the future, and more difficulty identifying feelings. The USC group did not report significantly different working relationships with professors but did report lower grade point averages. Because the comparison group in this study reported experiencing no trauma, these analyses do not clearly indicate whether the found relationships are specific to unwanted sexual contact.

90. Values and Career Goal Commitment

Jamie Weeda
Faculty Advisor: Tom Kane

Values affect work-related outcomes such as career choice (Dill, et al., 2012), turnover intention (Kaygin & Gulluce, 2013), and workplace attitudes (Twenge, et al., 2010). While values are important to individual

vocational and career choices (Jin & Rounds, 2011), of special relevance for this research are effects that different values have on career goal commitment. Self-determination theory asserts that optimal motivation occurs when people are intrinsically motivated. If so, then intrinsic values such as personal growth and autonomy should affect career goal commitment differently than extrinsic values such as pay and benefits. This study makes three contributions to career research and theory: 1) it introduces and tests a measure of career commitment that contains both rational and emotional components; 2) it explores effects of intrinsic and extrinsic career values on the forms of commitment expressed by career planners; and 3) it examines the potential role that career values and career goal commitment have on proximal motivation. Findings can aid in understanding long-term drivers of motivation. Implications of this research are relevant to career and academic advisers.

91. Individual Differences in 3-Month-Old Infants' Visual Sensory Habituation and Learning

Autumn Houser, Amanda Bonnot, Jordan Rawson
Faculty Advisor: D. Wayne Mitchell

Two experiments were conducted to explore the sensory and behavioral characteristics of 3-month-old infants' visual habituation. In Experiment 1 ($n = 34$), the test-retest reliability of fixation time and rate of habituation was assessed via an infant-controlled floating-point calculation procedure. Reliability was in concordance of other researchers' reported finding ($r = .53$, $p = .001$ for peak fixation time; $r = .50$, $p = .002$ for habituation rate; $r = -.15$, ns for number of fixations). In Experiment 2 ($n = 71$), infants were habituated to a 3-component (varying in levels of saliency) stimulus and were assigned randomly to 1 of 4 dishabituation conditions, a control and 3 conditions differing regarding the stimulus component presented. The infants displayed significant dishabituation response only to the less salient component, suggesting they failed to learn that stimulus component although exhibiting habituation. Via secondary analyses, it was found that those infants who displayed long fixation times had a significant dishabituation response. These findings are interpreted theoretically as an interaction between prior environmental visual experience, sensory habituation, and visual scanning behavior.

92. Effect of Yoga on Metabolic Parameters of a Young Adolescent with Cerebral Palsy: A Single-Subject Design

Kristine Drane, Michaela Lupo
Faculty Advisor: Elizabeth Williamson

Individuals with childhood-onset disabilities have higher incidences of chronic health conditions partly

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due to sedentary behavior and decreased opportunities for physical activity. This single-subject designed study examined yoga as a fitness activity. A 15-year-old, ambulatory, male with cerebral palsy received yoga instruction twice a week (6 weeks yoga, 6 weeks no yoga, 6 weeks yoga). The participant also performed yoga via videos of previous sessions on off days and during the break. Measurements of body mass index (BMI), body fat percentage, heart rate, respiration rate, blood pressure, height and weight were completed for three days prior to the first yoga session, weekly for 18 weeks, and for three days following the final yoga session. Gross Motor Function Measurement assessments were completed prior to and upon completion of the study. Positive findings included a decrease in mean arterial pressure and body fat percentage. Further investigation of yoga as an inexpensive, life-long activity to improve physical fitness of individuals with childhood-onset disabilities is warranted.

93. Effects of Time of Day on Postural Stability with a Cognitive Task

Brianna Hutchins, Connor Pratt
Faculty Advisor: Elizabeth Williamson

This study examined the interaction between three factors (time of day, cognitive demand and sensory input) using the Neurocom VSR (VSR) and NeuroCom Smart Balance Master (NSB). In the orientation session, postural sway was measured in four sensory conditions using the NSB and VSR. Cognitive demand was measured using an auditory Stroop test. Participants returned for morning and evening testing. Testing consisted of a single-task condition of steadiness of static posture using both the NSB and VSR and a dual-task condition of steadiness of static posture using the NSB and VSR while completing an auditory Stroop test. Significant differences were found for stable surface vs unstable surface and eyes open vs eyes closed. There was also a significant difference between eyes open or eyes closed while on a stable or unstable surface. With the NSB, there was a significant difference in time of day, with greater sway in the evening than the morning. Our findings found similar results between the NSB and VSR systems. Future research using the VSR will assess if time of day and cognitive demand affect static postural control in older adults.

94. The effect on balance when approaching a sitting surface on the paretic side compared to the non-paretic side following stroke

Ryan Clements, Kayla Enloe, Jennifer Humphrey, Andrew Ludwig
Faculty Advisor: Jason Shaw

Individuals with hemiparesis are at an increased risk for falls. To date, no study has investigated postural

control during the functional task of approaching a chair. We hypothesized that the leading foot would be more medial and anterior to the pelvic center of mass when moving toward the chair on the paretic side compared to the non-paretic side, indicating an increased risk for falling. The purpose of this study was to investigate how the center of mass relative to the base of support is altered when a person with hemiparesis approaches a chair located on the paretic side compared to approaching a chair on the non-paretic side. The paretic side toe marker was a mean $25.6 \text{ mm} \pm 70.6 \text{ mm}$ more lateral than the strong side, $p = .97$. The paretic side heel marker was $47.7 \pm 92.2 \text{ mm}$ forward of the strong side, $p = .38$. Contrary to the hypothesis, the paretic side toe marker was more lateral to the center of mass when moving toward the chair on the paretic side compared to the non-paretic side. As hypothesized, the heel marker on the paretic side was more anterior to the center of mass compared to the non-paretic side, indicating increased risk for falling backward when moving toward the paretic side.

95. Relationship Between HEXACO Personality Inventory Scores and Scores on MSU DPT Program Clinical Performance Instrument

Ashley Boyle, Dianna Ferro
Faculty Advisors: Jeanne Cook, Scott Wallentine, Patrica Cahoj, Marcia Himes

Entry to professional, graduate education is competitive. Measures of student success traditionally include GPA or GRE scores. However, additional variables, such as non-cognitive variables, may be helpful to measure potential student success in a clinical profession. Non-cognitive variables can be measured using the HEXACO Personality Inventory. Clinical internship performance in entry-level doctoral physical therapy education may be assessed using the Clinical Performance Instrument (CPI). The purpose of this study was to determine if there is a relationship between Missouri State University applicant facet scores on the HEXACO-PI and their subsequent clinical performance during a first clinical internship measured by the CPI. De-identified retrospective aggregate data of 36 MSU DPT students were analyzed. Instruments include HEXACO-PI scores and CPI scores from a first clinical internship. Bivariate correlations revealed negative significance ($p < .05$) between HEXACO-PI and CPI scores. Multiple linear regressions revealed predictive relationships between some HEXACO-PI and CPI scores. These results are consistent with other studies that suggest non-cognitive variables may influence student clinical performance.

96. Are TUG and ABC Scores Predictive of mCTSIB Composite Scores in Community Dwelling Older Adults?

Matt McClanahan, Caitlin Winschel
Faculty Advisor: Marcia Himes

Introduction: The Timed Up-and-Go Test (TUG) assesses functional mobility and dynamic balance in older adults. The Activities-specific Balance Confidence Scale (ABC) is a self-perceived balance confidence rating of 16 functional activities. The Modified Clinical Test of Sensory Interaction on Balance (mCTSIB) provides objective analysis of postural sway velocity during four sensory conditions. The purpose of this study was to determine if the TUG or ABC are predictive of the mCTSIB Composite Score (CS) as measured on the NeuroCom VSR System. **Methods:** Thirty-six individuals participating in a fall screening at a local senior center completed the TUG, ABC, and mCTSIB tests. **Results:** Findings indicate that TUG and ABC scores were not predictive of the mCTSIB CS; however, the TUG was significantly correlated with the CS. No significant correlation was found between the ABC and the mCTSIB CS. The TUG and ABC were significantly correlated with mCTSIB conditions 1 (eyes open) and 2 (eyes closed). The discrepancy between the results of our study necessitate further investigation to determine if there is indeed a correlation between balance confidence and postural sway.

97. Do the Five Times Sit-to-Stand Test and 30-Second Chair Stand Test Correlate with Postural Sway as Measured by the mCTSIB?

Hailey Jahnel, Zach Hershberger
Faculty Advisor: Marcia Himes

Introduction: The Modified Clinical Test of Sensory Interaction on Balance (mCTSIB), is a commonly used measure of postural sway for older adults or individuals with balance deficits. The 30-second Chair Stand Test (30s-CST) and the Five Times Sit-to-Stand Test (FTSTS) are measures of leg strength and can be used to conduct a fall risk screen. The purpose of this study was to determine if the 30-s CST and FTSTS are correlated with postural sway as measured by the mCTSIB in older adults. **Methods:** Thirty-six individuals participated in a fall screening at a local senior center completed the mCTSIB, 30s-CST, and the FTSTS tests. **Results:** Correlations between the 30-s CST and the FTSTS with the mCTSIB CS were not statistically significant. A follow-up analysis revealed a statistically significant correlation between the 30-s CST and the mCTSIB for condition 1 ($r = -.520$; $p = .001$). Additionally, the FTSTS scores were significantly correlated with the mCTSIB during conditions 1 and 2 respectively ($r = .552$; $p = .001$)($r = .453$; $p = .009$).

Conclusion: Further studies are needed to investigate the predictive ability of leg strength to determine postural sway.

98. Is Leg Strength or Balance Confidence a Better Predictor of Postural Sway as Measured by the mCTSIB?

Kelsey Jones, Taylor Meyer, Larry Skeen
Faculty Advisor: Marcia Himes

Introduction: The Five Times Sit to Stand Test (STS-5) and the Activities-Specific Balance Confidence Scale (ABC) are commonly used measures to test leg strength and balance confidence of older adults. The modified Clinical Test of Sensory Interaction on Balance (mCTSIB) measures postural sway. The purpose of this study was to determine if leg strength or balance confidence is a better predictor of postural sway as measured by the mCTSIB. **Methods:** Thirty-two individuals who participated in a fall screening at a local senior center completed the STS-5, ABC, and mCTSIB tests. **Results:** Multiple regression results indicate that the STS-5 and ABC scores were not predictive of the mCTSIB Composite Scores. A follow-up analysis was conducted to determine if a relationship existed among the STS-5, ABC, and the four mCTSIB sensory conditions. Pearson correlation results revealed a significant positive relationship between the STS-5 and the mCTSIB. A negative correlation was found between balance confidence and mCTSIB conditions 1 and 2 and between the STS-5 and the ABC. **Conclusion:** Further studies are needed to investigate leg strength, balance confidence, and postural sway.

99. Effectiveness of Virtual Reality Physical Therapy on Self-Perceived Urinary Incontinence: A Case Series Study

Michael Bradley, Jeffrey Fraley, John Klass,
Jenny Morgan, Lauren Skornia
Faculty Advisor: Patricia Cahoj

Purpose: Urinary incontinence (UI) affects up to 80% of all elderly persons in long term care facilities (Vaughn et al., 2017). This case-series study quantified, via questionnaires, the effectiveness of virtual reality games in treating UI in women in an independent living facility. **Methods:** This case study involved three subjects with a history of UI who participated in 30 minute sessions three times per week for six weeks. The participants used a virtual reality device (WiiFit) to control games through seated weight shifting. Pre and Post testing questionnaires included the King's Health Questionnaire, ICIQ-UI-SF, and the ICIQ-OAB to determine overall bladder function and impact on their lives. **Results:** All of the participants had an average improvement of -10.3 points with ICIQ-OAB, with a decreased score indicating less dysfunction.

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The data collected from the journals also indicated a R-squared= .74674 showing a decrease in episodes of leaking by Participant C with increased numbers of intervention. Conclusion: The UI study involving the use of the WiiFit determined that it was useful in improving deficits involved in UI. Limitations to this study included subjective nature of the data and lack of objective data.

100. Eccentric Exercises as an Alternative to Standard Treatments for Rotator Cuff Pathology

Dalton Burke, Philip Guinid, Taylor Little
Faculty Advisor: Sean Newton

Background: Subacromial shoulder pain is one of the leading orthopedic complaints in general practice. Previous studies have shown eccentric exercise programs to be an alternative conservative treatment method to produce more efficient muscle contractions, greater skeletal muscle hypertrophy, and increased neural and histological adaptations for improved function following injury. Purpose: The purpose of this systematic review was to analyze the effects of eccentric training for individuals with subacromial shoulder pain in comparison to other conservative treatment options. Methods: Electronic databases were utilized resulting in 9 articles for analysis meeting the initial inclusion criteria. DELPHI scoring system was utilized to decipher the articles with a strong validity and clinical significance. A score of 6/9 was required for any article to be included in this systematic review resulting in 5 articles for final review. Results: Eccentric exercise training was found to be an effective mechanism to treating subacromial shoulder including improved strength, range of motion, pain levels, and outcome measures, however, this treatment approach was not significantly better than other treatment approaches.

101. The Effectiveness of Conservative Methods in Comparison to Invasive Methods for Treatment of Adhesive Capsulitis

Rachael Wendelbo, Taylor Nolan
Faculty Advisor: Sean Newton

Purpose: Adhesive capsulitis is a limiting shoulder pathology where scar tissue or adhesions form across the glenohumeral joint, limiting range of motion and impacting functional abilities. Prevalence is 2-5% in the general population, usually in females aged 40-60. The primary objective for this review is to compare the effectiveness of conservative to invasive treatment methods of adhesive capsulitis. Methods: Authors searched the following databases: Academic Search Complete, Medline, CINAHL and SportDISCUS. Keywords used were “adhesive capsulitis,” “treatment,” “physical therapy,” and “surgery.” Inclusion criteria was adhesive capsulitis as the primary shoulder deficit, subjects over age 40, Delphi

score of 5/9 or higher, study less than ten years old. Exclusion criteria was if additional pathology was present, the article was not in English, the subjects were under age 40, the study was completed before 2008. The initial search yielded 2234 results, and the final systematic review was narrowed down to 8 articles. Conclusion: Both conservative and invasive treatment methods led to improvements in range of motion, functional status, and pain reduction. Further research is needed to assess the most effective treatment methods.

102. Is There a Difference Between mCTSIB Scores as Measured on Two Portable Balance Systems

Anna-Grace Eubanks, Emma Potter
Faculty Advisor: Barbara Susan Robinson

The NeuroCom Very Simple Rehabilitation (VSR) and the Bertec Balance Advantage – Essential (BBA) record postural sway as an individual is tested on the four test conditions of the modified Clinical Test for Sensory Interaction on Balance (mCTSIB): Eyes open firm surface (EO), Eyes closed firm surface (EC), Eyes open on foam (EOF), and Eyes closed on foam (ECF). The purpose of this study was to determine if there was a difference between mCTSIB scores as measured on the VSR and the BBA. We hypothesized that there will be no significant difference between mCTSIB scores as measured by the two devices. Thirty-six individuals who were 55 years or older (mean age = 72.8 ± 10.1 , Male = 9, Female = 27) participated. They completed one trial on each device and were given at least a 2-minute rest break between each trial. There was a significant correlation between the EO and EC conditions, indicating no significant difference between conditions 1 and 2 on both the devices. There was no significant correlation between conditions 3 (EOF) and 4 (ECF) or the composite scores. The characteristics of the two foam pads may have contributed to the differences in sway velocity during conditions 3 and 4 as measured on each device.

103. Is there a difference in ease of use between the NeuroCom InVision System and the Bertec Vision Advantage?

Shawn Artz, Adam Jahnel
Faculty Advisor: Barbara Susan Robinson

Vestibular-Ocular Reflex (VOR) integrity is assessed with the Dynamic Visual Acuity Test (DVAT) and Gaze Stabilization Test (GST). The NeuroCom InVision System (NIS) has good reliability and validity for assessing the VOR. However, ease of use and testing time have not been examined. The purpose of this study was to compare the ease of use between the NIS and the Bertec Balance Advantage (BVA) when testing VOR integrity in healthy college students. We hypothesized that

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participants would report greater ease of use with the BVA and that the NIS would require decreased testing time. Sixteen individuals (mean age = 24.0 ± 1.93 , Male = 5, Female = 11) participated. They were included if they had corrected vision of 20/20 or better and were between the ages of 18-30 years; excluded if they had impaired vision or balance, or previous participation in vision training or other visually demanding tasks. All participants completed one trial with each device. Standardized instructions were given. Testing order was randomized and participants were given a 2-minute rest break between trials. The BVA took significantly longer to complete; however, the majority of participants found it easier to use and more comfortable than the NIS.

104. The Effect of Moving Cupping on Cervical flexion

Collin Gilmore, W. David Carr
Facility Advisor: Allan Liggett

Context: Cupping therapy is used by healthcare professionals for a variety of issues, including increasing range of motion. Moving cupping has little research regarding its effect on range of motion. Objective: Purpose was to examine if moving cupping on the trapezius muscle had an effect on cervical flexion. Design: Participants were randomly assigned to experimental group or control group. A cervical flexion pre/post-test measurement was obtained for each participant. Researcher performing measurements was blinded to group participation. Setting: Missouri State University, Department of Sports Medicine and Athletic Training
Subjects: 26 healthy participants aged 18 to 35 years, convenience sample. Intervention: Moving cupping to the trapezius muscle Measurements: Digital inclinometer was used to measure cervical flexion in degrees. Results: Analysis using a mixed ANOVA showed a significant difference within the treatment group from pre-test to post-test. Conclusion: Results indicated the moving cupping group demonstrated an increase in cervical flexion.

105. Injury History is Correlated with Active and Functional Turnout in Collegiate Dancers

Ariana Fakeri, Sarah Wilcoxon
Facility Advisor: Kristin Paloncy

OBJECTIVE: The purpose of this study was to assess the correlation between injury history, active and functional turnout in collegiate dancers. DESIGN: In this observational study, 32 undergraduate dancers completed a self-reported injury history questionnaire. Active and functional turnout was measured using Functional Footprints and a goniometer. RESULTS: The logistic regression model was statistically significant, $\chi^2(4) = 20.422$, $p < .001$. Functional average left and the active measurements bilaterally were statistically significant. Higher measured active

and functional scores on the right side compared to the left showed a decreased likelihood of injury. Higher scores in the active position in the left leg increased the likelihood of moderate injury. With severe injuries, the logistic regression model was marginally significant, $\chi^2(4) = 8.251$, $p = .083$. The functional right measurement was statistically significant. CONCLUSION: Moderate injuries on the right side with greater measured active and functional turnout correlated with a decreased likelihood of injury. Severe injuries with a greater measured turnout may show a decreased likelihood of injury in all measurements except the left side functional turnout.

106. Dietary Supplement Knowledge and Use Among Collegiate Athletes

Julia Galloway, William Burney, Kelby Kujawa
Facility Advisor: Tona Hetzler

Context: Many athletes use dietary supplements with the intention of enhancing their athletic performance. Currently there are limited studies to show if athletes who are using supplements have adequate knowledge regarding the purpose and physiological effects of dietary supplement. Objective: To determine the use of dietary supplements in collegiate level athletes, and to evaluate the knowledge athletes have of dietary supplements. Design: Quantitative study setting: A web link with a survey was sent via email to all athletic trainers and head coaches with instructions to forward the survey link to their athletes. Participants: Collegiate level student-athletes in NCAA DI and DII universities in NATA Districts 4 and 5 were utilized in this study. Main Outcome Measure(s): A 19 question, validated survey consisting of demographic, dietary supplement use, and knowledge-based questions. Results: Descriptive analyses and a series of independent t-tests were run to correlate demographic factors to knowledge scores. Conclusion: Pending final data analysis. Key Words: Protein, pre-workout, athletic training.

107. Effect of Extended Use of a Single Strip of Kinesiology Tape on Balance: A Randomized Controlled Trial

Jordan Devenney,
Facility Advisor: W. David Carr

A randomized controlled trial experiment was designed to examine the immediate and prolonged effects of a single strip of kinesiology tape across the front of the ankle on proprioception as measured by postural stability. Approximately 50 subjects ages 18-30 will participate in this study. Exclusion criteria from the study includes hypersensitivity to adhesive, dense sensory and/or motor loss over the taped area, and open wounds along taping area. The experiment will utilize one leg as the control and the other as the experimental. Each individual will have their postural

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stability assessed four separate times on a Bertec via single-leg stance over the course of three trials each with eyes open and eyes closed. Subjects will have postural stability measured prior to tape application, immediately after tape application, four days after tape application, and three days after removal. Sway velocity will be collected and compared between each of the four assessments. Results and conclusion pending.

108. Athletic Trainers' Perceptions About Motivation Skills in Injury Rehabilitation

Lindsay Hampton, Kristin Paloncy
Facility Advisor: Allan Liggett

Objective: Motivational skills have been found to aid in the injury rehabilitation process leading to quicker return time. The purpose of this study was to examine the effect of gender and experience of the athletic trainer on the motivational skills in injury rehabilitation. Design: A 17-question web-based validated survey was completed by 58 certified ATs (24 male and 34 female) who worked in a rehabilitation clinic. Results: Multiple independent t-tests showed there were no significant differences in gender perceptions between goal setting ($t(56) = .814, p = .419$), relaxation ($t(56) = .848, p = .400$), mental imagery ($t(56) = 1.23, p = .213$), and self-talk ($t(56) = .538, p = .592$). There were no significant differences for years of experience in goal setting ($F(4,53) = .281, p = .889, \eta^2 = .021$), relaxation ($F(4,53) = .381, p = .821, \eta^2 = .028$), mental imagery ($F(4,53) = .577, p = .680, \eta^2 = .042$), and self-talk ($F(4,53) = .596, p = .667, \eta^2 = .043$). Conclusions: While there was no difference between gender, years of experience, and motivational skills, goal setting and self-talk were found to be the most used motivational skills in injury rehabilitation by athletic trainers.

109. Effect of supraspinatus trigger point release on glenohumeral internal rotation

Alexandra Jahnke, Tona Hetzler
Facility Advisor: Allan Liggett

Content: Myofascial trigger points (MTrP) are a common source of musculoskeletal pain that affect a large percentage of the population. MTrPs are capable of disrupting activities of daily living. Objective: The purpose of the study was to identify if a supraspinatus trigger point release would increase glenohumeral joint internal rotation (GHJ IR). Design: Experimental design of control and treatment group. Setting: Sports medicine clinic. Participants: N=28 (12, male, 16 female) Intervention: Participants were positioned on the treatment table in supine hook lying with dominant arm abducted to 90 degrees and forearm perpendicular to floor. In both the treatment and control group, a passive GHJ IR pre-intervention measurement was taken with a digital inclinometer

that was secured to the distal forearm. The MTrP release intervention was applied for 60 seconds and a second measurement was taken. Main Outcome Measures: Degrees of GHJ IR. Results: Statistical analysis was not completed at time of abstract submission. The means of the control and treatment groups will be compared to determine any degree of significant difference. Conclusions: Pending
Keywords: shoulder, rotator cuff, manual therapy, range of motion

110. The Benefits of a Yoga Program on an Active Straight Leg Raise

Kaitlynn Preston, Danielle Allison, Maria Hermann
Faculty Advisor: Allan Liggett

The goal of the study was to examine the effectiveness of a four-week yoga program on an active straight leg raise (ASLR). The ASLR incorporates hip mobility, balance, core stability, and breathing. A pre-test and post-test ASLR measurement using an inclinometer were completed by an unbiased, blinded assessor. Participants were randomly assigned to a control group or yoga group. The yoga group met twice a week for four-weeks; sessions lasted 20 minutes. The program utilized the warrior poses, supine leg raises, and downward dog. There were 26 participants ranging from 18-25 years old; 7 males and 19 females. Participants were excluded with an ASLR above 110 degrees. The results showed a significant increase between pre- and post-measurements of the yoga group. The control group showed similar measurements for pre- and post-testing. Subjects undergoing the four-week yoga program showed an increase ASLR measurements. The implementation of yoga would be relatively easy for health care providers.

111. Effects of Two Interventions on Hip Extension Range of Motion

Fiona Lefresne, Bailee Hayward, Samantha Jo Staton
Faculty Advisor: Gary Ward

Hip flexor muscle injuries are common in sports such as soccer. Some of these injuries may be due to insufficient hip extension range of motion secondary to decreased hip flexor extensibility. There is little literature describing interventions attempting to increase hip extension range of motion. This project looks to see if foam rolling or proprioceptive neuromuscular facilitation stretching has a greater effect at improving hip extension range of motion. Foam rolling and proprioceptive neuromuscular facilitation stretching have been shown to improve range of motion in previous studies. All subjects were part of a convenience sample of college students aged 18-25. Subjects were randomly assigned to one of three groups. The first group performed an intervention consisting of rolling the hip flexor

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muscles over a foam roll for 2 minutes. The second group did an intervention consisting of a hold-relax stretching technique to the hip flexors. The third group was the control group where no intervention is applied. All subjects had their active hip extension range of motion measured pre- and post-intervention by one of the investigators. Data Analysis will be done using a mixed ANOVA in SPSS.

112. Ashtanga Yoga has an Effect on Maximal Oxygen Consumption

Andrea Allison, Tona Hetzler
Faculty Advisor: Kristin Paloncy

OBJECTIVE: The purpose of this study is to determine if Ashtanga yoga improves athletic performance measured by oxygen consumption and heart rate. **DESIGN:** A pre-test/post-test design included 23 NCAA Division II athletes who participated in a 4-week Ashtanga yoga program. Utilizing the Bleep shuttle run test, oxygen consumption and heart rate were measured prior to and at the completion of the yoga program. Heart rate was measured before and after the Bleep shuttle run test. **RESULTS:** Paired sample t-tests showed no significant differences in the HR difference scores pre vs post intervention ($t(22) = -0.525$, $p = .61$; $\eta^2 = .01$; $d = -.11$). There were significant differences between HR Pre vs Post prior to intervention ($t(22) = -44.47$, $p < .001$; $\eta^2 = .57$; $d = -1.12$) and between HR Pre vs Post after intervention ($t(22) = -48.91$, $p < .001$; $\eta^2 = .87$; $d = -2.55$); in both cases HR increased significantly. Paired samples t-tests showed the VO₂Max was found to be significantly lower post intervention ($t(22) = 5.404$, $p < .001$; $\eta^2 = .57$; $d = 1.23$). **CONCLUSION:** Ashtanga yoga will have some positive impacts on athletic performance when heart rate is evaluated; however, it does not improve maximum oxygen consumption.

113. The Forgotten Domain: The Athletic Trainer's Ability to Answer Cervical Spine Injuries and Heat Illness Based Questions

Isaac Fields
Faculty Advisor: Kristin Paloncy

OBJECTIVE: The purpose of this study is to identify if there is a decrease in subsets of emergency medical knowledge as an athletic trainer (AT) gets further from their initial certification. **DESIGN:** A web-based test was sent to 1,000 ATs through the NATA database; 10.4% responded. The test consisted of 9 scenario-based questions, split into two subsets: heat illness ($n=5$) and cervical spine (c-spine) ($n=4$). Content was validated by a panel of experts ($n=6$). **RESULTS:** For the analysis, the test was split into the two subsets. For the heat subset, there was no statistically significant decrease in scores ($r = .05$, $p = .645$), suggesting that all participants performed

similarly. For the c-spine subset, there was a statistically significant decrease in scores ($r = .29$, $p = .008$), suggesting that participants with fewer years out of school scored better. **CONCLUSION:** Even though there was a significant decrease in c-spine knowledge, further exploration of this topic should be performed.

114. The Effects of Tissue Floss Bands on Glenohumeral Internal Rotation

Erin Harold, Bayli Galeassi, Tanner Forrest
Faculty Advisor: McCall Christian

The Effects of Tissue Floss Bands on Glenohumeral Internal Rotation. Our research aims to determine if applying a tissue flossing band to the shoulder prior to performing a stretching program would be more effective at increasing shoulder internal rotation than the stretching program alone. In our study, all patients will have their shoulder internal rotation measured with a digital inclinometer before and after participating in a stretching program using their dominant arm. The stretching program consists of a modified sleeper stretch, a cross-body stretch, and a stabilization exercise. Participants will be randomized into two groups. Group 1 received a tissue flossing band prior to the stretching program. Group 2 only performed the stretching program. A third group, our control, was made up of all participants' non-dominant arm. We will analyze our data using a 3x2 ANOVA with repeated measures, as well as an evaluation of means and standard deviations. The analysis will be used to determine which treatment parameters are most effective. We are expecting to find that the group receiving the tissue flossing band will improve more than the group without the band.

115. Clinical Practice vs Current Research: Athletic Trainers' Knowledge of Ankle Taping

Addison Thonen, Allison Griffin, Carter Alwardt
Faculty Advisor: Michael Hudson

The objectives of this study were to examine if practicing athletic trainers are current on the clinical evidence of ankle taping and to determine if there is a difference in the knowledge levels among four selected counties in Missouri and among the different practicing settings. We sent an email containing a hyperlink to an electronic survey containing seven demographic questions and ten close-ended questions based on the current evidence of ankle taping. We sampled one hundred fifteen practicing athletic trainers in Greene, Jackson, Boone, and St. Louis counties of Missouri. Participants received an email explaining the study with a consent form and a hyperlink to the electronic survey. Participants will receive one point for a correct answer and no points for an incorrect answer. We will use the total score correct for each participant when running the

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analyses. We will run two separate one-Way ANOVAs to determine if there is a difference in the knowledge score among the counties and among the different athletic training work settings. We predict the findings will show a difference among the settings within the profession; however, they will fail to show a variation among scores across the four counties.

is greater than the average return to play of 7-10 days. While literature suggests zeros in symptom number and severity are not possible, the majority our subjects reported no symptoms at RTP.

116. The Effects of VooDoo Floss Band on Ankle Proprioception and the Lasting Effect

Jessica Cobban, Kirstin Schwart, Ayron Osborn
Faculty Advisor: W. David Carr

The goal of our study was to assess the immediate and delayed effect of a VooDoo band on proprioception of the ankle. The participants were male and females between the ages of 18-26 years old with no lower body injuries in the last 3 months, chronic ankle instability, neurological deficits, or latex allergies. Ankle proprioception was measured using the Bertec force plate. The researcher measured the participant's baseline single leg balance on each leg, which was blinded to which ankle was wrapped. During all testing, they wore a noise canceling device and closed their eyes. After pretesting they had a VooDoo band wrapped on the experimental ankle, overlapping by 50% with an increase in band tension throughout. The experimental ankle was decided by flipping a coin. The subject stood on one leg for four repetitions of 30 seconds of standing and 15 seconds of sitting, for a total of three minutes. The exercises were repeated on the control ankle without a VooDoo band. Then, they completed a post-test on the Bertec immediately after and 7 days later. We will analyze the data using a 2x3x3 mixed ANOVA. Our hypothesis is that the application of a VooDoo band will improve immediate single leg balance but won't have a lasting effect.

117. Time to Treat for Concussions

Megan Won, Kristin Paloncy
Faculty Advisor: W. David Carr

Introduction: A metabolic cascade disturbs the brain's physiology and exhibits symptoms described as clinical trajectories. The purpose of this study was to determine the best time to initiate an active rehabilitation for concussions. Methods: Athletic trainers conducted baseline assessments, implemented relative rest and active treatment programs to inter-collegiate athletes after sustaining a concussion. Each collegiate institution was chosen purposely for placement in the rest interval groups 1 day, 3 days, or 5 days. Results: Of the 57 patients included in the study, the average time loss due to concussions was 11.5 days (SD=7.6). The average time loss for day 1 was 15 days (SD=8.0), day 3 was 9.7 days (SD=4.6), and day 5 was 10.5 days (SD=8.4). Discussion: This study had an average return to play be 12 days, which