



**Missouri  
State**  
UNIVERSITY

**Welcome to  
the 22nd Annual**

**College of Health and Human Services**

***Student  
Research  
Symposium***

Plaster Student Union

Friday, May 4, 2018

1:00 – 3:00 P.M.



# College of Health and Human Services

## *Student Research Symposium*

Welcome to the twenty-second annual 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.

College of Health and Human Services 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 CHHS 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. Wafaa Kaf, Communication Sciences and Disorders

Dr. Bogdan Kostic, Psychology

Dr. Florence Uruakpa, Biomedical Sciences

Dr. Ruth Walker, Psychology

Dr. Jianjie Wang, Biomedical Sciences

Ms. Jacqueline Patterson, Executive Assistant

Ms. Carly Totsch, Executive Assistant

*Dr. Helen Reid*

Dean, College of Health and Human Services



## ORDER OF PRESENTERS (First Author)

---

1. Kristopher Lee
2. Cara Lynn Bland
3. Taylor Cook
4. Kristen Fisher
5. Jacquelyn Hodge
6. Lauren Pavel
7. William E. Padfield
8. Tristan Farnen
9. Olivia Kunze
10. Alexis Hutchison
11. Nathaniel Lambert
12. Kelsey Dulin
13. Taylor Barker
14. Julia Essman
15. Catelynn Classick
16. Kelsey Bellew
17. Abigail Collett
18. Katherine Cederberg
19. Celcey Clark
20. Stephanie Cronin
21. Emily Bohnert
22. Anna Marie McWoods
23. Sadie Flood
24. Natalie Truber
25. Meghan Hagenhoff
26. Haley Reiff
27. Elizabeth Gannon
28. Eva Klein
29. Dr. Marc Willey
30. Philip Soza
31. Michaela Goldsmith
32. Sakinya Palakurthi
33. Brooke Empson
34. Rachel Mullner
35. Taylor Walker
36. Tara Renee Holcomb
37. Sara Lovse
38. Matt Bowden
39. Stephanie Thompson
40. Samantha Fluck
41. Matthew Flint
42. Lucas Braun
43. Courtney Buechter
44. Joseph Stenberg
45. Jessica Rosenberg
46. Morgan Brown
47. Hayley Peterson
48. Abigail Behnke
49. Jenna Parrott
50. Jordan Burt
51. Christine Salyer
52. Ama Bikoko
53. Alexa DeClue
54. Jeremy Tee
55. Jessica Aikens
56. Abbie Hebron
57. Isabelle Strack
58. Nicole Berg
59. Kate Okland
60. Grace Prosperi
61. Zachary Mouser
62. Emily Nischwitz
63. Kyle Cook
64. Katelin Peters
65. Abigail Witt
66. Zachary Ingram
67. D. Bowers
68. Alexis Peters
69. Erica Campbell
70. Maribel Franco

71. Julia Larson
72. Taylor M. Hayes
73. Alexandra Badalamenti
74. Heather Felske
75. Dallas Robinson
76. Paige Lammert
77. Alyssa Alkier
78. Scott Geyer
79. Rachel Essmyer
80. Sierra Schieber
81. Kayla King
82. Kate Okland
83. Casey Tibbs
84. Aubrey Baker
85. Danielle Capone
86. Zachary Werner
87. Kimberly Korff
88. Elise Rodriguez
89. Jaron Alexander
90. Katie Bussard
91. Sara Rabbermann
92. Kristen Keeney
93. Vanessa L. McConnell
94. Morgan Meyer
95. Tate Hammers
96. Ashley Kubik
97. Jessica Streb
98. Kayla Kleinjan
99. Cody Conner
100. Robert Tipton
101. Sara Kostelnick
102. Julia Roundtree
103. Dani Willhite
104. Natalie Amrhein
105. Kennedy Conn
106. Tesa Oryall
107. Nathanael Comer
108. Spencer Thomas
109. Hailee Marino
110. Hannah Calhoun
111. Celia Chojnacki
112. Justin Lawson
113. Hannah Fink
114. Anna White
115. Ben Mitchell
116. Hogan Brecount
117. Kristin Pryor
118. Courtney Kuepfert
119. Rene McKiddie
120. Nick Van Valkenburg
121. Stephanie Jones
122. Jessica Jones
123. Cameron Deckett
124. Caleb Garde

## Presenters and Faculty Mentors

### - A -

Abernathy, Amber.....	60
Adams, Emily.....	25
Aikens, Jessica.....	55
Alexander, Jaron.....	89
Alkier, Alyssa.....	77
Allen, Natalie.....	6
Altena, Thomas S.....	61, 72, 75
Alvarado, Alexander.....	115
Amrhein, Natalie.....	104
Awopetu, Precious.....	89
Ayala, Nivia.....	55

### - B -

Badalamenti, Alexandra.....	73, 74
Baker, Aubrey.....	84
Bakker, Klaas.....	1, 47
Barker, Taylor.....	13
Beck, Emily.....	116
Becker, Chris.....	50
Bellew, Kelsey.....	16, 17
Behnke, Abigail.....	48
Bennett, Cody.....	8
Benson, Miranda.....	13
Berg, Nicole.....	58
Bertram, Lacey.....	24, 113
Bikoko, Ama.....	52
Bland, Cara Lynn.....	2
Bleich, Emily.....	69
Bohnert, Emily.....	21
Bowden, Matt.....	38
Bowers, Drew.....	67
Bradley, Yumeko.....	72
Braun, Lucas.....	42

Brecount, Hogan.....	71, 116
Brodeur, Amanda.....	15, 22, 48, 81, 86
Brown, Courtney.....	67
Brown, Morgan.....	46
Brown, Taylor.....	88
Brueseke, Kaelin.....	3
Buchanan, Erin.....	7
Buechter, Courtney.....	43
Burnett, Hannah.....	50
Burr, Abigail.....	3
Burt, Jordan.....	50
Burt, Zachary.....	72
Bussard, Katie.....	90

### - C -

Cahoj, Patricia.....	69
Calhoun, Hannah.....	110
Camenzind, Lauren.....	43
Campbell, Erica.....	69
Cantrell, Hannah.....	89
Capone, Danielle.....	85
Cardin, Ashlea.....	18, 27
Carr, Audrey.....	11
Carr, W. David.....	26, 40, 45, 102, 104
Carson, Megan.....	53
Carver, Amy.....	50
Casey, Shae.....	101
Cederberg, Katherine.....	18
Cernetich, Victoria.....	92
Chakraborty, Sapna.....	12, 18
Chmelir, Emma.....	50
Chojnacki, Celia.....	111
Chundru, Srita.....	41

## Presenters and Faculty Mentors

Claborn, David.....	41
Clark, Celcey.....	19
Clark, Heather.....	23
Classick, Catelynn.....	15
Coffman, Erin.....	100
Cofield, Mariah.....	25
Cole, Ashley.....	43
Cole, Randall.....	104
Collett, Abigail.....	16, 17
Comer, Nathanael.....	107
Conn, Kennedy.....	103, 105, 117
Conner, Cody.....	99
Cook, Kyle.....	63
Cook, Taylor.....	3
Cornelius, Rylee.....	60
Craig, Christopher.....	49, 106
Crause, Paige.....	24, 64
Cronin, Stephanie.....	20
Crotty, Brooke.....	25
Cuthbert, Shelby.....	61

### - D -

Daniel, Todd.....	4
Daniels, Lysie.....	35
Davis, Kalen.....	107
Davis, Troy.....	50
Deakins, Shannon.....	42
Deal, William Paul.....	23
Deckett, Cameron.....	123
DeClue, Alexa.....	53
Dennis, Lindsey.....	10
Derks, Chelsy.....	90
DeTienne, Shelby.....	87
Dickey, Jessica.....	31

Dildine, Kenneth.....	124
Doucet, Sam.....	42
Dowler, Seth.....	60
Duitsman, Dalen.....	32, 52
Dulin, Kelsey.....	12
Dunn, Cara.....	9

### - E -

Echols, Leslie.....	98, 99
Elliot, Amanda.....	29
Elliot, Kim.....	42
Empson, Brooke.....	33
Engler, Karen.....	103, 105, 117
Enright, Samuel.....	61
Essman, Julia.....	14
Essmyer, Rachel.....	79
Eutsler, Ryan.....	8

### - F -

Fallone, Melissa.....	75, 111, 118, 119
Farnen, Tristan.....	8
Felske, Heather.....	74
Ficek, Melissa.....	15
Fink, Hannah.....	24, 113
Fischer, Donald.....	30
Fisher, Kristen.....	4
Fisher, Michaela.....	55
Flint, Matthew.....	41
Flood, Sadie.....	22
Fluck, Samantha.....	40
Forst, Kaylee.....	89
Franco, Maribel.....	70



## Presenters and Faculty Mentors

### - G -

Galloway, Riley.....	61, 72, 75
Gannon, Elizabeth.....	27
Garde, Caleb.....	124
Gardner, Aarika.....	71
Gardner, Kathryn.....	56, 57, 64, 77, 78, 87, 88, 92, 101, 113, 114
Gaspard, Mason.....	3
Garrad, Richard.....	59, 71, 90
Gdovin, Jacob.....	11, 42, 43, 50, 89
Gevers, Marshall.....	43
Geyer, Scott.....	77
Gillenwaters, Amber.....	7
Goldsmith, Michaela.....	31
Gragg, Austin.....	42
Graves, Carolyn.....	96
Green, Breanna.....	27
Green, Emily.....	8
Gurram, Avaneendra.....	41

### - H -

Hagenhoff, Meghan.....	25
Hall, Lisa... ..	21, 36, 39, 46, 58, 65, 70, 73, 76, 79, 80, 83, 84, 85, 91, 94, 97
Hammers, Tate.....	95
Harris, Alicia.....	61
Hart, Bailey.....	3
Hayes, Taylor.....	72
Hebron, Abbie.....	56
Heim, David.....	3
Henson, Katie.....	110
Herrin, Britton.....	8
Hetzler, Brandon.....	102
Hetzler, Tona.....	19, 40, 45, 53

Hill, Kalli.....	59
Hodge, Jacquelyn.....	5
Holcomb, Tara Renee.....	35
Hollis, Brennan.....	11
Hom, Harry.....	10
Hoogland, Charles.....	14
Hook, Kristen.....	89
Hope, Kathryn.....	93, 96
Hopke, Tabetha.....	60
Hosp, Kealy.....	114
Hudson, Michael.....	123, 124
Hulme, Amy.....	66, 67, 82
Hunter, Anne Marie.....	24, 25
Hutchison, Alexis.....	10

### - I -

Ingram, Zachary.....	66
Isbell, Kaitlin.....	113

### - J -

Jaegers, Bret.....	43
Johnson, Lily.....	71
Jones, Jessica.....	122
Jones, Jordan.....	61
Jones, Robert.....	28, 55
Jones, Stephanie.....	121

### - K -

Keen, Brianna.....	89
Keeney, Kristen.....	92
Kennell, Rachel.....	55
Khamissi, Fatimazohra.....	22
Kifer, Troy.....	42

## Presenters and Faculty Mentors

King, Kayla.....	59, 81
King, Sarah.....	18
Kinney, Liegh Anne.....	101
Kiolbasa, Megan.....	15
Klein, Eva.....	28
Kleinjan, Kayla.....	98
Koch, Kimberly.....	3
Koebbe, Paige.....	69
Korff, Kimberly.....	87
Kostelnick, Sara.....	101
Kubik, Ashley.....	96
Kuepfert, Courtney.....	118
Kunze, Olivia.....	9

### - L -

Lacker, Alli.....	50
Laing, Alyssa.....	24
Lambert, Nathaniel.....	11
Lammert, Paige.....	76
Lampkin, Trevor.....	8
Larson, Julia.....	71, 112
Lawson, Justin.....	112
Le, Thien.....	43
Lee, Kristopher.....	1
Lehman, Paige.....	31
Liggett, Allan.....	38, 102, 107, 120, 123
Linck, Chad.....	122
Lockenvitz, Sarah.....	9, 16, 17, 20
Loehr, Adam.....	11
Lovse, Sara.....	37
Luedecke, Kelsey.....	11
Lybarger, Lindsey.....	43

### - M -

MacConnell, Joseph.....	43
Marino, Hailee.....	109, 116
Marshall, Caleb.....	119
Martin, Amanda.....	25
Massey, Mirissa.....	114
Mataya, Nick.....	8
Mazerolle, Stephanie.....	37
McClew, Brendan.....	107
McConnell, Vanessa.....	93
McDaniel, Kayla.....	43
McKiddie, Rene.....	119
McNair, Maggie.....	56
McWoods, Anna Marie.....	22
Melting, Allision.....	72
Menz, Emma.....	11
Metz, Emma.....	22
Meyer, Morgan.....	94
Middleton, Tyler.....	50
Miller, Alyssa.....	8
Mitchell, Ben.....	115
Moldenhauer, Brooke.....	42
Montejo, Hugo.....	108
Moore, Lindsey.....	92
Morris, Tyler.....	109
Mosquera, Mikaela.....	87
Mouser, Zachary.....	61
Mueller, Tara.....	18
Mullner, Rachel.....	34, 100
Murphy, Rachel.....	12
Myers, Kayley.....	24

## Presenters and Faculty Mentors

### - N -

Nabors, Hannah.....	27
Newman, Mary.....	74
Nicholls, Olivia.....	53
Nickels, Tanner.....	8
Nischwitz, Emily.....	62
Noe, Logan.....	27
Nolan, Michael.....	124
Norris, Hannah.....	89

### - O -

Okland, Kate.....	59, 82
Okwo, Victor.....	41
Orr, Alex.....	104
Oryall, Tesa.....	106
Osmundson, Madelyn.....	33
Oswalt, Jill.....	103, 105
Owensby, Christina.....	22

### - P -

Padfield, William E.....	7
Palakurthi, Sakinya.....	32
Paloncy, Kristin.....	19, 37, 38, 122
Parrish, Connor.....	122
Parrott, Jenna.....	49
Patterson, Kathryn.....	93
Pavel, Lauren.....	6, 25
Perez- Garcia, Erwin.....	22
Peters, Alexis.....	68, 100
Peters, Katelin.....	24, 64
Peterson, Hayley.....	47
Perkins-Ball, Amanda.....	61, 72
Pinkner, Jesse.....	11
Pratt, Ashton.....	18

Price, Spencer.....	100
Proctor, Lisa.....	51, 121
Prosperi, Grace.....	60
Pryor, Kristin.....	103, 105, 117

### - R -

Rabbermann, Sara.....	91
Reiff, Haley.....	26
Reynolds, Courtney.....	42
Richardson, Haley.....	12
Richmond, Scott.....	61, 72
Riddle, Nicole.....	77
Robinett, Tessa.....	6
Robinson, Dallas.....	60, 75
Robinson, Mercedes.....	89
Rodas, Ana.....	78
Rodriguez, Elise.....	6, 88
Rose, Coe.....	4
Rosenberg, Jessica.....	45
Rosser, Chase.....	116
Roundtree, Julia.....	102

### - S -

Salyer, Christine.....	51
Schembra, Abby.....	11
Schermer, Alissa.....	69
Schieber, Makaila.....	12
Schieber, Sierra.....	80
Schmoll, Emily.....	59
Schroeder, Anna.....	89
Smith, Joshua.....	34, 35, 54, 62, 63
Smith, Andy.....	42
Smith, Ashlin.....	29
Soza, Philip.....	30

## Presenters and Faculty Mentors

### - V -

Stafford, Myles.....	42	Van Nuland, Abigail.....	7
Stark, Alex.....	8	Van Valkenburg, Nick.....	120
Stark, Sonja.....	29		
Staudt, Lindsay.....	71		
Steinbach, Madeline.....	89		
Stenberg, Joseph.....	44		
Stephens-Cantu, Heather.....	75		
Strack, Isabelle.....	57		
Streb, Jessica.....	97		
Stroud, Rachel.....	90		

### - T -

Taube, Abby .....	12
Taylor, Melanie.....	59
Tee, Jeremy.....	54
Thomas, Spencer.....	108
Thomas-Tate, Shurita.....	5, 33
Thompson, Chase.....	15
Thompson, Ryan.....	30
Thompson, Stephanie.....	39
Tibbs, Casey.....	83
Timson, Benjamin.....	112
Tipton, Robert.....	100
Tombley, Ken.....	2
Toomey, Mackenzie.....	11
Trammell, Joshua.....	59
Travis, Erin.....	74
Truber, Natalie.....	24
Tucker, Cristni.....	64

### - U -

Ulbricht, Randi.....	94, 109, 115, 116
Urhahn, Maddie.....	43

### - W -

Wagner, Rory.....	90
Walker, Erin.....	3
Walker, Taylor.....	35
Wang, Jianjie.....	44, 68, 108, 109
Ward, Gary.....	110
Wei, PeiYuan.....	87
Werner, Zachary.....	15, 86
Wheat, Ashlyn.....	110
White, Anna.....	114
Wikowsky, Addie.....	7
Willard, Garret.....	50
Willey, Marc.....	13, 29
Willhite, Dani.....	103, 105, 117
Williamson, Elizabeth.....	4
Williard, Alicia.....	22
Wilson, Daniel.....	8, 11, 42, 43, 50, 89
Wise, Kaitlyn.....	11
Witkowski, Colette.....	100
Witt, Abigail.....	65
Wright, Annie.....	68
Wolken, Holly.....	57
Wood, Kelly.....	45

### - Y -

Young-Jones, Adena.....	3
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### - Z -

Zimmerman, David.....	31
Zimmerman, Scott.....	112
Zinke, Holly.....	11, 75

## Abstracts

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### 1. **A Guide for School-Based Speech Language Pathologists: Cluttering**

Kristopher Lee

Faculty Advisor: Klaas Bakker

The objective of this research project is to provide school-based speech language pathologists (SLPs from now on) with a history, definition and user friendly diagnostic classification, and treatment document, for use with individuals who clutter. At the conclusion of this study the information will be turned into a presentable form through a PowerPoint presentation. This PowerPoint presentation will be created based on the review of multiple sources including: journal articles, websites, blogs, and books. Cluttering is a recently recognized fluency disorder other than stuttering. This paper and its associated PowerPoint presentation will provide written information of cluttering to school-based SLPs, who typically are the professionals responsible for diagnosing and treating cluttering. The presentation will be freely available without restriction and will hopefully facilitate clinical management of this often misdiagnosed and overlooked group of clients.

### 2. **Organizational Culture of Southwest Missouri Regional Offices and Its Impact on Employee Job Satisfaction**

Cara Lynn Bland

Faculty Advisor: Ken Tombley

Layoffs, construction, threats of contracting positions, and a variety of management changes at the Department of Mental Health Southwest Missouri Regional Offices posed the question: How does organizational culture of the Southwest Regional Offices impact employee job satisfaction? The primary objective of this qualitative program evaluation was to define the culture in the Southwest Regional Offices and the satisfaction level of its employees, as well as determine what the preferred culture is. The Organizational Culture Assessment Instrument (OCAI) and the Job Satisfaction Survey were offered to the 56 employees at the Southwest Regional Offices. The information obtained from this study will be provided to the executive management team to make data-based decisions, to begin creating the desired culture and to increase job satisfaction among its employees.

### 3. **Promoting Diversity Awareness in Junior High Students: Perspective Taking Through Interactive Activities**

Taylor Cook, David Heim, Mason Gaspard, Abigail Burr, Erin Walker, Kimberly Koch, Bailey Hart, Adena Young-Jones

Faculty Advisor: Adena Young-Jones

The impact of bullying begins in primary education and increases in prominence during adolescence; this produces lasting effects on individuals. Overall, bullying results from perceiving differences as relevant determinants of socially (un)desirable connections. The desire for homogeneity within society perpetuates aggression and exclusion toward targeted members based largely on race and sexual orientation, but also includes factors such as ethnicity, socio-economic status, and religion. Individuals possess natural bias for in-groups as opposed to differing out-group members. In order to fully understand effects of bullying, the constructs of stereotype threat, self-fulfilling prophecy, empathy, contact hypothesis, and Self-Determination Theory should be considered. This study aimed to analyze these theories in relation to prejudice by evaluating responses before and after a diversity workshop. The present study examined three hypotheses: diversity workshops increase empathy among school children, these trainings increase favorable diversity perceptions, and the interventions decrease instances and perceptions of bullying.

### 4. **Effects of Time of Day on Postural Stability and a Cognitive Task**

Kristen Fisher, Coe Rose, SPT, Elizabeth Williamson  
DPT, PhD, Todd Daniel, PhD

Faculty Advisor: Elizabeth Williamson

Purpose: The steadiness of static postural control in various sensory conditions has been examined (Woollacott et al. 1986). The effect of time of day on the steadiness of static postural control in various sensory conditions has also been examined (Bougard & Davenn, 2014). Additionally, steadiness of postural control when completing a cognitive task has been examined (Broglia et al., 2005). This study examined the interaction between these three factors using the VSR Clinical Test of Sensory Interaction and Balance (CTSIB) system with the intent of establishing a reliable method to assess older adults. Participants: Forty-eight healthy, young adults participated in three sessions, which assessed the effect of time of day and cognitive load on static postural control. Methods and Materials: In the orientation session, postural sway was measured in four sensory conditions using the VSR CTSIB and selective attention was measured using an auditory Stroop test (Shor, 1975). Patients were then assessed in randomized order of performing postural sway test on VSR and CTSIB with varying order of time of day and either single-balance task or with the added cognitive task on each balance machine.

## Abstracts

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### 5. **A Review of Literature on the Relationship Between Motivation and Reading for Kindergarten Through Eighth Grade Students**

Jacquelyn Hodge

Faculty Advisor: Dr. Shurita Thomas-Tate

Motivation is a universal component of a student's learning and ultimately, their academic experience and success. There are two broad categories of motivation (intrinsic and extrinsic) which have been identified and verified through numerous researchers over the past 40 years. Intrinsic motivators include internal psychological factors such as curiosity, enjoyment, challenge, enrichment, etc. which self-drives a person to do a task. Whereas, extrinsic motivators include external factors in the environment such as money, recognition, competition, praise from others, etc. which pushes an individual to action. Understanding the correlation between the types of motivation a student is driven by and their current reading skills can provide insightful information regarding how to better teach and support students who struggle with reading and overall academic success. The aim of this paper is to review and surmise the results of research literature that have studied the relationship between motivation and reading skills in elementary and middle school-aged students, the tools that have been used to measure motivational orientation in students, challenges associated with those tools, and how to increase motivation in students.

### 6. **Diving Deep: Investigating Recovery Ratios of Protein and Carbohydrates in Swimmers**

Lauren Pavel, Tessa Robinett, Elise Rodriguez

Faculty Advisor: Natalie Allen

Post-recovery in collegiate athletes is essential to peak performance. There is ongoing research on whether a 2:1 carbohydrate-to-protein improves recovery compared to a 3:1 carbohydrate-to-protein ratio. The goal of this study was to understand which ratio provides the optimal energy level and decreases recovery time, through a post-recovery snack. Eighteen participants from the Missouri State University swim team rated their energy levels through the 4-day study using homemade energy bites. After consuming the provided energy bites for their post-recovery snack, participants completed a survey evaluating their energy level before, during, and after practice. Results of the study showed athletes experienced an increased energy level from the 3:1 ratio energy bites, during 2-hour of recovery post practice. Overall, there was a 28% increase in energy in the post 2-hour recovery time. The participants were not aware of the ratios in the different bites confirming that a 3:1 ratio provides the optimal energy to improve performance. This data will help swimmers choose better post-practice food options to improve performance and decrease recovery time.

### 7. **Measuring Effects: An Online App for Effect Size Calculation for Research and Statistics Classes**

William E. Padfield, Addie Wikowsky, Abigail Van Nuland, Amber M. Gillenwaters, Erin M. Buchanan  
Faculty Advisor: Dr. Erin Buchanan

Recent developments in the psychological sciences have shown the de-emphasis of p-values with a renewed focus on effect sizes as a measure of the importance of research findings. Even with the shift in focus, report rates for effect sizes are very low. In this presentation, we will demonstrate a new application that could be used as a teaching tool in statistics and research method courses. This application is designed to allow the user to select the research design and corresponding effect size through drop down menus. For each effect, users type in relevant numbers to calculate those effects, and the effect size and related statistics are presented in APA style. For teaching purposes, helpful description text and YouTube how-to videos are coupled with each effect size page. We believe this application will aid in teaching and learning in statistics and research methods courses for students at the undergraduate and graduate level.

### 8. **Kinetics of Barefoot Walking vs Shoe Walking**

Tristan Farnen, Cody Bennett, Ryan Eutsler, Emily Green, Britton Herrin, Trevor Lampkin, Nick Mataya, Alyssa Miller, Tanner Nickels, Alex Stark, Dr. Daniel Wilson

Faculty Advisor: Dr. Daniel Wilson

The purpose of our project is to compare the kinetics of shoe walking with barefoot walking. Previous studies have indicated that the vertical component of the ground reaction force, the braking impulse and the propulsive impulse are greater in the shoe walker than the barefoot walker. This would imply that the rotational moments of the lower extremities (hip and knee) would also be greater, which could contribute to injuries at these joints. This study will compare these variables for a subject in the two walking conditions (shoe vs. barefoot) to determine if the forces and moments are greater in the shoe condition, and thus may contribute to greater injury potential.

### 9. **Using Electropalatography and Principles of Motor Learning to Correct a Persistent Lisp: A Multiple Baseline Designed**

Olivia Kunze, Cara Dunn

Faculty Advisor: Dr. Sarah Lockenvitz

Few studies report systematically varying biofeedback from electropalatography (EPG) with clinician feedback as a component of treatment addressing persistent lisping. This study describes how the principles of motor learning were applied through manipulation of feedback in

treatment of an adult with persistent lisping. A multiple baseline design across treatment targets was used. Remediation of the lisp at the word level was efficiently accomplished.

### 10. Does Counterfactual Thinking Make It Seem More Likely?

Alexis Hutchison, Lindsey Dennis  
Faculty Advisor: Harry Hom

Hindsight bias is the tendency to overestimate the predictability of an event where the outcome is known. Asking individuals to think about alternative outcomes (counterfactual thinking) enhances hindsight bias. One hundred-thirty six participants were randomly assigned to three conditions: counterfactual hindsight, counterfactual foresight, and non-counterfactual foresight. Participants were given a laptop scenario used in our previous research. Foresight participants were asked to consider the possibility of being too late to purchase a laptop whereas hindsight participants were told they were late. All participants made composites of foreseeability and inevitability judgments along with other evaluations. Prior to these judgments, participants in the counterfactual conditions were asked to list 10 reasons as to how they could have arrived on time to purchase the laptop. As expected evidence of hindsight bias occurred when counterfactual thinking was present in the foresight to hindsight comparison. Also, hindsight participants responded to the negative outcome by minimizing their disappointment.

### 11. Kinetic Differences while Running in Athletic Shoes vs Non-Athletic Shoes

Nathaniel Lambert, Audrey Carr, Brennan Hollis, Adam Loehr, Kelsey Luedecke, Emma Menz, Nathaniel Lambert, Jesse Pinkner, Abby Schembra, Mackenzie Toomey, Kaitlyn Wise, Holly Zinke, Jacob Gdovin, PhD, and Daniel Wilson, PhD  
Faculty Advisor: Daniel Wilson, PhD

The purpose of our experiment is to determine whether running in an athletic shoe or a non-athletic shoe creates larger ground reaction forces (GRF) acting in the anterior-posterior direction. Defined as the forces acting on the body due to an interaction with the underlying surface, GRF can be broken down and quantified into medial/lateral (Fx), anterior/posterior (Fy), and vertical (Fz) components. In terms of human gait, the forces acting in the anterior-posterior direction represent the frictional properties exhibited between the footwear and ground during the "heel strike" and "forefoot strike" phases. Preceding research indicates that footwear's frictional properties are directly related to risk of injury in the lower extremities. Therefore, it is hypothesized that running in an athletic shoe will produce greater anterior-

posterior GRF than a non-athletic shoe. We predict that the greater anterior-posterior GRF exhibited by the athletic shoe will create greater stability in running conditions and reduce the risk of lower extremity injury.

### 12. The Perceptions of Pediatric Occupational Therapists Regarding Their Use of Constraint-Induced Movement Therapy

Kelsey Dulin, Rachel Murphy, Haley Richardson, Makaila Schieber, Abby Taube  
Faculty Advisor: Sapna Chakraborty, OTD, OTR/L

Research has shown constraint-induced movement therapy (CIMT) to be an effective intervention for children with hemiplegia. The effectiveness and perceptions of CIMT with pediatric patients and their caregivers has also been explored. However, little is known about pediatric occupational therapists' perspective of CIMT. This qualitative study explored the perceptions of pediatric occupational therapists with knowledge of CIMT and sought to better understand contextual variables influencing implementation. Eight pediatric occupational therapists participated in the study. Questions were administered in two forms based on the preference of the participant: a structured interview or a written questionnaire. Thematic analysis and coding were used to analyze data and determine themes. Three themes emerged from the data: pediatric occupational therapists' perceived effectiveness of CIMT, their comfort level with delivery of the intervention, and their methods of implementation. While all participants agreed CIMT was an effective intervention, there were no clearly defined protocols nor consensus on materials. Therapists' comfort level with the implementation of CIMT was found to increase when education and training were provided.

### 13. Investigation of Hand Surface Temperature Patterns During Hot Pack Treatments

Taylor Barker, Miranda Benson, Kaelin Brueseke  
Faculty Advisor: Dr. Marc Willey

Hot packs are used in occupational therapy as a preparatory method; however, usage protocols vary. Skin temperature during treatment is unknown and excessive heat is indicated by patient verbalization. The purpose of the study is to investigate hand surface temperature patterns during treatment, provide evidence for prevention of thermal injuries, and develop a safe protocol. Thirty participants received a 15-minute treatment. Hot packs within covers were placed on each side of the hand. Two sensors recorded skin temperatures. An intervention occurred when a towel was placed or removed on both hand surfaces when the participant reported uncomfortable temperatures or if the temperature left therapeutic range (104°F-113°F). The maximum temperature tolerated on the dorsal surface

## Abstracts

(M=108.9°F) differed significantly from the volar surface (M=111.12°F). Most participants requested two interventions to maintain comfort level. The first intervention occurred at an average of 62.2 seconds. Temperatures can exceed therapeutic range sooner than current protocols suggest, and most participants are unable to tolerate the high end of therapeutic range. The findings suggest the need to develop a safe protocol to treat hand injuries.

### 14. **Just-World Beliefs and Prison Rape Victim Blaming**

Julia Essman, Charles E. Hoogland, Ph.D.

Faculty Advisors: Charles Hoogland

Perceiver just-world beliefs (e.g., "people deserve what they get and get what they deserve") typically correlate with greater victim blaming. Victim characteristics, however, also influence victim blaming. For example, prisoners generally make for unsympathetic victims, but are all prisoners perceived in the same way, and do perceptions of imprisoned victims depend on perceivers' just-world beliefs? To answer these questions, the current study will investigate reactions to the rape of a prisoner who had previously committed one of four crimes. Specifically, we will experimentally manipulate whether the crime for which the victimized prisoner was incarcerated was (1) violent or nonviolent and (2) sexual or nonsexual. By also measuring participants' just-world beliefs, we will be able to examine the extent to which just-world beliefs independently and/or interactively influence prisoner-victim blaming. We predict a positive correlation between just-world beliefs and victim blaming, and given that rape is a violent sex crime, this tendency will be more pronounced when the prisoner-victim is serving a sentence for a violent and/or sexual crime.

### 15. **Global Health Issues - Cardiovascular Disease Leading to Myocardial Infarction**

Catelynn Classick, Chase Thompson, Megan Kiolbasa, Melissa Ficek, and Zach Werner

Faculty Advisor: Dr. Amanda Brodeur

Cardiovascular disease continues to be a global health concern killing over 17 million people each year. If left untreated, cardiovascular disease can manifest itself as a myocardial infarction (a.k.a., a heart attack). There are numerous risk factors that contribute to this growing epidemic. Fortunately, some preventative strategies and treatments exist that can minimize the risk of experiencing fatal episodes due to cardiovascular disease. As molecular biology and medicine advances, scientists and doctors may be able to use personalized medicine, health education, and new prevention strategies to reduce the risk of myocardial infarctions due to cardiovascular disease. Different aspects of cardiovascular disease are

investigated here to enhance awareness of this growing epidemic and provide answers about one of the most common and deadliest diseases of the twenty-first century.

### 16. **Communication Coding in Infant-Caregiver Pairs and Infant Play Groups: Participants and Rationale and Execution of Elicitation Methods**

Kelsey Bellew, Sarah Lockenvitz Ph.D. CCC-SLP, Abigail Collett, B.S.

Faculty Advisor: Sarah Lockenvitz, Ph.D., CCC-SLP

The aim of this study was to determine the most effective means of eliciting and transcribing vocalizations of infants in a group and in pairs with caregivers to aid in the development of materials for college-level phonetics courses. Participants included a total of five infants under the age of 2, each with a paired caregiver. A search of the literature yielded guidance pertaining to specific characteristics of the infant participants and varying stimulus materials that have proven to be successful in eliciting speech in young children, as well as materials used in teaching phonetics to students. This in turn contributed to the selection of activities and tasks provided during infant-group play and infant-caregiver pair play. The vocalizations of the infant participants were video recorded and transcribed to create educational materials to facilitate the development of phonetic transcription skills targeted in college level phonetics courses.

### 17. **Communication Coding in Infant-Caregiver Pairs and Infant Play Groups: Transcription Process for Use in Educational Materials**

Abigail Collett, B.S. Sarah Lockenvitz, Ph.D., CCC-SLP Kelsey Bellew, B.S.

Faculty Advisor: Sarah Lockenvitz, Ph.D., CCC-SLP

The purpose of this study was to determine how technology can be used to create resources that will facilitate the development of phonetic transcription skills. Research was carried out through the extensive and thorough search of literature pertaining to specific methods and materials that have been successful in teaching phonetics to students. This study sought to refine phonetic transcription skills by incorporating features from audio and video recordings of speech samples from 1- to 2-year-old infants. This study provided a framework for collecting and analyzing speech samples from this population utilizing technology in the classroom. The findings outlined in this research have been used as a basis upon which to create a variety of updated transcription recordings that will be utilized in the teaching of college-level phonetic and phonology courses.



## Abstracts

**18. Interactive Metronome®: Effects on Handwriting Assessed by the Evaluation Tool of Children's Handwriting**

Katherine Cederberg, Sapna Chakraborty, Ashlea Cardin, Sarah King, Tara Mueller, Ashton Pratt  
Faculty Advisor: Sapna Chakraborty

**Background:** The purpose of this study was to determine if the Interactive Metronome® (IM) is a viable OT intervention for children with handwriting deficiencies. **Methods:** A single subject pre-/post-test study design was used. The study included six children (N=6; female, n=2; male, n=4) aged seven to twelve years. Handwriting performance, in terms of legibility, was tested using the Evaluation Tool of Children's Handwriting (ETCH) before and after 12 IM sessions. **Results:** Statistical analyses were performed to compare the pre-/post-test ETCH legibility scores with the IM scores using Cohen's *d* with a Dunlap correction. A small effect size was found for word ( $d = .099$ ), letter ( $d = .0211$ ), and numeral ( $d = .069$ ) legibility. Task averages for the IM generally declined over the course of the treatment for all participants. **Conclusion:** The results of this study suggest that although there were improvements in IM scores, the IM intervention did not have a significant impact on handwriting legibility. Further research is needed to determine if the IM is a viable OT intervention for improving handwriting performance.

**19. Certified Athletic Trainers' Perception of Sexual Harassment in the Workplace**

Celcey Clark, Kristin Paloncy, Tona Hetzler  
Faculty Advisor: Kristin Paloncy

**OBJECTIVE:** The purpose of this study was to identify the prevalence of sexual harassment towards male and female certified athletic trainers (ATs) and to identify if ATs can accurately define sexual assault and sexual harassment. **DESIGN:** This web-based survey contained 13 scenario-based questions validated by a panel of experts (n=6) for content validity. The survey was randomly sent to 3,222 ATs through the NATA members-only database and completed by 506 participants. **RESULTS:** There was no statistically significant difference in the accuracy of males (n=181) to define sexual assault (M=2.80, SD=0.53) and females (n=325) defining sexual assault (M=2.87, SD = 0.38),  $t(504) = -1.90$ ,  $p = 0.058$ . There was no statistically significant difference in males (M=6.87, SD=1.60) to females (M=7.11, SD=1.36) accurately defining sexual harassment,  $t(504) = -1.74$ ,  $p = 0.082$ . Neither group were able to accurately identify the scenario in which neither incidence occurred,  $t(504) = -0.009$ ,  $p = 0.993$ . Experiences with sexual assault and harassment were analyzed for prevalence. **CONCLUSION:** While males and females can both accurately identify scenarios of these incidences, further exploration of the prevalence of this topic should be completed.

**20. An Observation of Infant Communication Partner Preference in Play Groups and the Relationship of Assertiveness in Infant-Caregiver Dyads**

Stephanie Cronin  
Faculty Advisor: Dr. Sarah Lockenvitz

In this study, infant-caregiver communication style was systematically compared to the communication partner preference of infants within a playgroup setting based on assertiveness, responsiveness, and joint attention. Initial qualitative observations informed preliminary quantitative discoveries to be further explored in future studies. Participants were infants under the age of 24 months with a close relationship to a Communication Sciences and Disorders Department affiliate. Direct observations of assertiveness and communication-partner preference were documented during two sessions of 5-minute infant-caregiver dyad play and two sessions of 5-minutes of infant playgroup interaction. Analysis of the data suggested a relationship between caregiver assertiveness during one-on-one play and infant-preferred communication partners during group play. This preliminary research suggested that infants who tended to prefer their own caregiver as a communication partner in a group-play setting demonstrated low assertiveness, relative to their caregivers, during infant-caregiver dyad play. All infants in this study showed a preference for adult communication partners during play groups when compared to their tendency to communicate with same-aged peers.

**21. The Effects of Coloring on Mood and Overall Well-being in an Independent Living Facility**

Emily Bohnert  
Faculty Advisor: Dr. Lisa Hall

Although moving into an independent living facility can be a positive transition in an older adult's life, it may also, at least initially, have a negative effect on mood. This can occur for many reasons including downsizing, relocating, and leaving a lifelong home. Colorful Creations is a coloring class implemented within an independent living facility to attempt to increase mood and overall well-being of residents. The ethnographic method of participant observation was used to collect data, along with two surveys utilized to gauge residents' moods before and after the six-week class. Whether Colorful Creations enhanced mood and well-being among those who participated will be discussed. Due to time constraints, this study was unable to measure whether Colorful Creations had lasting effects on mood. A limitation of this study was participation bias. Recommendations for future studies include increasing the duration of the intervention.

## Abstracts

### 22. **Further Characterization of the Skeletal Phenotype in Idua-W392X Knock-in Mice as a Model of Mucopolysaccharidosis Type I**

Anna Marie McWoods, Christina J. Owensby, Alicia R. Williard, Fatimazohra Khamissi, Emma C. Metz, Erwin Perez-Garcia, Amanda C Brodeur  
Faculty Advisor: Amanda C. Brodeur

Mucopolysaccharidosis type 1 (Hurler syndrome) is a rare, autosomal recessive disorder caused by the deficiency in the lysosomal enzyme Î±-L- iduronidase (IDUA). Hurler syndrome is characterized by cognitive disabilities, hearing impairment, and organ enlargement. Additionally, patients exhibit degenerative joint disease and bone deformities. It is a progressive disorder that involves multiple organ systems and leads to early neurological decline and death in childhood, if not treated. To improve quality of life, there are therapeutic options available. Despite available treatments improving the majority of symptoms, there are minimal improvements in the bone phenotype. As a result, diagnosed individuals continue to experience disabling, painful bone disease that often requires intense surgical intervention. Our lab examined the bone phenotype using a knock-in mouse model, which has a nonsense mutation analogous to the human IDUA mutation. To better understand the physiochemical composition of the bone, collagen content of the IDUA mouse model can be indirectly quantified using a hydroxyproline assay. The aim of this study was to gain a greater understanding of the bone phenotype seen in Hurler syndrome through this assay.

### 23. **Law Enforcement Academy Training: Changes in Agreeableness and Neuroticism**

Sadie Flood, B.A. Heather L. Clark, B.S. Paul Deal, Ph.D.  
Faculty Advisor: Paul Deal, Ph.D.

The Drury University Law Enforcement Academy (LEA) offers training and continuing education for law enforcement officers and others in the criminal justice community. Much of the law enforcement research associated with personality has addressed the predictive ability of various traits and subsequent employment performance. Very little research has examined the potential impact of law enforcement training itself on these characteristics. Specifically, there are few studies to date examining the relationship between agreeableness and neuroticism within law enforcement trainees. The purpose of this exploratory study was to examine the relationship between changes in proneness to psychological distress (i.e., neuroticism) and interpersonal interaction style (i.e., agreeableness). The NEO PI 3 was administered to approximately 270 LEA cadets over the past six years early in their academy experience and again immediately prior to graduation.

The relationship between different scores on broad facets of neuroticism and agreeableness as well as differences between narrow facets of these constructs were examined. Implications for the law enforcement community and suggestions for future research are discussed.

### 24. **The Effect of Visible Calories on Consumer Food Choices**

Natalie Truber, Alyssa Laing, Kayley Myers, Lacey Bertram, Hannah Fink, Paige Crause, Katelin Peters  
Faculty Advisor: Dr. Anne Marie Hunter

With fast-food outlets growing in number, convenience, and affordability, total food expenditure spent away from home is on the rise. Legislation has been enacted by the FDA that requires restaurants with more than 20 chains to post caloric value of each item on the menu. The purpose of this study was to determine whether visible calories on the menu affect a customer's decision by relating the calories to consumer preferences. Ninety-one randomly selected participants from three different restaurants participated in a survey consisting of three yes/no questions and one scaling question. The survey was then analyzed using a frequency table and descriptive statistics. Questions 1-3 were yes/no questions. Question 1 showed 71% of people noticed the calories on the menu. Question 2 showed 57% of people did not consider calories when determining their food choice. Question 3 showed 33% of people who used calories to determine their choice did not choose the lower calorie option. Question 4 showed an average of 5 on the 1-10 scaling question, showing that calories are of neutral importance. Across all three restaurants, even though most people were aware of the visible calories on the menu, it did not affect their food choice.

### 25. **Registered Dietitian Nutritionists and Interprofessionalism**

Meghan Hagenhoff, Brooke Crotty, Amanda Martin, Mariah Cofield, Lauren Pavel, Emily Adams  
Faculty Advisors: Dr. Anne Marie Hunter

Interprofessionalism is a collaborative approach to problem-solving in which various healthcare disciplines work together towards an end goal to benefit society. Research shows that interprofessionalism can be most effective when multiple health disciplines collaborate using concepts such as partnership and sharing of information. The goal of this project was to survey registered dietitian nutritionists who are members of the Missouri Academy of Nutrition and Dietetics (MOAND) to assess their participation in interprofessionalism at their place of employment. A quantitative study was conducted with a survey of 14 questions including demographic data and interprofessional experience. The survey was sent using Survey Gizmo to MOAND

members through a listserv communication system. There were 18 responses out of the 180 members on the listserv. The research concluded that 76.9% of the total participants who experience interprofessionalism said it benefited them. Of the total participants, 72.2% ranked the importance of interprofessionalism at or above 6, on a scale of 1-10 with 10 being very important. Overall, the results showed that interprofessionalism has a positive impact on dietitians working in various settings.

**26. Athletic Trainers' Demonstrate Knowledge of the National Athletic Trainers' Association (NATA) Consensus Statement on Psychological Concerns**

Haley Reiff

Faculty Advisor: W. David Carr, PhD

Athletic trainers (ATs) play a vital role in the recognition and referral of mental health illnesses. With psychological concerns being on the rise in collegiate athletes, it is crucial ATs have the capability to effectively manage this ever-present issue. The purpose of this study was to examine the knowledge of collegiate athletic trainers regarding the NATA's consensus statement on psychological concerns. We distributed an online questionnaire via e-mail through the NATA member database to 1,000 randomly selected collegiate ATs. The survey consisted of 23 true/false knowledge-based questions with a series of 4-point Likert scale questions to assess self-confidence of each response. We received 178 completed responses (17%) from ATs who worked in a collegiate setting with different years of experiences. We ran a repeated measure ANOVA to assess raw scores and the overall confidence score of participants. The analysis revealed an average score of 72% on the questionnaire. The analysis also noted a correlation between gender and the overall score as well as between the raw score and confidence level, however, both correlations were non-significant.

**27. Validation of the PLAIN Assessment: Focus Group Implementation**

Elizabeth Gannon, Breanna Green, Hannah Nabors,

Logan Noe, Ashlea Cardin, OTD, OTR/L, BCP

Faculty Advisor: Ashlea Cardin, OTD, OTR/L, BCP

This project sought to increase content validity of the PLAIN Assessment and contribute to the discussion of evidence-based occupational therapy practice in Plain communities. Plain communities encompass Amish, Amish-Mennonite, and Mennonite groups. Version 1 of the PLAIN Assessment used a top-down approach focusing on an individual's occupational performance. Informed by pilot results, student researchers created version 2 of the PLAIN Assessment, which used a bottom-up approach. Version 2 was divided into four sections: structures, occupations, performance

skills, and a fill-in-the-blank sentence to identify the individual's primary occupational performance concern. A Bishop from a local Plain community assisted with the project, leading a focus group to gather perceptions of both versions. Focus group participants preferred version 2 based on its biomechanical approach, visual appeal, and comment boxes. Feedback from the targeted population identified relevance and acceptability of version 2, which contributed to the tool's content validity. This project contributed to evidence-based occupational therapy practice by emphasizing cultural sensitivity and supporting the call for rigorous tool development by the profession.

**28. Sustainable Design Impacts on Pro-Environmental Behaviors and Perceptions: Can a Sustainable Context Predict Recycling?**

Eva Klein

Faculty Advisor: Dr. Robert G. Jones

This research is designed to assess the effect of Missouri State University students' physical environment on their pro-environmental behaviors (PEBs) and values. Out of a sample of 46 students (mean age 18.71), 36.4% eat in on-campus dining centers "most of the time". We used this setting, while controlling for social modeling to identify correlations between sustainable building design and recycling. The dining facilities use ZipGrow Towers, hybrid hydro-aeroponic systems to grow herbs and greens in a sustainable way. The presence or absence of the ZipGrow Tower was manipulated in an experimental study to evaluate whether the Towers' presence influenced recycling. A survey on preexisting PEBs, values, and perceptions related to campus and daily life was administered after observing behaviors, as another measure to predict recycling behaviors. No significant effect on recycling behaviors was found from the ZipGrow Tower's presence; however, higher concern for food and waste production was correlated with participants asking if they may recycle,  $r(70) = .266, p = .026$ .

**29. Hand Length and Hand Volume as Predictors of Grip Strength: A Correlational Study**

Dr. Marc Willey, Amanda Elliott, Ashlin Smith, Sonja

Stark

Faculty Advisor: Dr. Marc Willey

The Jamar® dynamometer, with norms based on age and gender, measures grip strength. Current research postulates other variables may be more accurate predictors of grip strength. This correlational study investigated relationships between (1) hand length and grip strength, and (2) hand volume and grip strength. Students (18-24 yrs) were recruited on campus (N = 239). Following accepted protocols, researchers measured hand length from the wrist's distal crease to the 3rd digit, grip strength using a Jamar® Dynamometer, and hand volume using a

Jamar® Hand Volumeter. Multiple regression revealed the following predictors of grip strength: for the left hand, gender ( $B = .506$ ;  $t = 9.406$ ,  $p < .001$ ), hand length ( $B = .275$ ;  $t = 5.085$ ,  $p < .001$ ), hand volume ( $B = .130$ ;  $t = 2.416$ ,  $p = .016$ ), and age ( $B = .085$ ;  $t = 2.315$ ,  $p = .021$ ); for the right hand, gender ( $B = .471$ ;  $t = 8.582$ ,  $p < .001$ ), hand length ( $B = .292$ ;  $t = 5.237$ ,  $p < .001$ ), and hand volume ( $B = .149$ ;  $t = 2.640$ ,  $p = .009$ ). Gender, hand length, and hand volume were stronger predictors of grip strength than age for both left and right hands. This evidence contributes to the literature supporting the need for updated normative data.

**30. The Development and Validation of an Implicit Association Test Using Pictures of Facial Affect**

Philip Soza, Donald Fischer and Ryan Thompson  
Faculty Advisor: Donald Fischer

Anxiety is a psychological construct that has a long history of interest in psychology. Over a century of evidence has linked anxiety to many important behavioral phenomena that range from psychopathological syndromes to impaired job performance. Traditional measures of anxiety have relied on self-reports. Contemporary cognitive science recognizes that these measures are vulnerable to contamination due to impression management and inaccurate self-knowledge artifacts. Implicit measures of psychological constructs like anxiety have demonstrated less vulnerability to these artifacts. Egloff and Schmukle (2004) developed an implicit measure of anxiety using an Implicit Association Test (IAT) procedure with word stimuli. This research investigated whether an IAT that uses graphic stimuli (pictures of facial expressions depicting anxiety) would enhance the validity of the measure. A sample of 82 subjects responded to two IATs (Egloff & Schmukle's word IAT and our pictorial IAT) and three established self-report measures of anxiety (Paulhus Impression Management scale (IM) and Spielberger Trait and State Anxiety Scales (STAI-S & STAI-T)). Results were analyzed according to Campbell and Fiske's multitrait-multimethod design.

**31. The Impact of Haven Training on Victim Blaming in a Rape Scenario**

Michaela Goldsmith, Paige Lehman, Jessica Dickey, and David Zimmerman  
Faculty Advisor: David Zimmerman

"Haven" training is an online sexual assault prevention program which aims to educate college freshman about sexual assault and reduce misconceptions that might lead to underreporting of rape (Kilpatrick et al., 2007). In a previous study examining the efficacy of Haven training at reducing the tendency to blame victims, neither an abridged experimental manipulation of Haven exposure

nor real-life exposure impacted victim blaming (Oberdieck, 2017). Unfortunately, the real-life exposure comparison involved a serious confound. The current research was a follow-up designed to assess the efficacy of the Haven program by recruiting better real-life comparison groups, using students from a freshman summer orientation program as a main source for the no-Haven group and fall Introductory Psychology students as a primary source for the Haven-exposed group. All participants completed a paper/pencil packet that included a sexual assault vignette and a measure of victim blame, followed by a demographics form that included a question at the end asking whether they had completed Haven training. Analyses yielded little evidence that completion of Haven reduces victim blaming.

**32. An Epidemic on the Ground: Overview of America's Opioid Crisis**

Sakinya Palakurthi  
Faculty Advisors: Dr. Dalen Duitsman

The United States is currently facing an opioid overdose epidemic. Opioid addiction killed more than 33,000 people in 2015; approximately half involved prescription opioids. The daily death toll for opioid overdose is 44 people per day. It is estimated that currently 2 million individuals in the United States have an opioid addiction. In the United States alone, \$78.5 billion is being spent annually on this problem. The objective of this study is to give an overview regarding opioid addiction in the United States. Opioid addiction has severe detrimental effects at the community and personal level. There is currently no effective screening tool to precisely assess the transition from treatment to dependence. However, proven strategies are available to manage chronic pain without opioids. Physicians can be considered as the epicenter in this issue; therefore, various guidelines for prescribing opioids are established.

**33. UJIMA Literacy Camp**

Brooke Empson, Madelyn Osmundson  
Faculty Advisor: Dr. Shurita Thomas-Tate

The purpose of Camp UJIMA was to provide students from local Title 1 schools with literacy-based instruction over the summer. The camp was held for three weeks during the month of June for children between 4 and 10 years-old. It consisted of stations with different activities focusing on reading and writing skills. An ongoing assessment outlined each child's strengths and weaknesses and allowed for individualized instruction throughout the camp's duration. The two researchers each selected a topic related to the project and completed a literature review of six to ten articles. Brooke Empson researched the "summer slide" and the increased risk for children of lower socioeconomic classes. There is

evidence that summer reading programs can decrease the chance of deterioration of reading skills over the summer break, but the program must have qualities that predict success such as properly trained personnel, resources for caregivers, and engaging, evidence-based materials. Madelyn Osmundson researched factors contributing to the literacy gap for those of low socioeconomic status in America. Out-of-school factors such as parenting styles, home learning environment, and family dynamic are highly related to future literacy skills.

**34. Characterization of Nucleotide Excision Repair Damage Sensor RAD4 in Tetrahymena Thermophila**

Rachel Mullner, Dr. Joshua Smith  
Faculty Advisor: Dr. Joshua Smith

Xeroderma Pigmentosum Group C (XPC) serves as the damage sensor in Global Genome - Nucleotide Excision Repair (GG-NER) to remove UV-induced lesions in silent DNA. Mutations in XPC cause Xeroderma Pigmentosum, a condition characterized by increased UV sensitivity and cancer risk. To further study XPC in GG-NER, we found a Rad4 homolog in Tetrahymena thermophila, a binucleated ciliate containing a transcriptionally active Macronucleus (MAC) and a silent Micronucleus (MIC) to store genetic information. This allows us to examine XPC/Rad4 in DNA repair away from transcription-coupled DNA repair. In this study, RAD4 was tagged with GFP and RFP (Green/Red Fluorescent Protein) as well as FH6 (FLAG-His6) and 2xHA epitope tags. GFP-Rad4 localized to the MAC and MIC after UV damage, but not after damage with H<sub>2</sub>O<sub>2</sub> or MMS, which induce different repair pathways. This indicates that GG-NER is happening in Tetrahymena and that Rad4 plays a key role. Colocalization of RFP-Rad4 and GFP-Rad23 can be studied, and co-immunoprecipitation can be done with 2HA/FH6-Rad4 to identify other interacting proteins. These studies will further characterize Rad4, confirm that Rad4 is a functional homolog to XPC, and identify other GG-NER proteins in Tetrahymena.

**35. Cloning of Various Genes in the Model Organism Tetrahymena thermophila in an Introductory Biomedical Sciences Lab**

Taylor Walker, Lysie Daniels  
Faculty Advisor: Dr. Joshua J. Smith

Throughout a semester, genes within the model organism *T. t.* that contained homologs in humans were cloned to gain a better understanding of their functionalities. The study began by isolating genomic DNA from cells. Once the DNA was isolated, further information had to be obtained. Therefore, a bioinformatics report was compiled to determine the specific homolog that was being studied as well as any additional information required to conduct the research. Once all of the

necessary information was obtained, the DNA was quantified using a technique called PCR. To check which gene was amplified, gel electrophoresis was performed. Once confirmed, the gene was inserted into a pENTR-TOPO-D plasmid vector that contained a gene for kanamycin resistance and transformed into *E. coli*. The cells were grown on kanamycin plates to select for the cells that contained the plasmids. The plasmids were then isolated and cut via restriction enzymes to ensure proper orientation of the gene within the plasmid. The cells were cryopreserved for future experiments. This new information can aid researchers as they look into the functionality of different homologs by tagging the gene with GFPs or other epitope tags to study the localization and function.

**36. Individual Cognitive Stimulation Therapy (iCST) in a Long-Term Care Setting and the Effect on Cognition, Depression and Quality of Life**

Tara Renee Holcomb  
Faculty Advisor: Dr. Lisa Hall

The need for non-pharmaceutical intervention for those with dementia is of ever-increasing importance. Cognitive Stimulation Therapy (CST) is an intervention that aims to stimulate and engage people with dementia by discussing current events and doing themed group activities. Individual Cognitive Stimulation Therapy (iCST) is CST for the individual. It has been conducted thus far only by caregivers in private homes and research is limited. The purpose of this study is to measure the benefits of iCST in a long-term care setting, conducted by a certified administrator. Three residents agreed to participate in this mixed method three-phase study. (1) Three assessments were administered for baseline measurements. (2) Ten 35-minute iCST sessions were conducted over a 5-week period. (3) Post-assessments were completed. Quantitative data were analyzed using standard means from pre-and post-assessment scores. Qualitative data were analyzed using the constant comparative method. Preliminary results suggest that cognitive function will not increase, due to the 10-session time constraint. The effect on depression and quality of life is unclear. In future research, a certified administrator should conduct iCST for a longer duration.

**37. Perception of Gender Bias from the Female Athletic Trainers' Perspective in the Professional Sport Setting**

Sara Lovse, Kristin Paloncy, Ed.D., ATC Stephanie Mazerolle, Ph.D., ATC  
Faculty Advisor: Kristin Paloncy

**OBJECTIVE:** The purpose of this study was to gain better understanding of the perception of gender bias in the athletic training professional sport setting from the

## Abstracts

female athletic trainers' perspective. **METHODS:** This study used a phenomenological design with criterion sampling for subject recruitment. Participants were contacted by email from a member-only listserv from National Athletic Trainers' Association based on practice setting. Six participants reviewed the questions and electronically signed an informed consent before participating in individual phone interview with open-ended questions. An open-coding process was conducted for data analysis using two independent coders. The codes were then peer-reviewed by an expert in qualitative research. **FINDINGS:** Five themes associated with gender bias were identified: perception of age inequality (ageism), mentorship, communication, traditional expectations, and perception of gender inequality (sexism). **CONCLUSION:** The female athletic trainers expressed adversity faced stemming from their age, gender, and the traditional expectations of male athletics. Participants disclosed mentorship, communication, and inter-professional connections were beneficial in facing gender bias issues.

### 38. **The Acute Effects of Increased Lower Extremity Mobility on Postural Sway**

Matt Bowden, Kristin Paloncy, Allan Liggett  
Faculty Advisor: Kristin Paloncy

**OBJECTIVE:** The purpose of this study is to determine if improving mobility to the lower body posterior musculature, as measured by a sit-and-reach test, affects the anterior-posterior sway during a standing toe touch. **METHODS:** The study employed a controlled laboratory study design with randomization in which 12 participants reported for a single data collection session. Participants were either placed in the control group that did not contain an intervention, or in the experimental group that performed foam rolling. **FINDINGS:** For the sit-and-reach test, there was a statistically significant finding in posterior chain flexibility for intervention and time,  $F(1, 10) = 12.745$ ,  $P = .005$ ,  $\eta^2 = .560$ . This indicates the post intervention group ( $39.750 \pm 0.99$  cm,  $P = .018$ ) had a significant increase compared to the pre-intervention group ( $31.583 \pm 2.79$ ,  $P = .018$ ), and when compared to the control group. No significant finding was found during the anterior-postural sway test when comparing group and time,  $F(1, 10) = 2.1947$ ,  $P = .169$ ,  $\eta^2 = .180$ . **CONCLUSION:** Although significant difference could not be obtained, postural sway increased by 37.24% in the experimental group.

### 39. **What's New? The Effects of a Cognitive Stimulation Program on Older Adults in an Assisted Living Facility**

Stephanie Thompson  
Faculty Advisors: Dr. Lisa Hall

Cognitive Stimulation Therapy (CST) was developed to address mild or moderate cognitive impairment in older adults. Research indicates that cognitive stimulation therapy is just as effective as Alzheimer's medication in memory retention and can improve cognitive impairment in older adults. What's New? is a cognitive stimulation group that was implemented at an assisted living facility to five individuals, twice a week for seven weeks. Before What's New? began, three preliminary assessments-SLUMS, QOL-AD, and CSDD were given to the five individuals. After 14 sessions, the assessments were re-administered to see if cognitive impairment had improved for the individuals. Ethnographic data collection methods of participant observation and audio recordings were also utilized to collect data. Data were recorded via fieldnotes and then coded. The results, limitations, and challenges of this study will be discussed. Facilities should consider implementing cognitive stimulation sessions as part of daily activity schedules.

### 40. **Can Post-Concussion Symptoms Be Prevented Through Utilization of Interventions and Activities Associated With Vestibular Therapy?**

Samantha Fluck, Dr. W. David Carr; Dr. Tona Hetzler  
Faculty Advisors: Dr. W. David Carr

The conventional treatment of concussions focused on rest and achieving a complete asymptomatic state before starting an athlete's return to play protocol. A relatively new tool, Vestibular Ocular Motor Screen (VOMS), has shown promise in determining the underlying cause of continued symptoms following a concussion. The purpose of this study is to identify a set of exercises to help rehabilitate concussed athletes to prevent post-concussion symptoms and decrease the length of time it takes to fully return to play. The subjects consisted of 18-26 year old collegiate athletes from Evangel University, Missouri State University and Drury University who participated in athletics and sustained a concussion. All athletes participated in a multi-exercise/activity treatment until asymptomatic, followed by the standard return to play protocol. Participants are tested every 48 hours post-concussion with the VOMS and a symptom checklist every 24 hours until asymptomatic. Our analyses will examine the duration it took to get back to full participation after a concussion. We expect to find that with use of the intervention, less than 20 percent of our population had prolonged symptoms over one month.

## Abstracts

**41. Adult Mosquito Activity in the Ozarks as Determined by Various Survey Techniques**

Matthew Flint, Victor Okwo, Avaneendra Gurram, Srita Chundru, David M. Claborn  
Faculty Advisor: Dr. David M. Claborn

In recent years, much information has been published on *Aedes aegypti* and *Ae. Albopictus* as vectors of Zika virus, but few surveys have provided information on the efficacy of trap and bait types used to survey mosquito population, or the abundance of certain species in Missouri. This study aims to provide baseline information on the appropriate traps and baits needed to obtain substantial species-specific results as well as to provide an overview of the most abundant mosquito species in Missouri. These findings will aid model-based predictions of future transmission of Zika virus and other important arboviruses. A total of 31 counties were surveyed from June to September 2016 and survey sites were selected based on CDC estimates for the presence of *Ae. aegypti*. CDC light traps, Fay-Prince and BG sentinel traps were used to catch adult mosquitoes while dry ice, octenol or both were used as the baits. Larval specimens were also obtained from standing bodies of water using larval dippers and turkey basters. Of all the 43 species that were identified, *Ae. vexans*, *Ae. albopictus*, *Ae. japonicus*, *Ae. triseriatus*, *Culex erraticus*, and *Anopheles quadrimaculatus* were the most abundant species.

**42. Evaluation of Ground Force Reactions of Barefoot Walking and Running**

Lucas Braun, Shannon Deakins, Sam Doucet, Kim Elliot, Austin Gragg, Troy Kifer, Brooke Moldenhauer, Courtney Reynolds, Andy Smith, Myles Stafford, Dr. Jacob Gdovin and Dr. Daniel Wilson  
Faculty Advisor: Dr. Daniel Wilson

The purpose of this study is to evaluate the anterior-posterior and medial-lateral ground reaction forces (GRF) generated during barefoot walking and barefoot running for persons who are accustomed to being shod (wearing shoes). Previous studies have shown that barefoot performance results in GRF of less magnitude than shod performance because foot contact with the ground occurs at the mid- or forefoot. However, studies also warn that habitually shod persons who wish to begin barefoot regimens need to gradually transition from shod to barefoot due to an increased likelihood of stress fractures and muscle strains. This study will determine the anterior-posterior and medial-lateral GRF of barefoot walking and barefoot running in habitually shod individuals and utilize the data to understand how GRF of barefoot performance in non-habituated persons may contribute to the increased risk of overuse injuries.

**43. The Effects of Barefoot vs Shod Forefoot Running**

Courtney Buechter, Lauren Camenzind, Ashley Cole, Marshall Gevers, Bret Jaegers, Thien Le, Lindsey Lybarger, Joseph MacConnell, Kayla McDaniel, Maddie Urhahn, Dr. Jacob Gdovin, Dr. Daniel Wilson  
Faculty Advisor: Dr. Daniel Wilson

The purpose of our project is to compare barefoot running to shod (shoe) running. Studies show that most barefoot runners use a forefoot strike and most shod runners use a heel strike. These studies have also shown that shod runners using a forefoot strike gain more compliance and force absorption. This study will compare three subjects in two running conditions (barefoot forefoot vs. shod forefoot) to determine if barefoot running will produce more or less ground reaction force than shod running, and if there is a difference in injury potential. It is expected that shod running will produce more force than barefoot running.

**44. Effect of Loss of P2Y2 Receptor on Purinergic P2Y Receptor Family Expression.**

Joseph Stenberg, Jianjie Wang  
Faculty Advisor: Jianjie Wang

The P2Y2 Receptor (P2Y2R) is a purinergic G-coupled protein receptor that is stimulated by the nucleotides ATP and UTP. The P2Y2R has been shown to mediate immune-regulating functions such as vascular inflammation and leukocyte migration. However, the absence of P2Y2R does not result in complete lack of immune-regulating functions. The aim of the study is to determine transcript expression of seven isoforms of the P2Y R in microvascular endothelial cells (MEC) derived from both wild type (WT) and P2Y2R knockout (KO) mice. MEC from P2Y2R KO mice showed an increase in expression of the P2Y12R relative to WT cells. The P2Y13R expression became detectable in MEC from P2Y2R KO mice in contrast to undetectable level in MEC from WT mice. The P2Y2R KO MEC also experienced a decrease expression of P2Y14R compared to WT cells. The P2Y4R transcript was undetectable for both the WT and P2Y2R KO MEC. The P2Y6R levels was the highest for both WT and KO cells. This study reveals that knocking out P2Y2R causes compensatory alteration of P2Y12R, P2Y13R, and P2Y14R transcript level. Further, the biologic functions of those three receptors in the P2Y2R KO mouse model remains to be investigated.

## Abstracts

**45. The Association Between Nonverbal Communication Sensitivity and Communication Apprehension in the Recently Certified Athletic**

Jessica Rosenberg, Dr. W. David Carr, Dr. Tona Hetzler, Dr. Kelly Wood

Faculty Advisor: Dr. W. David Carr

Recent research has shown employers' dissatisfaction with newly graduated athletic training students' communication skills. A large portion of communication is based on nonverbal behavior; therefore, recent graduates may be experiencing communication apprehension that is negatively affecting their nonverbal communication sensitivity. The purpose of this non-experimental study is to determine the association between nonverbal communication sensitivity and communication apprehension in thirty recently certified athletic trainers. (Male = 11, female = 19; age = 22 + 1.07 years). Participants completed the Mini Profile of Nonverbal Sensitivity (MiniPONS) and the online Personal Report of Communication Apprehension (PRCA-24). The results showed no significant association between nonverbal communication sensitivity and communication apprehension despite a weak positive correlation between increased communication apprehension and increased nonverbal sensitivity accuracy. Across the board, females were better able to recognize all forms of displayed nonverbal behavior than males in the MiniPONS. More research is needed to determine the association between communication apprehension and nonverbal communication sensitivity.

**46. Senior Citizen Prom**

Morgan Brown

Faculty Advisor: Dr. Lisa Hall

The aim of this study is to observe the effects of a Senior Citizen Prom on the depressive mood of the residents in a local assisted living facility. The Prom was put on by local college students who participate in their university's Gerontology Club. Participants in this study included female and male residents from an assisted living facility who independently chose to attend the Prom. Previous research suggests that intergenerational activities can improve the mood of residents of a long-term care facility as well as foster better communication skills for younger adults. This is an ethnographic study involving general observation, participant observation, field note analysis, loosely structured interviews, and the Geriatric Depressive Scale-Short. Fieldnotes were analyzed using open coding and the constant comparative method. Findings suggest that this intergenerational event improved the moods of residents. More research is needed to verify the effects a one-time Prom has on the depressive mood of long-term care residents. Prosodic Features in Young Adults with Attention Deficit Hyperactivity Disorder.

**47. Prosodic Features in Young Adults with Attention Deficit Hyperactivity Disorder**

Hayley Peterson

Faculty Advisor: Klaas Bakker

This study addressed the question whether young adults with attention deficit hyperactivity disorder (ADHD) differ from those without ADHD in terms of several prosodic characteristics in speech while in a visually distractive environment. The specific prosodic features observed were average loudness, average speech rate, and pitch variability. Participants with ADHD and participants from a control group were recruited throughout the Missouri State University campus and participated in an interview to collect a conversational sample for examining loudness, rate, and pitch in speaking tasks. These characteristics were compared between those with and without ADHD. The results indicated that there were no statistically significant differences in loudness ( $t=0.789$ ,  $df=21$ ), rate ( $t=0.479$ ,  $df=21$ ), or pitch variability ( $t=0.883$ ,  $df=21$ ) between the participant groups. These results do not support that individuals with or without ADHD differ on the prosodic variables studied.

**48. An Exploration of Marfan Syndrome: Causes, Complications, and Molecular Diagnostics**

Abigail Behnke, Dr. Amanda Brodeur

Faculty Advisor: Dr. Amanda Brodeur

Marfan syndrome is a genetic disorder that affects an estimated 200,000 people in the United States alone. Individuals with this disorder can suffer from visual difficulties as well as heart valve complications that could ultimately lead to premature death if untreated. Individuals who are diagnosed early in life can be treated with medication and surgery to prevent cardiovascular difficulties, increasing their life expectancy. However, for a confirmed diagnosis of Marfan syndrome, a genetic test for mutations in the FBN1 gene is required. Genetic tests, for personal knowledge or research, have many rules and regulations in place to protect the general public from misuse of their genetic information. Here we present a discussion of Marfan syndrome and its causes, as well as regulations for genetic testing and informed consent.

**49. Factors Impacting the Grieving Process of Parents of Children With or Without Hearing Loss**

Jenna Parrott

Faculty Advisor: Dr. Christopher Craig

While it is generally understood that hearing parents who have a child with a hearing loss may experience some variation of a grieving process, it is equally important to understand the nature of this process for Deaf parents who have a child who is hearing. The purpose of this research



## Abstracts

is to investigate the professional literature and to gain insights from direct interviews with families to determine factors of grieving of Deaf parents with a child who is hearing. Results of this qualitative study show that Deaf parents who have a child who is hearing did not experience the same process of grief as the hearing parents who have a Deaf child. Preliminary findings from this very limited sample size suggest that experiences of the Deaf parents are much more positive. The results of this preliminary study point to the need for further investigation of this important topic of inquiry.

### 50. **Comparison of Ground Reaction Forces Between Casual and Traditional Running**

Jordan Burt, Chris Becker, Hannah Burnett, Amy Carver, Emma Chmelir, Troy Davis, Alli Lacker, Tyler Middleton, Garret Willard, Daniel Wilson, Jacob Gdovin  
Faculty Advisor: Dr. Daniel Wilson

The purpose of our comparison is to determine how the kinetics of casual shoes compare to those of a traditional running shoe. Though footwear is not a new concept by any means, the modern running shoe was not conceived until the 1970's. Since then numerous studies have been done to study the effects of heel height and sole properties on lower extremity kinematics. In particular, we will look at how traditional running shoes provide greater shock absorption, resulting in a lesser vertical reaction force than the casual shoe and whether the cushioned sole will result in greater Medial-Lateral/Anterior-Posterior components needed to stabilize the ankle and knee joints due to less proprioceptive feedback. We expect to find lower vertical and medial-lateral GRF for the running shoe versus the casual shoe.

### 51. **Providing Best Practice to English Language Learners: The Role of the SLP and ELL Specialist**

Christine Salyer, Dr. Lisa Proctor  
Faculty Advisor: Dr. Lisa Proctor

The purpose of this research is to analyze the role Speech-Language Pathologists (SLP) and English Language Learning (ELL) Specialists in Missouri currently play in providing assessment and intervention services to students who are English Language Learners, as well as their familiarity with the roles and responsibilities of and level of collaboration between the two disciplines. In order to gather this information, an electronic survey was distributed to SLPs and ELL Specialists currently practicing in Missouri. There were twenty-four respondents that included both SLPs and ELL Specialists. Results from this survey concluded that these professionals utilized a variety of assessments/intervention techniques. In terms of familiarity and collaboration with the other discipline, respondents reported various levels of awareness.

Participants were interested in learning from the other discipline, particularly about types of assessments/intervention techniques used. Although the limited number of respondents restricts the conclusions that can be drawn, the study supports for the need for further understanding of interprofessional practice between SLPs and ELL Specialists.

### 52. **The Role of Public Health in Healthcare Accessibility in the United States**

Ama Bikoko  
Faculty Advisor: Dalen Duitsman

Public Health practitioners need to become deeply familiar with healthcare accessibility and the role that the field plays. Accessibility is heavily influenced by the factors of insurance coverage, socioeconomic factors, and physical environment. Public health plays a role that has been neglected in each of those factors. In the United States there is complex discussion happening on the reform of healthcare. As the discussion continues, Public Health needs to become more proactive in our role of healthcare. Failure to do so will ensure that the field loses its role and becomes eclipsed.

### 53. **Self-Efficacy of Collegiate Athletic Trainers on Identifying and Referring Student Athletes with Depression and Anxiety**

Alexa DeClue, Olivia Nicholls, Megan Carson  
Faculty Advisor: Tona Hetzler

Objective: Determine the self-efficacy of collegiate athletic trainers (ATs) in identifying and referring student athletes suspected of having depression and/or anxiety. Design: A 24-question online survey was developed with demographic information, a 7-point Likert scale to rank self-efficacy, and questions regarding experience, education, and available resources. Participants: 106 ATs from Division 1, Division 2, Division 3, and NAIA/JuCo settings completed surveys. Data Collection/Analysis: The survey was sent out randomly to 1,000 NATA members who identified themselves as working in the collegiate/university setting. A reminder email was sent to the ATs who received the initial survey, and the survey closed within two and a half weeks after its initiation. Result: A significant difference between the four institute types in identifying and referring athletes with depression and/or anxiety was not found. This aspect of the data collection shows that there is relatively equal efficacy in identifying depression and/or anxiety among collegiate ATs regardless of school size.

## Abstracts

**54. On The Integration of the Nourseothricin Acetyltransferase (Nat) Cassette as a Novel Selectable Marker in Tetrahymena Thermophila**

Jeremy Tee, Joshua Smith

Faculty Advisor: Joshua J. Smith

The streptothricin class of antibiotics consists of aminoglycosides that are derived from the *Streptomyces* genus, with different species producing different streptothricins, and *Streptomyces noursei* producing nourseothricin. As with other aminoglycosides, nourseothricin's mechanism of action involves the inhibition of protein synthesis, specifically by interfering with translocation. *S. noursei* possesses the nourseothricin resistance gene (*nat1*) that codes for an acetyltransferase that inactivates the drug. *Tetrahymena thermophila* is a ciliated protozoan that possesses unique qualities, namely, a segregated and alternatively heterochromatinated somatic macronucleus and meiotic micronucleus, as well as a polyploid 45 copies of every chromosome. Often used to study chromatin remodeling and cilia, its fast growth rate and easy upkeep makes it a great model organism. While the nourseothricin gene has been used as a selective marker in other protozoans, its use in *T. thermophila* has not been tested. Here we attempt to create a novel plasmid tagging system for *T. thermophila* that utilizes the NAT cassette. It is thought that our system will be compatible with other selectable markers, permitting greater gene tagging in the organism.

**55. Selection Feedback Derived from Biographical Correlates of Long Term Strategic Perspective**

Jessica Aikens, Rachel Kennell, Nivia Ayala, Michaela Fisher

Faculty Advisor: Dr. Robert Jones

The purpose of this research was to find biographical information that could be used to provide applicants with feedback from the personnel selection process. Much of personnel selection is focused on the decisions made by the employer. This research aims to provide meaningful feedback to applicants regarding their scores on selection devices. In addition to possibly changing applicant reactions to the selection process (Smither, Reilly, Millsap, AT&T, & Stoffey, 1993), such feedback may provide developmental options that applicants can pursue in order to improve their employability. The Long Term Strategic Perspective (LTSP) scale used in this study measures one's development perspective on life experiences. Managers often refer to this as "the big picture." The LTSP scale was used to identify life experiences unique to those who scored higher, indicating a more strategic, developmental level of thinking. Results suggest there are significant amounts of biographical life experiences that are related to higher scores on the LTSP scale. Employers can suggest these experiences to future applicants who seek to improve their LTSP score and

possibly to current employees pursuing developmental activities.

**56. The Effects of Almond Soak Time on Flavor, Viscosity, and Overall Acceptance of Almond Milk**

Abbie Hebron, Maggie McNair

Faculty Advisor: Kathryn Gardner

With a rise in almond milk consumption and self-preparation, there is a need to assess quality of this product. The purpose of this research is to determine how the flavor, viscosity, and acceptability of homemade almond milk is affected by the soak time of the almonds. Four samples of almond milk were prepared; the almonds were soaked for 6, 12, 24, and 48 hours. The samples were tested by 31 participants and rated on a likert scale (1-4; 4 being most accepted). A triangle test was also conducted in order to determine the difference between the 6 and 48 hour samples. The results of the acceptance test showed that the 12 hour sample was most accepted with an average score of 2.74/4. The 24 hour sample was least accepted with an average score of 2.48/4. The results of the triangle test found that participants correctly differentiated the 6 hour sample from the 48 hour sample 46.67% of the time ( $p=0.08$ ). Both tests' results failed to support the hypothesis and suggest that duration of almond soak time does not directly affect acceptability of the almond milk. Further research should be conducted with larger sample sizes to confirm these results and identify other possible characteristics that can increase the acceptability of almond milk.

**57. The Use of Chickpea Puree in Eggless Cookie Dough Dip as a Replacement for Flour**

Isabelle Strack, Holly Wolken

Faculty Advisor: Kathryn Gardner

Chickpeas are a type of legume known to be a good source of protein. Chickpeas can be used to replace flour to make gluten free items and increase viscosity. This study analyzed the acceptability and emulsification of eggless cookie dough. The variations included a control made with AP Flour, a variable with 50% AP Flour/50% Chickpea Puree, and a variation with 100% Chickpea Puree. A penetrometer and line spread test were used to measure the viscosity. The control was found to have a higher viscosity, and the 100% chickpea variation was the least viscous. A sensory evaluation was conducted using 39 panelists. Each panelist received a scorecard that used a hedonic scale of 1-5, with 1 being extremely disliked and 5 being extremely liked. Each panelist rated the color, texture, flavor, aroma and overall acceptance of each sample. T-tests were conducted to find that there was a significant difference [ $p\leq 0.05$ ] between the control and the variables in every category. The control was significantly favored more than the variables. In

conclusion, substituting flour with chickpea puree makes the dish gluten-free, but is not palatable. Further research is needed to mask off flavors and increase palatability in chickpea products.

### 58. **Grand-Pal Friendship Exchange**

Nicole Berg

Faculty Advisor: Dr. Lisa Hall

Intergenerational relationships can have a positive impact on the lives of children and older adults. Research has shown that children who participate in intergenerational programs have a more positive view of older adults and older adults receive emotional, social and physical benefits. The goal of this project was to determine the impact of a pen-pal program between six elementary school children and six residents of an assisted living community. A mixed method four-phase study was conducted to: (1) administer a pre-assessment questionnaire, (2) facilitate letter sharing between the residents and the children, (3) host an in-person meeting between the residents and the children at the end of four weeks of letter writing, and (4) administer a post-assessment questionnaire. Data were collected via ethnographic methods, such as participant observation and researcher-administered pre and post assessment questionnaires. Data were analyzed using the constant comparative method. The results, limitations, and challenges of this study are discussed.

### 59. **Vaccinations**

Kate Okland, Emily Schmoll, Joshua W Trammell, Melanie Taylor, Kalli Hill, Kayla King, and Richard Garrad, M.D.

Faculty Advisor: Richard Garrad

Under vaccination is a multifaceted global health concern that decreases herd immunity resulting in a negative impact on the human population. Unfortunately, misgivings in the general population have led to decreased vaccination rates across the globe. Education may help alleviate concerns about vaccination, raised by poorly researched studies. The poorly supported beliefs are briefly discussed. These misgivings are not all that stand in the way of vaccination; there is also an inequality in the access to health care, even in the United States. Despite these obstacles, vaccination should occur and the reasons as to why one should vaccinate are highlighted. Further sources of information on vaccination and a brief overview of current new vaccinations will also be discussed.

### 60. **Parental Personality and Child Preparation: Warm Father's and Conscientiousness**

Grace Prospero, Dallas Robinson, Rylee Cornelius, Seth Dowler, Tabetta Hopke, Amber Abernathy  
Faculty Advisor: Amber Abernathy

Research has examined the importance of a parent's role, more often in relation to the mother, in the developmental outcomes of their children. Parents taking an active role in their child's growth is a significant predictor in the outcome of a child's life and how they interact with others. Although research is not as abundant, the amount of time that a father spends with a child has been shown to have an impact in the overall development of the child. The current studies investigate how varying levels of support impact a child's personality development. Two self-report studies (online and seated) examined the relationship between high levels of the personality trait Conscientiousness and the perceived warmth of the participants' fathers. In both studies, results showed participants with perceived warmer fathers (Warmth, Structure, and Autonomy Support) had higher levels of conscientiousness. Study 1:  $F(1,48) = 4.86, p = .03, B = .31$ . Study 2:  $F(1,106) = 4.07, p = .05, B = .19$ .

### 61. **The Impact of Exercise on Stress Management in Federal Law Enforcement Officers**

Zachary Mouser, Alicia Harris, Shelby Cuthbert, Jordan K. Jones, Samuel Enright, Scott D. Richmond, PhD, Riley J. Galloway, PhD, Amanda M. Perkins-Ball, PhD, Thomas S Altena, EdD  
Faculty Advisor: Thomas S Altena, EdD, Riley J. Galloway, PhD

Federal Law Enforcement Officers (FO) serve in a high-stress, yet highly sedentary position. This combination places FO at greater risk for a variety of health issues. **PURPOSE:** The purpose of this descriptive study was to examine the level of physical fitness in FO and determine the relationship between exercise (EX) on Quality of Life (QoL) scores. **METHODS:** A total of 19 FPO participated (10 males and 9 females) including the Cooper's Test of physical fitness before and after six-months of unsupervised, voluntary exercise. Subjects completed weekly online surveys indicating EX type, weekly total EX time, well-being, and a 10-point questionnaire on weekly stress (QoL). **RESULTS:** Time reported performing cardiorespiratory and resistance training was slightly below ACSM recommendations (cardio =  $129.5 \pm 20.3$  min/week, resistance =  $81.0 \pm 18.5$  min/week). A paired-samples t-test showed no significant changes in any anthropometric scores after 6-months of unsupervised training. Baseline vs 6-month Cooper's Test fitness results showed no significant changes with the exception the Sit-&-Reach. **CONCLUSIONS:** While EX is an important element for overall health, in FO there was little connection between amount of type of EX and overall QoL.

## Abstracts

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**62. Role of RAD4 in DNA Repair and Its Interplay with *Tetrahymena thermophila*'s Telomeres**

Emily Nischwitz, Joshua J. Smith  
Faculty Advisor: Joshua J. Smith

Telomeres are repetitive parts of the genome that act as a protective end cap to the chromosomes, and help protect the integrity and stability of the entire genome. Telomeres are so critical to the overall integrity of the genome that ensuring they are properly repaired is crucial. One repair protein that has been understudied at the telomeres is Xeroderma Pigmentosum C (XPC), which plays a part in recognizing damage in the nucleotide excision repair pathway (NER). Due to the high amount of thymines found in *Tetrahymena thermophila*'s telomeres (GGGGTT), they are more susceptible to thymine dimers, which must be repaired by nucleotide excision repair. Much of the pioneering work for telomeres has been conducted in ciliates, and specifically in *Tetrahymena thermophila*, which makes this organism ideal for telomere repair studies. To further understand the interplay, RAD4 knockdown strains were established alongside a DIG-labeled probe telomere detection assay. This detection assay will be used to study the telomeres in the presence and absence of RAD4, and will help begin to elucidate their relationship.

**63. Characterization of the SIRT2 and SIRT3 homologs in *Tetrahymena thermophila***

Kyle Cook, Joshua J. Smith  
Faculty Advisor: Joshua J. Smith

The ciliate *Tetrahymena thermophila* contains 18 histone deacetylase (HDAC) homologs, which are responsible for removing acetyl groups from acetylated lysines on histones and other proteins. There is a class of HDACs called Sirtuins (Class III HDACs), which have been implicated in various cellular processes like cancer, diabetes, aging, apoptosis, and transcription regulation. The model organism *Tetrahymena thermophila* has 11 homologs of Sirtuins (four more than humans and other vertebrates even). The scope of this research is to investigate the genes homologous to human SIRT2 and SIRT3, *Tetrahymena* Histone Deacetylases (THDs) 13, 15, and 16. This study will investigate their expression levels within the cell under various conditions including genotoxic stressors, starvation, and conjugation using qRT-PCR. Localization studies will be done through cloning these genes into plasmids to encode for GFP and 2HA tags. These tagged constructs were then transformed into *T. thermophila* to be used in future studies. Characterizing the function, localization, and the proteins interacting with THD13, THD15, and THD16 could help us better understand the various roles of SIRT2 and SIRT3 histone deacetylases.

**64. Effects of Xanthan Gum on Acceptability and Stability Properties in Different Ice Milks**

Katelin Peters, Cristni Tucker, Paige Crause  
Faculty Advisor: Kathryn Gardner

Xanthan Gum (XG) is a carbohydrate that has been used as a thickening agent. XG contains a polysaccharide backbone that creates a stable product, which can help replace and reduce fat. The experiment was designed to evaluate stability, melting rate and acceptability in taste and texture with 3 samples of vanilla ice cream. The control was a standard ice cream recipe. The two variables were one being ice milk with whole milk and XG added and the second being ice milk with skim milk and XG added. The stability and melting rate were measured using a line-spread test for 15 minutes total, assessing it every 5-minutes. After 15 minutes, the control melted 15 cm on the line spread test, the first variable recipe melted 2 cm, and the second variable melted 0 cm. A duo-trio test was conducted to compare which recipe was the most similar to the control. Twenty-two participants evaluated the taste, texture, and appearance of the samples and selected the sample most similar to the control. When viewing the data, 95.45% of participants thought that the sample made with whole milk and XG was most similar to the control. In conclusion, XG creates a more firm and stable product but is not widely accepted due to its lack of flavor and texture.

**65. Seeking Naturally Occurring Senior Centers**

Abigail Witt  
Faculty Advisor: Dr. Lisa Cox Hall

Baby Boomers are not attending senior centers at the same frequency as past generations. Seeking Naturally Occurring Senior Centers is a basic research study about where Baby Boomers go for lunch, creative activities, fitness, and socializing. The ethnographic methods of participant observation and informal interviewing were used to evaluate formal senior centers as well as the informal settings where Boomers naturally congregate. Data were collected in the form of field notes, which were then analyzed through open coding. Findings indicate that senior centers are stigmatized as places "old" people go, with poor quality food, and outdated activities. Recommendations for increasing Boomer's participation in traditional senior centers, as well as the opportunities and challenges of formalizing the natural gathering routines of Boomers, will be discussed. A limitation of this study is small sample size, as only 20 percent of senior centers in Southwest Missouri were assessed.

**66. Cyclophilin A Enhances Early HIV-1 Replication Steps in Microglial Cells**

Zachary Ingram, Amy E. Hulme  
Faculty Advisor: Dr. Amy E. Hulme

The early steps of HIV replication are required to establish infection making these pre-integration events ideal targets for the development of therapies. After viral fusion with the cell membrane, the HIV capsid is released into the cytoplasm. As the capsid traffics to the nucleus, early products of reverse transcription help initiate capsid disassembly, a process called uncoating. Uncoating is required for nuclear import of HIV DNA, which precedes integration. Cyclophilin A (CypA) is a cytoplasmic protein that binds the capsid to modulate HIV infectivity. The drug cyclosporine A (CsA) disrupts the CypA-capsid interaction in microglial cells resulting in decreased infectivity at early time points. The interplay between reverse transcription, uncoating, and nuclear import suggests that CypA may affect multiple steps of replication. Therefore, microglial cells in CsA or ethanol containing media were infected with HIV. At early time points post-infection HIV DNA was extracted. Early and late reverse transcription products and 2-LTR products were quantified using qPCR to determine the replication steps altered by CypA. Elucidating which steps are impacted CypA will provide a better understanding of the early steps of HIV replication.

**67. Expression of Cellular Proteins Dia1, Dia2, KIF5B, NUP358, and CPSF6 Upon Infection of TCN14 and OMK Cells With HIV**

D. Bowers, C. Brown, A. Hulme  
Faculty Advisor: A. 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 the capsid may be involved with the differences in uncoating between OMK and TCN14 cells. KIF5B, Dia1, Dia2, NUP358 and CPSF6 are cellular proteins that could be accounting for the 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 for obtaining a better understanding of cellular factors that may influence HIV capsid uncoating in both cell lines.

**68. Regulation of the Microvascular Barrier by Focal Adhesion Kinase**

Alexis Peters, Annie Wright  
Faculty Advisor: Jianjie Wang, MD, PhD

Blood vessels are comprised of microvascular endothelial cells (MEC) which are responsible for controlling barrier function and maintaining vascular homeostasis. When this function becomes impaired, vascular diseases, such as atherosclerosis, can be initiated. Atherosclerosis is a chronic inflammatory disease that can manifest into ischemic heart disease, ischemic stroke, or peripheral artery disease and is responsible for a large percentage of deaths worldwide. The purinergic P2Y2 receptor (P2Y2R) is known to be activated by extracellular nucleotides, predominately ATP, which are released at sites of inflammation. The P2Y2R has been shown to regulate the microvascular barrier by disrupting integrin which binds endothelial cells to the extracellular matrix. Additionally, interrupting focal adhesion kinase (FAK), a focal adhesion protein coupled to integrin, induces hyper-permeability of the microvascular barrier. We hypothesize that FAK mediates P2Y2R-induced microvascular hyper-permeability.

**69. Is Virtual Reality an Effective Treatment for Urinary Incontinence?**

Erica Campbell, Emily Bleich, Paige Koebbe, Alissa Schermer  
Faculty Advisor: Patricia Cahoj

Objective: The objective of this study was to investigate the effectiveness of virtual reality games in treating urinary incontinence (UI). Methods: Two female subjects with self-reported UI participated in this study. The subjects participated in supervised virtual reality intervention consisting of 30 minutes of seated exercises on the Wii Fit® Balance Board three times a week for six weeks. Data was collected at pre- and post-intervention using the International Consultation on Incontinence Questionnaire UI-Short Form (ICIQ UI-SF), the International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB), and the King's Health Questionnaire (KHQ). Subjects also completed daily journals tracking fluid intake, voiding habits, and periods of incontinence. Results: Both subjects reported a decrease in leakage, urination frequency, and interference of incontinence with daily life. The greatest improvement was noted in frequency of episodes per day and in quality of life following intervention. Discussion: This case series design demonstrates the utilization of Wii Fit® may be an appropriate, efficient, and effective treatment intervention for urinary incontinence, and furthermore increased quality of life.

## Abstracts

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### 70. Safer Senior Homes

Maribel Franco

Faculty Advisor: Dr. Lisa Cox Hall

One in four Americans over the age of sixty-five fall each year. The quality of life for members of the older population can decline due to injuries caused by falls. With increased preventive care, the number of falls can be reduced. A falls prevention program was implemented through a senior in-home care agency to bring awareness and prevent falls to seniors living at home. A home safety assessment was conducted first, assessing the home for excess clutter, loose throw rugs, dim lighting, absence of handrails, steep stairs, and any other factors that could lead to falls. The assessment data were then used to design educational safety pamphlets for each client. Lastly, a follow-up interview with the clients measured the older adults' awareness to safety issues in the home and educated them on ways to avoid future falls. Findings will discuss change in falls behavior and change in quality of life. All in-home care agencies should include a falls assessment due to the many benefits it provides.

### 71. Antibiotic Resistance

Julia Larson, Hogan Brecount, Aarika Gardner, Lily Johnson, Lindsay Staudt

Faculty Advisor: Dr. Richard Garrad

There are single-celled organisms found all over and inside the human body called bacteria, some harmful and some helpful. These organisms can be killed or prevented from growing through the use of antibiotics. Bacteria develop antibiotic resistance primarily via four mechanisms: altering the target site at which an antibiotic binds to the bacteria, enzymatic inactivation or modification of the antibiotic, "bypass" pathways, or antibiotic efflux. The effects of antibiotic resistance are widespread, with the potential to negatively impact not only individuals, but also the global economy. Antibiotic resistance is growing into a global epidemic, and diseases that were once treated easily with antibiotics, such as pneumonia, are now developing into lethal infections. In preventing antibiotic resistance, there are several known benefits in using multi-drug therapies and various enhancing metals to combat such bacterial pathogens. Furthermore, studies are being performed to discover new classes of antibiotics altogether. The search for potential preventions and new antibiotics continues, but great headway has been made thus far.

### 72. Measured Fitness and Self-Reported Exercise and Stress in Law Enforcement Officers: A Longitudinal Study

Taylor M. Hayes, Allison N. Melting, Yumeko S. Bradley, Zachary Burt, Riley J. Galloway, PhD, Scott Richmond, PhD, Amanda M. Perkins-Ball, PhD, Thomas S Altena, EdD

Faculty Advisor: Thomas S Altena, EdD, Riley J. Galloway, PhD

The job duties of law enforcement officers (LEO) are highly sedentary and stressful. **PURPOSE:** The purpose of this year-long descriptive study was assess physical activity levels in LEO and to determine if self-reported stress indicators were related to exercise. **METHODS:** Twelve LEO completed a 12-month unsupervised exercise program (7 males and 5 females). Participants completed the Cooper's Test of physical fitness at baseline, at 6-months and again at 12-months. Participants also completed an online survey indicating EX type, total EX time, and a 10-point questionnaire on weekly stress. **RESULTS:** Survey response rates ranged from 36% to 80% over the course of the study. Reported cardiorespiratory and resistance training exercise levels were slightly below ACSM recommendations (cardio =  $145.0 \pm 34.4$  min/week, resistance =  $58.4 \pm 15.7$  min/week). Time was significantly lowered ( $p=0.002$ ) in the 1.5 mile run over a 12 month period. No significant changes were observed in body weight ( $p=0.149$ ) or BMI ( $p=0.447$ ); however, body fat percentage was significantly reduced by 2.61% ( $p=.47$ ). **CONCLUSIONS:** This 12-month, was sufficient for maintaining fitness levels but did not influence weekly stress.

### 73. Finding a Purpose: The Personal Impact of Being a Volunteer

Alexandra Badalamenti

Faculty Advisor: Dr. Lisa Hall

Retirement can coincide with boredom and loneliness in later life. Research shows that volunteering can benefit older adults by improving emotional health. The purpose of the Retired & Senior Volunteer Program (RSVP) is to coordinate the skills and talents of retired individuals so they can help meet the needs of vulnerable citizens. This study examined whether RSVP volunteers were satisfied with the program and explored what impact, if any, volunteering had on their personal lives. Methods included participant observation and the verbal administration of a 32-item survey to twenty-one volunteer participants, which were audio-recorded. Fieldnotes and open-ended survey questions were open coded. Frequencies and means are reported for the quantitative survey items. Preliminary findings suggest that volunteers' sense of purpose and interaction with others have increased since joining the program.

## Abstracts

Limitations include a small sample size (12%) of RSVP volunteers. Future researchers should include additional community volunteer programs and more systematically investigate volunteers' life satisfaction, happiness, and loneliness.

**74. A Glimpse into the World of Dementia for Caregivers: Improving Quality of Life for Caregivers and Individuals with Dementia**

Heather Felske, Alexandra Badalamenti, Erin Travis  
Faculty Advisor: Dr. Mary C. Newman

Caregivers' negative feelings about caregiving and care recipients put their health at risk; many precede care recipients in death. The current study gives caregivers a glimpse into the world of dementia to increase empathy and understanding of care recipients. This study was modeled after the Virtual Dementia Tour® with an extra task, for a total of 6 tasks. Participants completed pre- and post-questionnaires, wore distorted-lens goggles simulating visual impairment; wore headphones with sounds simulating hallucinations; and binding on the knees, elbows and 3 fingers per hand to simulate arthritis. Participants were frustrated and surprised by trouble remembering and completing tasks, especially sorting medication. Post-questionnaire responses indicated better understanding of emotional and cognitive effects of dementia. Most gained empathy for people with dementia. The experience improves caregiver feelings about caregiving and care recipients, and hopefully will improve quality of life. Investigators will submit a grant proposal to the Alzheimer's Association to become Certified Trainers and obtain Virtual Dementia Tour® equipment.

**75. The Impact of Intrinsic Versus Extrinsic Motivation on Exercise Adherence and Stress**

Dallas Robinson, Heather A. Stephens-Cantu, Holly E. Zinke, Riley Galloway, Melissa D. Fallone, Thomas S Altena  
Faculty Advisor: Thomas S Altena

Research shows that exercise is associated with increased physical health and psychological well-being as well as decreased health risks (Teixeira et al., 2012). While exercise in even a single acute session can result in positive well-being and a reduction in psychological distress, further research is needed to understand the factors that lead to sustained exercise maintenance (Elkington et al., 2017). Motivation, specifically differences between intrinsic and extrinsic motivators, is a critical factor in supporting long-term exercise habits. Gender, age, and previous exercise habits also play a factor in the internalization of these motivators and create differences in motivational barriers for exercise across populations (Louw et al., 2012). The purpose of this study

was to examine the relationship between exercise motivations, exercise habits, and stress levels across various age groups. Participants included middle-aged adults in law enforcement who completed longitudinal weekly self-reports as well as college-aged adults who completed a two-part study examining differences in self-reported intrinsic or extrinsic motivators and subsequent exercise habits and stress levels.

**76. What Are the Observable Effects of Music on the Moods of Hospice Patients in Long-term Care Facilities?**

Paige Lammert  
Faculty Advisor: Dr. Lisa Hall

Research suggests that listening to music has many benefits such as pain relief, lowering stress, lessening depression, and improving sleep quality. To explore the effects of music on patients, playlists of specific genres of music (country, gospel, and big band) from the 1950s and 1960s, were created and played for five patients, who volunteered for the study, once a week for six weeks. Participant observation and a key point indicator tracking sheet were used to collect data. Field notes were analyzed through open coding. Preliminary findings suggest that music promotes reminiscence and increases cheerfulness. Limitations of this study include a small sample size. Recommendations for future research include providing the opportunity for patients to self-report their mood before and after the music sessions.

**77. Evaluation of Moisture, Texture, Flavor and Overall Acceptance of Meatballs Made with Varying Degrees of Black Beans**

Alyssa Alkier, Nicole Riddle  
Faculty Advisor: Kathryn Gardner

Black beans are an excellent source of a variety of nutrients and can be an added benefit when used or substituted in a recipe. The experiment was designed to test the acceptability of all-beef meatballs mixed with varying degrees of black beans. The samples were prepared as follows: all beef meatballs, ¼ black beans and ¾ beef meatballs, ½ black beans and ½ beef meatballs, ¾ black beans and ¼ beef meatballs, and all black beans. The volume and moisture of each variation was measured. Sensory evaluation was performed using 29 participants. Texture, flavor and overall acceptance were rated using a 5-point hedonic scale. The samples containing ¼ and ½ black beans had the highest acceptance. Participants preferred the sample containing all black beans over the sample containing ¾ black beans and ¼ beef. There was no significant difference in scores for flavor and texture between the control and ¼ black bean samples. There was no correlation between percentage of black beans and volume. The results show that although substituting black

## Abstracts

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beans in meatballs causes decreased moisture content, using a 50/50 black bean to beef ratio was accepted by the participants and can be used as an acceptable substitution for all beef recipes.

increasing the sample size, and assessing the program in multiple levels of care.

**78. Effects of Extra Virgin Olive Oil as a Substitution for Safflower Oil in Mayonnaise**

Scott Geyer, Ana Rodas

Faculty Advisor: Kathy Gardner

A large body of research has established the importance of a diet high in antioxidants. One way to increase antioxidant intake is by including extra virgin olive oil (EVOO) in the diet. Due to its minimal processing, EVOO is comprised largely of monounsaturated fatty acids and a small amount of highly active antioxidative phenolic compounds including hydroxytyrosol, tyrosol, oleuropein, and glucoside. The objective of this study was to determine the effects of substituting EVOO for safflower oil in mayonnaise on flavor, consistency, texture, and color. Mayonnaise made with EVOO was evaluated against mayonnaise made with safflower oil, which was used as the control. Sensory evaluation was conducted using 25 untrained panelists who rated the flavor, consistency, texture, and color of EVOO and safflower oil mayonnaise on a 9-point hedonic scale. T-tests showed that ratings of acceptability of flavor, consistency, and color were greater for safflower oil mayonnaise than EVOO mayonnaise ( $p < .05$ ). Ratings of the acceptability of texture were not significantly different between the safflower oil mayonnaise than EVOO mayonnaise ( $p > .05$ ).

**79. Real-Life Satisfaction in a Virtual World**

Rachel Essmyer, Dr. Lisa Hall

Faculty Advisor: Dr. Lisa Hall

A virtual reality program with an emphasis on traveling was offered at a senior living community. Virtual reality is a realistic and immersive simulation of an environment that is created using technology and experienced by movement of the body. Although a fairly new technology, research suggests that virtual reality can improve individuals' moods through promoting positive emotions. Similarly, research on traveling suggests that there are numerous benefits for people of all ages, such as stress relief, relaxation, and higher life satisfaction. Multiple methods were used to gather data and to evaluate the impact of this program on the residents, including participant observation, video recording, and informal interviews. The data were collected as field notes and then coded. Findings suggest that this program increased satisfaction of participants by inspiring reminiscence and a sense of adventure. Recommendations for future research include using more advanced technology,

**80. Exploring the Social Benefits of a Resident History Program**

Sierra Schieber,

Faculty Advisor: Dr. Lisa Hall

Storytelling and reminiscing among older adults can greatly impact the social and emotional aspects of health. The value of personal narrative has been well established in the literature and suggests that sharing one's life history with others can strengthen bonds and encourage social interaction. To this end, the author designed a "Resident History" program in an independent living community. Using an ethnographic research approach, the author conducted informal interviews and documented brief biographies that were distributed throughout the facility. The effectiveness of the program was assessed through participant observation and field notes. Data analysis consisted of open coding to determine concepts demonstrating the outcomes of the program. Results of this study indicate increased social interaction among residents, staff, and visiting family and friends.

**81. Bone Loss and Genetic Changes as a Result of Spaceflight**

Kayla King

Faculty Advisor: Dr. Amanda Brodeur

Space medicine is the branch of medicine concerned with the effects of spaceflight on the human body. The conditions encountered in space, including microgravity and space radiation, cause a unique set of problems in humans such as vision changes and bone loss. The few astronauts that have gone past low Earth orbit have experienced negative effects on their cardiovascular systems. If humans are to venture further into space, the medical problems associated with spaceflight must first be mitigated. One of the biggest concerns associated with spaceflight is bone loss due to a disturbance in the balance of the bone remodeling process. Microgravity affects the function of osteoclasts, osteoblasts, and osteocytes. Recently, the effects of microgravity on bone marrow mesenchymal stem cells has been studied as well. One of the most exciting new areas of research in space medicine is the effect of spaceflight on genetics. Preliminary results from NASA's Twin Study indicate that spaceflight affects telomere length and genetic expression. Studies have investigated the potential pathways that are affected by microgravity. Further studies of altered genetic expression may provide a deeper understanding of how spaceflight affects the body.



## Abstracts

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**82. Effect of Compensatory Capsid Mutations on HIV Infectivity and Uncoating**

Kate Okland, Amy Hulme  
Faculty Advisor: Amy Hulme

HIV infection is a major global health issue affecting more than 35 million lives. Mutations that affect the structure and interactions of the capsid monomers of HIV alter the processes of infectivity and uncoating. The uncoating process occurs after the virus has entered the cell and is the disassembly of viral capsid to allow the viral genome to enter the nucleus. The capsid mutation E45A results in a hyperstable capsid and decreases infectivity. This is seen because changes in viral capsid stability are detrimental to the uncoating process. The secondary mutation R132A rescues this hyperstable E45A mutation to restore HIV infectivity. To further examine the effect of this compensatory capsid mutation on HIV infectivity and uncoating, we studied wildtype, E45A, and E45A/R132A virus in the microglial cell line TCN14. We used the Cyclosporine A washout assay, in which TRIM-CypA-mediated restriction is applied to study the kinetics of uncoating of each virus in TCN14 cells. In this cell line, the R132A compensatory mutation was able to rescue uncoating of the E45A mutation to kinetics similar to wildtype. These results suggest that capsid stability correlates with uncoating kinetics in microglial cells.

**83. Reminiscing Through Childhood and Adolescence**

Casey Tibbs  
Faculty Advisor: Lisa Hall

Reminiscing about the past has shown to decrease pain, stimulate dialog, and promote happiness. For those who have dementia, reminiscing boosts interaction. The photo elicitation technique was used in this study to explore whether photographs increased reminiscence in four volunteers with mid-stage dementia who were patients on hospice. Each participant was initially interviewed about their childhood and adolescence. Next, photographs that represented the volunteers' most salient memories from both life stages were presented to them during a second and third interview, respectively. Then, a final interview was conducted to explore whether childhood or adolescence was most discussed. Data were collected in the form of fieldnotes, which were analyzed using the constant comparative method. Preliminary findings suggest that the photographs do elicit memories and increase interaction.

**84. Impact of Seated Exercise on Quality of Life in Local Nursing Home Residents**

Aubrey Baker  
Faculty Advisor: Lisa Hall

Experts claim that exercise improves quality of life. This study focused on two factors of quality of life: mental and physical wellbeing. The purpose of this study was to explore whether and to what degree seated exercise improved the moods and physical functioning of nursing home residents. Five volunteers participated in a 20-minute seated exercise class, which met three times a week for four weeks. The ethnographic methods of participant observation and informal interviewing allowed data to be collected on the volunteers' observable moods and physical function. Fieldnotes were analyzed using the constant comparative method. Preliminary findings suggest that there was an increase in smiling, pleasant expressions, and balance while there was a reduction in muscle stiffness. Volunteers' self-reports on the impact of seated exercise will be discussed. More quantifiable measures such as the Profile of Mood States and the Sit-and-Reach Test could be included in similar future research studies.

**85. Being Mindful of Mental Health in Independent Living**

Danielle Capone  
Faculty Advisor: Lisa Hall

Currently, gerontologists know little about depression/suicide in later life and mental health professionals know little about older adults. With the rapid increase in the number of aging Baby Boomers, more older adults will be seeking ways to improve their mental health. "Mindful Monday" was a support-group-style activity utilized to better understand and improve the well-being and happiness of older adults in an independent living facility through lectures, discussions, and group activities. The ethnographic methods used to collect data include: group discussion, document collecting, informal interviewing, and participant observation. Data were recorded in fieldnotes and analyzed with open coding. Then, data were categorized to reflect the impact of "Mindful Monday" on the facility in general, "Mindful Monday" participants, individual nonparticipating residents, and lessons learned about older adults and mental health. Results will be discussed. Limitations include self-selection, small sample size, and time constraints. In the future, discussion-based activities that encourage residents to talk about their life history, hobbies, and accomplishments should be implemented in independent living.

## Abstracts

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**86. Breast Cancer Screening Mammography: USPSTF Guidelines and the Implications for Women aged 40-74**

Zachary Werner, Amanda Brodeur  
Faculty Advisor: Amanda Brodeur

The United States Preventative Services Task Force (USPSTF) provides recommendations for primary care clinicians on their diagnostic testing practices. Said recommendations range from prostate cancer screening to pediatric vision screening. The USPSTF changed one particular guideline in 2009 --the age and frequency of breast cancer screening mammography. The recommendation was reduced from annual screening mammography for women over 40 years old to biennial screening mammography for women aged 50-74 years. They found that although the risk of death may be further reduced through annual screening, the number of false-positive results and unnecessary biopsies is larger. This results in over diagnosis, wasted resources, and possible unnecessary harm to patients.

**87. The Effect of Salt Type on Kimchi pH and Consumer Acceptability**

Kimberly Korff, Shelby DeTienne, PeiYuan Wei  
Faculty Advisor: Kathy Gardner

Kimchi is a Korean fermented cabbage, consumed for its probiotic content and spicy, sour flavor. Salt is an essential component of the kimchi fermenting process, but there is disagreement in the type of salt best to use. While making kimchi, the cabbage is salted to inhibit harmful bacterial growth. Experts suggest that the makeup of the salt can alter the type and amount of bacteria allowed to grow. This study explored the effects of acidity and consumer acceptability of kimchi when the type of salt is changed. The sample consisted of 29 untrained panelists. Participants were given 3 different samples of kimchi to evaluate. Sourness rating confirmed that sea salt kimchi (pH 4.00) was the most acidic sample (iodized at 4.01 and Himalayan at 4.10). When asked to choose the most preferred kimchi overall, 23 participants (79%) chose the sea salt sample, 2 (6.8%) chose the iodized sample and 4 (13.7%) chose the Himalayan sample. Results show that people detected a difference in sourness between the samples, and they prefer a more acidic kimchi. This suggests the type of salt alters bacteria in kimchi. A larger study with more salt trials is needed to further analyze the relationship between type of salt and consumer acceptability.

**88. The Effect of Different Fats on the Acceptability of Pie Crust**

Elise Rodriguez, Taylor Brown  
Faculty Advisor: Kathy Gardner

Heart disease is the leading cause of death in America, causing 633,842 deaths in 2016. Because of this, heart-healthy diets and healthier food substitutes are being sought. With apple pie being one of the most favorable desserts in the world, this became an optimal target for evaluating if healthier fats would be accepted in the product. The purpose of this experiment was to see the effect of different types of fat (each with different compositions of total fat, saturated fat, monounsaturated fat, and polyunsaturated fat) on the flakiness, color, and flavor of pie crust. The three fats tested were Crisco, coconut oil, and vegetable oil. The crust was evaluated using a scale from 1-5. Overall, Crisco deemed most favorable, with the highest scores in acceptability (514 points), flavor (184) and color (169). Coconut oil came in second in overall acceptability (479). Vegetable oil came in third (478) but was considered to have the best flakiness (167). The results show that manipulating the fat did not largely impact the overall acceptability of the pie crust. Therefore, vegetable oil, which is the healthier fat of the three, can be used to bake pie crust without losing quality.

**89. The Effect of Barefoot and Athletic Shoe Walking on Ground Reaction Forces**

Jaron Alexander, P. Awopetu, H. Cantrell, K. Forst, K. Hook, B. Keen, M. Mosquera, H. Norris, M. Robinson, A. Schroeder, M. Steinbach, Dr. Gdovin, Dr. Wilson  
Faculty Advisor: Daniel J. Wilson

The purpose of this project is to compare the differences in vertical ground reaction forces (GRF) while walking barefoot and in an athletic shoe. Previous research by Dames (2016) indicated that barefoot walking produces smaller GRF than athletic shoe walking. It has also been reported that barefoot walking increased hip and knee moments and power, and decreased swing time and double support time (Dames, 2016). These findings suggest that barefoot walking would be more efficient than walking in an athletic shoe because more work would be required while wearing an athletic shoe in order to have the same moments and powers as walking barefoot. Therefore, we hypothesize that barefoot walking will produce smaller GRFs than walking in athletic shoes which leads to easier and more efficient walking.

## Abstracts

**90. The Effects of Amino Acid Alterations on P2Y2 Receptor Activity**

Katie Bussard, Rachel Stroud, Chelsy Derks, Rory Wagner  
Faculty Advisor: Dr. Richard Garrad

P2Y2 receptors serve diverse functions throughout the body. The present study looks to examine the effects of changing various amino acids within the receptor to try to understand how the receptor performs its functions. A calcium assay was used to measure the receptor's downstream activity in response to varying concentrations of UTP. Mutants C183G, C25L, C278G and R131L were hypothesized to diminish receptor activation. Mutants S350A, S243A/T344A/S356A, S352A/S353A and S356A/S361A were designed to test their impact on desensitization of the receptor. Mutant S243A/T344A/S356A and S352A/S353A showed no response to UTP, suggesting a disruption of intracellular signaling, lack of receptor expression, or premature degradation. All other mutants, except C25L, appear similar to wild type receptor in terms of activation. Our aim is to now investigate receptor desensitization and in those mutations that were unresponsive, verify receptor presence using flow cytometry.

**91. How Volunteering Can Affect Self-Worth in Older Adulthood**

Sara Rabbermann  
Faculty Advisor: Dr. Lisa Hall

People who participate in volunteer work tend to have a higher sense of self-worth than those who do not. Older adults, particularly those with limited mobility or who are unable to leave their homes, tend to have few opportunities to help others. This letter writing outreach program was designed to raise the self-worth of such older adults by providing an opportunity to support others. Participants who volunteered were asked to write an encouraging note to a military serviceperson through the charity, A Million Thanks, and then discuss their experience with a researcher. Ethnographic methods were utilized, which included participant observation and guided interviews. Fieldnote data were analyzed using the constant comparative method. Findings, including reported feelings of worthlessness or hopelessness, coping strategies, and perceptions of knowledge/skills/abilities, will be discussed. Limitations of this study include low rates of participation and inaccessibility to older adults with poor manual dexterity, visual impairment, and low literacy skills. Future research should focus on implementing longer-term volunteer opportunities which have more potential for sustained improvement of self-worth.

**92. The Use of Mashed Avocado as a Fat Replacer in Chocolate Crinkle**

Kristen Keeney, Lindsey Moore, Victoria Cernetich  
Faculty Advisor: Kathryn Gardner

The avocado is a healthy fat that provides various nutritional benefits in the diet. The experiment was designed to test the acceptability of chocolate crinkle cookies with mashed avocado as a fat replacer. The chocolate crinkle cookies were prepared in three ways: control cookies made with a standard recipe using 100% vegetable oil, a variable cookie made with 50% mashed avocado and 50% vegetable oil, and another variable cookie made with 100% mashed avocado. The volume of each sample was measured using a volumeter. Twenty-six participants evaluated taste, texture, and color using a five-point hedonic scale. Overall, there was no significant difference ( $p < .05$ ) between the control and both variables for taste, texture, color, and volume. In conclusion, substituting avocado for vegetable oil in chocolate crinkle cookies can improve the nutritional content of the cookie without changing the quality.

**93. Implementing Routine PTSD Screening on Civilian Adults in a Free Primary Care Setting With a Vulnerable Population**

Vanessa L. McConnell, Chair: Dr. Katie Hope,  
Co-Chair: Dr. Kathryn Patterson  
Faculty Advisor: Katie Hope

There is a two-way relationship between socioeconomic status and mental health disorder. Mental health disorders lead to employment and income reductions, entrenching poverty, in turn increasing the risk of mental disorder. The homeless are exposed to many traumas. PTSD is a mental health or psychiatric disorder commonly resulting from witnessing or experiencing life-threatening or traumatic events. After exposure to a trauma, the individual can develop PTSD. PTSD screening is lacking among civilians and in the primary care setting. Multiple studies support the need for identifying PTSD due to the increase risk of suicide, inability to function in society, cope effectively, and/or hold down a steady job and household. Furthermore, literature revealed patients were misdiagnosed, leading to unidentified PTSD, causing lack of medical and counseling interventions. When patients are not diagnosed or misdiagnosed, they continue to suffer from the encumbrance of feeling like a failure or something is wrong with them and no one will listen. Therefore, if routine PTSD screening is administered to all civilians in a primary care setting, more patients will be properly diagnosed, received proper treatment, and referral to counseling.

## Abstracts

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**94. Changing Plate Color to Combat Weight Loss in Memory Care Facilities**

Morgan Meyer,  
Faculty Advisor: Lisa Hall

Older adult residents with advanced forms of dementia can regularly struggle with losing an unhealthy amount of weight. There can be a number of explanations why someone is not eating or losing weight: depression, loss of appetite, dislike of meals, etc. The Red Plate Theory states that older adults do not eat because they cannot visually process what is in front of them. A 2004 study was replicated to see if the results would yield the same success of eating 25% more. To do so, a change of switching from basic white plates to bright red plates was made in order to obtain results. The purpose of this study is to increase weight of those at risk. Data were collected by weighing residents at monthly intervals and by weighing the plates from each individual daily to see how many ounces were uneaten. Several residents wanted to eat from red plates, but four participants were closely monitored, as they had shown declines in weight over the past several months. Findings from this Red Plate experiment will be discussed. Limitations include a short time frame, daily mood changes affecting behaviors, and unintended weight gain in other participants.

**95. RNA Editing Biosensor**

Tate Hammers  
Faculty Advisor: Dr. Randi Ulbricht

In gene expression, mRNA is created from the gene and read by ribosomes to dictate the composition of the protein. RNA can be altered between these steps by RNA editing. Our interest is centered around Adenosines (A) to Inosine (I) changes, A-to-I RNA editing, and changing the sequence of amino acids in the final protein. Our goal is a biosensor that detects the amount of RNA editing by emitting one or two colors of light, based on editing. The CAPS1 gene encodes an RNA that undergoes A-to-I RNA editing. First, CAPS1 gene was modified by creating the stop codon UAG. Next, we truncated the sequence making the minigene. Eventually, the minigene will be located between the CFP and YFP genes. RNA editing of the biosensor results in a protein with CFP and YFP, while unedited RNA will only have CFP. Recently, we tested the minigene in cultured mammalian cells, RNA was isolated from the cells, amplified by RT-PCR, and the products were sequenced to determine the ratio of A (non-edited) and I (edited). We found ~50% of the minigene transcripts had I at the edited site, supporting the construct is capable of RNA editing. Eventually, the biosensor can become an essential tool for allowing rapid quantification of editing RNA in cells.

**96. Use of High Fidelity Clinical Simulation Education to Objectively Measure FNP Student Clinical Competency Upon Completion of Advanced Assessment.**

Ashley Kubik, Kathryn Hope-DNP chair, Carolyn Grave-Simulation Coordinator  
Faculty Advisor: Kathryn Hope

Purpose: To assess clinical competency upon completion of advanced assessment by incorporating best practices in clinical simulation. In utilizing a clinical competency tool, the project will assess the student's ability to obtain a thorough history and physical examination by the FNP graduate student upon completion of advanced assessment clinical course. Students will have the opportunity to demonstrate bedside manner, history taking, physical examination, basic clinical reasoning and initial integration of these skills. The foundation of the project is the utilization of core competencies of Nurse Practitioner Practices established through AACN and NONPF organizations. The MSU Family Nurse Practitioner Doctorate of Nurse Practitioner handbook will also be a resource for the objective standard clinical examination for clinical excellence upon completion of the standardized examination. Evidence to support the project is in utilizing NP Core Competencies across the lifespan in order to communicate practice knowledge effectively, both didactically and clinically. With a continued need to document clinical competence, research will be completed in an attempt to raise the standard for clinical excellence in an FNP-DNP program.

**97. Reduction of Weight Loss in Older Adults in a Memory Care Unit of Skilled Nursing Facility**

Jessica Streb  
Faculty Advisor: Lisa Cox Hall

Weight loss due to a loss of appetite affects many older adults in skilled nursing facilities. Dementia can cause additional complications from neurological changes that prevent the brain from stimulating appetite. Gradual weight loss can lead to malnutrition and death. Research shows that essential oils have been used for hundreds of years to relieve stress, headaches, congestion, poor sleeping habits, low energy, and poor digestion. In this study, lemon essential oils were used daily with five older adults in a memory care unit to increase their food intake and decrease their weight loss. The ethnographic method of participant observation was used in this study. Data, in the form of fieldnotes, were analyzed using the constant comparative method. The findings will be discussed. Limitations include a small sample size and time constraints. Future research should be conducted continuously over a longer period of time with a larger sample size while testing other types of essential oils and application methods.

## Abstracts

**98. Emotional Intelligence and Peer Relationships in Middle Childhood**

Kayla Kleinjan

Faculty Advisor: Leslie Echols

Emotional intelligence is a set of psychological processes that allow an individual to interpret and regulate verbal and nonverbal affective information in the self and others. Individuals high in emotional intelligence tend to have more positive social interactions with others. This study seeks to understand the role that emotional intelligence plays in relationship building tasks aimed at increasing the quality of students' interactions with their peers. Students (n = 138) completed a questionnaire to assess their emotional intelligence and quality of peer relationships. Based on their scores students were selected to participate in a relationship-building program and took part in activities to get to know each other, identify shared interests, and participate in activities based on those interests. After participating in the program, student's emotional intelligence increased. However, emotional intelligence did not have an effect on whether or not the students nominated their partners as friends after participating in the program. After the program, students were more likely to choose their partners to work with on assignments, hang out with their partners after school, and intervene if someone was being mean to their partner.

**99. Missouri State University Friendship Study**

Cody Conner, Leslie Echols

Faculty Advisor: Leslie Echols

Caregiver attachment is linked with adjustment outcomes in children. As children age, peer relationships become increasingly important and also impact adjustment outcomes. However, the role of caregiver attachment in peer attachment and adjustment has not been fully explored. In the present research, the associations between caregiver attachment, peer attachment, and social and academic adjustment outcomes were examined. Caregiver and peer attachment were measured by three subscales: trust, communication, and alienation. Social and academic adjustment outcomes included peer aggression and victimization, school belonging, and academic self-efficacy. In the first set of analyses, the trust subscale was used to examine adjustment outcomes associated with caregiver attachment. The results of a mediation analysis indicated that peer trust partially explained the association between caregiver trust and school belonging. In other words, although caregiver trust had a significant effect on school belonging, part of this effect was due to its influence on peer trust. Subsequent analyses will be used to examine social and academic adjustment outcomes associated with the communication and alienation subscales of caregiver and peer attachment.

**100. Mental Health Education as a Global Health Concern**

Robert Tipton, Spencer Price, Erin Coffman, Alexis Peters, and Rachel Mullner

Faculty Advisor: Colette Witkowski

Mental Health has been a complicated issue because it can manifest, be defined, and be measured using many different diagnostic criteria. Along with the difficulty of defining what mental health is, there are also a multitude of stigmas that contribute to the complications underlying mental health education. Interventions and the promotion of mental health education may be promoted in a variety of different fashions. This further complicates the issue on how to identify and manage the diagnosis along with the stigmas attached to mental health disorders cast by society. Although many obstacles face the world's population in its attempt to identify, educate, and treat current mental disorders globally, it is important to note that improving mental health has many potential benefits to the point where it is a worthwhile goal in itself and it leads to better outcomes for affected individuals along with their communities.

**101. The Acceptability of Sugar-Free Orange Sherbet Containing Monk Fruit or Stevia as a Substitute Sweetener**

Sara Kostelnick, Shae Casey, Liegh Anne Kinney

Faculty Advisor: Kathy Gardner

Sugar substitutes have become of topic of interest as more of the population is becoming concerned about their health. Stevia and Monk Fruit are natural sweeteners that contribute no calories, sugar, and effect on blood glucose levels, while providing a satisfying sweetness. The purpose of this study is to determine the acceptability of non-nutritive sweeteners in orange sherbet. To measure sensory quality for mouthfeel, appearance, sweetness, and aftertaste, 30 participants were asked to score each sample on a 10-point hedonic scale using a scorecard. Results show that the sugar control was preferred over the Stevia and Monk Fruit sweetened versions (control to Stevia preference DIFFSCORE = 58.8%; control to Monk Fruit preference DIFFSCORE = 45%). Overall acceptability for the sugar sweetened sherbet was measured with 28 out of 30 (93.3%). Acceptability for stevia and monk fruit sherbet was 10 out of 29 (34.5%) and 14 out of 29 (48.3%) respectively with one participant excluded. This concluded that stevia and monk fruit are acceptable sweeteners for less than 49% of participants. Further research should be done to alter the amount of substitute used and use different preparation methods to improve acceptability of these sugar substitutes.

## Abstracts

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**102. Functional Movement Screen (FMS): Considering Total Asymmetries, Painful Movements, and Scores of One as "At-Risk Variables"**

Julia Roundtree, Dr. W. D. Carr, Brandon Hetzler, Dr. Allan Liggett  
Faculty Advisor: W. D. Carr

Background: The total composite scores of the functional movement screen (FMS) have been extensively researched to determine effective corrective exercises and to understand if the total scores can predict injury rates. Purpose: This study identified the number of asymmetrical scores, scores of 1, and scores of 0 (collectively termed as "at-risk variables") within each FMS as a way of including valuable information overlooked by the total composite FMS score in an attempt to utilize the information gathered through FMS in a new way. Methods: Secondary data was compiled to determine the total composite FMS scores and the "at-risk variables" as well as the gender and age of each subject. This data were analyzed to identify possible correlations.

**103. Midwestern Cochlear Implant Consultation Descriptive Data Analysis for School-Aged Students With Cochlear Implants and Their Service Providers**

Dani Willhite, Kennedy Conn, Kristin Pryor, Dr. Karen Engler, Jill Oswald  
Faculty Advisor: Dr. Karen Engler

The purpose of this study was to analyze descriptive characteristics of school-aged students with cochlear implants being served through a Midwestern Implant Consultation Grant. Research was conducted from nine years of archival data reported from each participating school from 2008/2009 through 2016/2017 academic years. The purpose of this study was to determine: "Who are the service providers serving students with cochlear implants?" It was hypothesized that the majority of student participants in this study would not receive direct services from a Deaf educator. The findings supported the hypothesis: only 35.7% or 25 of the 70 students in this research received direct services from a Deaf educator. Upon further analysis, it was discovered that the majority of students receiving direct services from a Deaf educator outperformed their peers not receiving direct services from a Deaf educator when analyzing overall language performance.

**104. The Effect That Clinical Experiences Have on Students' Career Plans Who are Preparing to Graduate From an Accredited Athletic Training Program.**

Natalie Amrhein, Randall Cole, Alex Orr  
Faculty Advisor: W David Carr

Objective: This study is looking to see if clinical experiences directly affect athletic training students' decision to continue in the profession post-graduation. We are looking to see if there are any differences between students who had originally intended on continuing within the profession and students who originally planned to use athletic training as a stepping stone degree. Design: An electronic survey consisting of qualitative and quantitative questions were sent out via email to all participants. Participants: Participants will be in accredited athletic training programs and are within one year of graduation. Data Collection/Analysis: Data will be collected with a quantitative and qualitative survey through Qualtrics. The survey will ask questions that look at parts of the clinical setting to see if they factor in the decision of the students' career path. The questions will ask about demographics, career plans before and after the AT program, relationships developed with other AT staff, and factors that influenced their career decision. The data will be kept on a secured Qualtrics account and on a Missouri State University approved SharePoint site. Results: Pending. Conclusion: Pending the analysis of data.

**105. Analysis of Cochlear Implant Consultative Services for Students with Cochlear Implants in a Midwest Region**

Kennedy Conn, Kristin Pryor, Dani Willhite, Dr. Karen Engler, Jill Oswald  
Faculty Advisor: Karen Engler

In a time when most students with a hearing loss attend a mainstream classroom, professionals serving these students may seek consultation services to better assist their students who are deaf or hard of hearing. Through a grant, consultation services were provided to professionals serving students with cochlear implants attending public schools in a Midwest region. This researcher sought to analyze nine years of archival data to complete a descriptive, quantitative study with a focus on the geographic locales in which these students were served. It was hypothesized that the majority of school districts seeking consultation services would be located in more rural locales than city locales. The findings of the research support this hypothesis. The findings indicate that 75% of the school districts who sought consultation services were located within more rural locales. It also was hypothesized that students in more rural locales would be less likely to be directly served by a Deaf educator. The findings of the research did not support this

## Abstracts

hypothesis. The findings indicate that 52% of the students directly served by Deaf educators are attending schools within more rural locales.

**106. The Effects of Therapy Animals on Literacy for Students Who are d/Deaf or Hard of Hearing: An Analysis of Perspectives**

Tesa Oryall

Faculty Advisor: Dr. Christopher Craig

The focus of this study was on the prevalence and use assistance of therapy animals to improve literacy engagement or development in students with hearing loss. This project presents the limited professional literature, as well as an analysis of qualitative and descriptive data obtained from the interviews of four public school Educators of the d/Deaf and Hard of Hearing working in the Midwest region of the United States. This project was conducted based on an assumption that therapy animals, when used as part of an appropriate literacy intervention, can raise the level of engagement and development in all children, regardless of hearing loss. Of primary interest, however, is the degree to which this approach has specific value in a literacy program for children with hearing loss from the perspectives of teachers trained to work with this population in a school setting. While the limited research found in the professional literature has shown support of this supplementary tool, there is still a need for additional research to know the specific benefits of such a program. The open-ended coding system revealed need for training for teachers and more research to determine the efficacy of this approach.

**107. Certified Athletic Trainers' (ATCs) Perception of Athletes: Rehabilitation Adherence**

Nathanael Comer, Kalen J. Davis, Brendan H. McClew  
Faculty Advisor: Dr. Allan Liggett

Objective: To determine if ATCs perception of athlete rehabilitation adherence varied between NCAA Division I and II University athletes. Design: Investigators completed an internet search of ATCs' email at NCAA Division I and II Universities in Missouri from their respective University websites. The Rehabilitation Adherence Measure for Athletic Training (RADMAT) questionnaire was sent to 111 athletic trainers via Qualtrics. Participants completed the 16-question survey one time. Participants: 50 collegiate ATCs at NCAA Division I and II Universities in the state of Missouri. 19 Division I and 31 Division II ATCs completed the survey. Data Collection/Analysis: Data were collected through the use of Qualtrics. Data were analyzed using a 2x4 Mixed ANOVA in SPSS. Results: The research concluded that ATCs' perception of rehabilitation adherence in collegiate level athletes showed no significance difference between NCAA Division I and II

athletes. A review of the results found the responses were often similar in ATCs perception of athlete rehabilitation adherence.

**108. A Semi-Automatic Leukocyte Tracking (SALT) Method for Analysis of Leukocyte Rolling and Adhesion in Vivo**

Spencer Thomas, Hugo Montejó, Jianjie Wang

Faculty Advisor: Dr. Jianjie Wang

Leukocyte recruitment, rolling, and adhesion are hallmarks of inflammation. Traditionally, leukocyte tracking is accomplished by manual frame-by-frame analysis of time-lapse images. This method is time consuming, cumbersome and introduces bias. The aim of the project was to create a fully integrated semi-automatic leukocyte tracking (SALT) method for the quantification of leukocyte rolling and adhesion in vivo. Using the customized SALT module, leukocyte detection and leukocyte tracking was performed based on input criteria. Leukocyte flux, rolling, and adhesion were then quantified from leukocyte tracks based on a conditional decision algorithm. SALT data were validated by comparing data from Independent analysis and data obtained from the classical manual leukocyte tracking technique. The novel SALT method exhibited high inter-rater and intra-rater reliability for rolling velocity with no significant differences being observed ( $p > .05$ ). Correlation of SALT and ground truth measurements also revealed a strong correlation between manual measurements and the SALT data ( $R^2=0.81$ ,  $p < .05$ ). Thus, the method of SALT can potentially eliminate subjective bias and improve high-throughput analyses for in vivo leukocyte rolling and adhesion.

**109. Sex Differences in Glucose Tolerance**

Hailee Marino, Jianjie Wang, Tyler Morris, Randi Ulbricht

Faculty Advisor: Jianjie Wang

The ability to clear glucose from the blood stream differs between sexes due to differences in body-weight composition and hormones. In this study glucose tolerance test was performed in male and female C57BL/6 mice to assess the ability to tolerate exogenous glucose. Mice fasted for 5 hours on the day of the experiments. Using blood from the tail vein, the blood glucose levels were measured under fasting condition and at 10, 20, 30, 45, 60, 75, and 90 minutes after dextrose administration. The dextrose (50%, w/v) was injected intraperitoneally at the dose of 2g/kg per body weight. The blood glucose levels were measured using a glucometer and blood glucose test strips. The peak of increased blood glucose levels appeared at 20 minutes following the administration of exogenous glucose for both males and females while the amplitude of the peak

## Abstracts

was greater in females (n=3) than males (n=3). The preliminary findings suggest differences in glucose tolerance between sexes. The conclusion of sex-specific difference in ability to clear blood glucose from the pilot study remains to be confirmed by further experiments.

### 110. Does Foam Rolling or Plyometric Exercise Have an Effect on Vertical Jump Height?

Hannah Calhoun, Katie Henson, Ashlyn Wheat  
Faculty Advisor: Gary Ward

Objective: The study compared the effects of foam rolling and plyometric exercise on vertical jump height. Design: Randomized controlled study. Participants: Forty-five healthy participants between the ages of 18-25 years old who had not experienced any musculoskeletal injuries within three weeks prior to the study. Data Collection/Analysis: Participants were randomly allocated to one of three groups: 1) foam rolling, 2) plyometric exercise, 3) control. All participants performed an initial set of three vertical jumps, followed by performing their randomly assigned intervention. The foam rolling group rolled their quadriceps, hamstrings, and gastrocnemius bilaterally for 30 seconds each followed by a 15 second rest between muscle groups. The plyometric group performed two sets of 10 squat jumps, followed by 30 seconds of rest, and then 10 long jumps. The control group rested for two minutes between pre and post-vertical jump sets. Following the interventions each participant performed a second set of three vertical jumps. Vertical jump height was measured using a Vertec device. Results: There was not a statistically significant interaction between pre- and post-intervention vertical jump heights; however, there was a statistically significant difference in jump height at the different points in time among groups.

### 111. Racial and Gender Differences in Attributions of Blame for Children with Conduct Disorder

Celia Chojnacki, Dr. Melissa Fallone  
Faculty Advisor: Dr. Melissa Fallone

Mental health stigma is pervasive in today's society, even in adolescence, and the socialization of perceptions regarding mental health may impact an individual's willingness to seek treatment for themselves or their offspring. Empirical data suggest that mental health services may be underutilized by certain demographics, according to race and gender. While some studies have highlighted how parental attributions of blame for children's behavior may affect parent attitudes toward certain treatment options, there are none that examine racial or gender differences in the broader sense of stigmatic perceptions. It was hypothesized that black individuals would be rated as more personally responsible for their behavior than white individuals and that gender would interact with this variable as well. Data collection

is ongoing. Once complete, data will be analyzed using a 2(Race) x 2(Sex) x 3(Blame) Repeated-Measures Factorial Analysis of Variance to evaluate the hypothesis.

### 112. Comparing the Effect of Exercise Volume on Amyloid-beta In a Mouse Model of Alzheimer's Disease

Justin Lawson, Julia Larson, Benjamin Timson, Scott Zimmerman  
Faculty Advisor: Scott Zimmerman

It has been shown in Tg2576 mice that soluble amyloid beta is cleared in a dose dependent manner from the cortex and hippocampus by exercise (Moore 2016). This clearance has been shown to reduce amyloid plaques and improve cognitive outcomes later in the lifespan of the same model (Thomas 2018, unpublished thesis). However, it is unclear if this dose response is due to greater exercise distance, or greater exercise intensity. We are researching the effect of volume and intensity of treadmill exercise on soluble amyloid beta concentration in APP/PS1 mice. Male and female APP/PS1 mice ran on a motor-driven treadmill at 12 m/min for one hour (SS n=23), 12 m/min for 2 hours (SL n=17), and 24 m/min for 1 hour (FS n=20) to compare to sedentary controls (SED n=24). Soleus muscle citrate synthase activity was assayed to confirm a training effect and that the effect is volume related. The SL and SS groups had the highest and equivalent values. Ongoing amyloid beta assays show different effects of the exercise protocols.

### 113. Fat Content of Oils Correlated with Consumer Acceptability of Potato Chips

Hannah Fink, Lacey Bertram, Kaitlin Isbell  
Faculty Advisor: Kathy Gardner

Americans utilize various cooking methods and alternative ingredients to improve health and promote healthy eating. By switching unhealthy ingredients, such as a saturated fat, to a heart healthy option like monounsaturated fats, there can be positive benefits on overall health. The objectives of this study are to evaluate the physical and nutritional properties of potato chips in various frying mediums and to determine if participants will be able identify the higher saturated fat content chip by evaluating the texture, appearance, taste and crunch properties. Density of the potato samples was measured with a Warner-Bratzler shear. Grapeseed oil chips had the highest firmness and vegetable oil chips had the least firmness. Objective testing was done for acceptability. Lard had the highest acceptability for texture. Grapeseed had the highest appearance and taste acceptability. Vegetable oil chips and grapeseed oil chips had the same acceptability for crunchiness. Both lard and vegetable oil chips had the same value for what chip the participants thought had the highest fat content. The grapeseed oil chip was the overall favorite.



**114. The Sensory Quality of Fat Variations on the Shelf Life of Chocolate Cake**

Anna White, Kealy Hosp and Mirissa Massey

Faculty Advisor: Kathryn Gardner

Fat is an essential part of the diet and is used in many recipes to alter the stability, flavor, color, and mouthfeel of food. The experiment was designed to test the sensory qualities and shelf stability of different fats used in chocolate cake. The chocolate cakes were prepared in three different ways: control chocolate cake was made with canola oil and two treatment chocolate cakes made with lard and olive oil. We choose these three fats due to the differences in fat composition. The objective tests measured volume and moisture loss. After conducting the moisture and volume test, the data showed that the cake with olive oil retained the most moisture and held its volume the best at the end of the week. Lastly, we tested the sensory quality of the cakes by giving scorecards to 22 untrained panelists to determine the most favorable based on mouthfeel, color, sweetness, and freshness. The data collected failed to support our hypothesis that the cake with lard would have the best sensory quality. Our data showed that canola oil was favored in all sensory aspects over lard and olive oil. In conclusion, the fat variation results were similar when tested. Therefore, testing needs to be done on a larger scale.

**115. RNA Editing Mediates Oligomerization State of Calcium-Dependent Activator Protein for Secretion 1 (CAPS1)**

Ben Mitchell, Alexander Alvarado, and Randi J

Ulbricht, PhD

Faculty Advisor: Randi Ulbricht

CAPS1 RNA undergoes a site-specific adenosine-to-inosine RNA editing even that alters a genomically-encoded glutamate to a glycine codon within the carboxyl-terminal domain of the encoded CAPS1 protein. We functionally compare the CAPS1 protein isoforms generated from edited and non-edited transcripts in cultured neurons, showing that editing has a biphasic effect on synaptic vesicle distribution. Increasing expression of the non-edited CAPS1 isoforms negatively affects vesicle recycling and evoked release, leads to a more diffuse distribution of synaptic vesicles and increases spontaneous release from synaptic vesicles. Conversely, elevation of edited CAPS1 isoforms stimulates increases clustering of synaptic vesicles within the synaptic bouton and decreases constitutive release from synaptic vesicles. We hypothesize the mechanism for the distinct editing-dependent phenotypes is related to the effect of editing on CAPS1. To assess the oligomerization state of CAPS1, recombinant isoforms of edited and non-edited CAPS1 are isolated from transfected HEK cells and detected by western blot. We conclude that RNA editing serves as a molecular switch,

allowing CAPS1-mediated organization of synaptic vesicle distribution.

**116. Tissue Specific CAPS1 RNA Editing in P2Y2 Receptor Knockout Mice**

Hogan Brecount, Hailee Marino, Chase Rosser, Emily

Beck and Randi J. Ulbricht Ph.D.

Faculty Advisor: Dr. Randi Ulbricht

RNA editing is a molecular mechanism by which individual nucleotide sequences transcribed from the genome are altered to generate different nucleotides at selected positions. CAPS1 RNA editing changes a single nucleotide (A-to-I) that changes a single amino acid (Glu-to-Gly), which ultimately alters the function of the encoded protein. The enzymes that catalyze RNA editing increase in amount in response to inflammation. The research performed here utilizes the P2Y2 receptor knockout mouse as a model to address whether inflammation affects tissue-specific CAPS1 RNA editing. Research methods include developing a genotyping protocol for genetically modified mice and CAPS1 RNA editing analysis from wild-type and knockout mice. Quantification of RNA editing is accomplished by isolating RNA from dissected tissues, amplifying the region of CAPS1 mRNA containing the editing site by RT-PCR, then sequencing the CAPS1 RT-PCR amplicons. It is anticipated that the data here will provide insights into how conditions that cause chronic or acute inflammation can alter the identity and function of gene products that are subject to RNA editing.

**117. Analysis of the Modes of Communication Utilized by Students with Cochlear Implants in a Midwest Region**

Kristin Pryor, Kennedy Conn, Dani Willhite

Faculty Advisor: Dr. Karen Engler

Today's western society stresses that students with a hearing loss be placed into the least restrictive environment with hearing peers within a mainstream classroom. Compared to their hearing peers, many of these students face a number of challenges including reading and literacy skills and communication and socialization skills. With the development of the cochlear implant (CI), children and students have the opportunity to increase their skills and increase the probability of matching their peers in language development. An analysis of the modes of communication utilized by students with cochlear implants in a Midwest region was conducted. This research explored the modes of communication used by students with a CI in the school setting, which may aid in providing insight to possible changes that may enhance overall service provision for students with cochlear implants in a Midwest region. Data from the study revealed that a majority of students with

## Abstracts

cochlear implants in this region used spoken English in order to communicate, though, only 50% of these students were intelligible. There was also a strong connection between those using spoken English and students' performing "at grade level" in terms of language performance.

### 118. Contexts of Varying Time Commitments on Approachability

Courtney Kuepfert

Faculty Advisor: Melissa Fallone

To test the hypothesis that contexts of varying time commitment impact approachability ratings, 120 college students enrolled in Introductory Psychology at Missouri State University (85 women, 35 men, mean age = 18.66 years) completed an online survey. Participants were randomly assigned to read a short time commitment context, a medium time commitment context, or a long time commitment context. They were then asked to give their immediate approach or not approach response to 20 faces. The faces were shown to participants a second time allowing them to rate the approachability of each face on a scale from 1-9. The results did not support the hypothesis for either the immediate responses of approachability,  $F(2, 117) = 2.63, p = .08$ , nor the scale responses of approachability,  $F(2, 117) = 2.09, p = .13$ . It may be that varying time commitment contexts do not impact approachability. Design issues, such as all faces being presented in the same order for all participants, may have limited our ability to detect an effect. It is also possible that participants did not interpret the time aspect of the context as intended.

### 119. Latent Semantic Analysis of Expressive Writing

Rene McKiddie, Caleb Marshall and Dr. Melissa Fallone  
Faculty Advisor: Melissa Fallone

Therapeutic writing is becoming increasingly popular in clinical psychology. Research by Boals and Klein (2005) noted the efficacy of directing victims of domestic abuse to write expressively, as well as marked linguistic changes as their mood and outlook improved. This study hypothesized that the qualitative judgments made by trained clinical psychologists would be mirrored by quantitative statistical modeling of participants' writing. Participants were instructed to write on three separate prompts: a positive emotional prompt, a negative emotional prompt, and a neutral, task-based prompt. Latent Semantic Analysis (Landauer, Foltz & Laham, 1998) was then utilized to create individual semantic spaces for each participant, wherein measures of linguistic similarity could be measured using Pearson's correlation coefficient. After measuring the correlation between each writing condition-by-participant, a multi-level model was utilized to determine the significance of

each writing condition. It was determined that positive writing correlated most strongly with negative writing and that the relationship between positive-to-neutral and negative-to-neutral writing was statistically significant.

### 120. Symmetry Scores in a Single-leg Broad Jump

Nick Van Valkenburg

Faculty Advisor: Allan Liggett

**OBJECTIVE:** The purpose of this study was to observe a difference in power scores assessing the right versus left leg in a single leg broad jump. **DESIGN:** This study utilized healthy participants to perform the one-time experiment. Each participant performed three jumps on each leg while landing on both to determine power scores. **PARTICIPANTS:** College-age participants ranging from 18-26 were utilized from Missouri State University campus. Participants were healthy and reported no restrictions to exclude them from the study. **DATA COLLECTION/ANALYSIS:** Data collection and analysis is still in progress. **RESULTS:** No data exists to be statistically significant to demonstrate a difference single-leg power scores.

### 121. Relationship Between Phonological Working Memory and Second-Language Acquisition Success Regarding Oral Fluency and Contrastive Feature Knowledge in Adult Populations

Stephanie Jones

Faculty Advisor: Dr. Lisa Proctor

The purpose of this study was to explore factors which contribute to successful acquisition of a second-language (L2) in adult populations. More specifically, this study explored the causal relationship between phonological working memory and the procurement of oral fluency skills and contrastive features knowledge in a L2. Moreover, this research study examined the interconnection between phonological working memory and oral fluency abilities in a L2 to better understand salient features that positively influence adults' ability to become bilingual. The following research questions were addressed: 1) How do phonological working memory skills influence adults' knowledge of contrastive features? 2) How do phonological working memory skills contribute to adults' oral fluency success in a second-language? 3) What are additional factors that influence second-language learning? Limited statistical analysis of results was possible due to lower participant numbers than originally anticipated; however, the research results obtained suggested a positive relationship between phonological working memory ability and contrastive knowledge on oral fluency skills in a L2 among adult populations.

**122. The Effect of Collegiate Athlete's Sex and Sport Profile on Knowledge of Athletic Trainers'**

**Scope of Practice**

Jessica Jones, Chad Linck, Connor Parrish, Kirstin Paloney (research advisor)  
Faculty Advisor: Kristin Paloney

Objective: Examine the Division I collegiate athlete's understanding of an athletic trainer's (AT)s scope of practice. Hypothesis: Athletes involved in contact sports will have more knowledge when compared to noncontact athletes. Female athletes involved in contact sports will have more knowledge regarding the ATs scope of practice than male athletes in contact sports. Design: Paper survey distributed to a convenience sample of male and female, Division I NCAA athletes in non-contact and contact sports. Participants: 108 NCAA Division I athletes in both contact and non-contact sports. Seventy-two males (age 18-23) in contact sports, 12 females (ages 18-22) in contact sports, 8 males (age 18-22) in non-contact sports, and 16 females (age 18-22) in non-contact sports. Data Analysis: The data will be analyzed by assigning the score of 1 for each question answered correctly, and a 0 for each question answered incorrectly. Scores on the survey will be compared utilizing a two-by-two factorial ANOVA, stratified to examine the differences in knowledge that may or may not exist between sexes as well as contact versus non-contact sports of Division I athletes. Results: Pending. Conclusions: Pending.

**123. Effects of a Stability Intervention Following Instrument-Assisted Soft Tissue Mobilization in the Shoulder.**

Cameron Deckett, Dr. Michael B. Hudson, Dr. Allan J Liggett  
Faculty Advisor: Dr. Michael B. Hudson

Mobility and stability are both key aspects of any rehabilitation plan, but there is no consensus regarding the order of the interventions. We assessed if stability interventions done after mobility therapy (i.e., instrument assisted massage) maintained mobility changes with shoulder internal rotation. We randomly assigned 21 healthy college-aged students (mean age = 22.2 years; 9 males; 12 females) to two groups: 10 participants received massage only and 11 participants received the massage treatment and a shoulder stability intervention similar to a side plank. We provided treatments for 4 weeks, with a 2-week follow-up. Our hypothesis was the participants who received the stability intervention after the mobility therapy will maintain increases in shoulder mobility versus those participants who only received the massage therapy. Both groups showed a significant improvement in rotation as time went on ( $P < .001$ ), but there was no significant difference between the groups ( $P = .215$ ) at any point through the study. We recommend

future research examine changes in shoulder motion over a longer period following the conclusion of treatments.

**124. A Comparison of Ischemic Massage to Strain-Counterstrain Technique on Acute Changes in Iliopsoas Extensibility**

Caleb Garde, Michael Nolan, Kenneth Dildine  
Faculty Advisor: Michael Hudson

Our objective was to examine the differences in the effect of ischemic massage and strain-counterstrain interventions on relieving iliopsoas muscle tightness. We recruited sixty participants between the ages of 18-55 who were experiencing iliopsoas muscle tightness. We randomly assigned them to one of three treatment groups—massage, strain-counter-strain, and control—following a positive clearing test identifying iliopsoas muscle tightness. Two researchers collected pre-test measurements with a goniometer measuring passive hip extension. We then sent participants into another room to receive the ischemic massage, strain-counterstrain intervention, or no treatment from a third researcher. After collecting post-test measurements, we analyzed the acute changes in passive hip extension following each intervention. We will analyze the data using a mixed ANOVA. Ultimately, our research hypothesis is that the intervention of ischemic massage will increase the extensibility of the iliopsoas muscle.