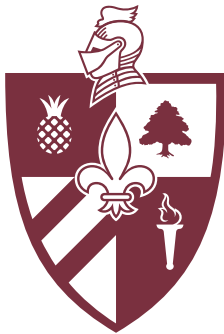


# FALL CELEBRATION OF STUDENT RESEARCH & CREATIVITY

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# **High-Quality Internships and the Impact to Employee Retention**

Lauren Coffey / Faculty Sponsor: Dr. Michael Strawser

High-quality internships are increasingly viewed as an integral part of a student's collegiate experience. However, little research exists measuring if high-quality internships throughout a student's undergraduate study also contributes to longer employee retention post-graduation. Because the millennial generation is frequently labeled a disloyal generation when it comes to organizational settings, this study examined if meaningful internship experiences in a student's field of study at the undergraduate level also correlated with three or more years of retention within the same organization post-graduation. Through a mixed modal approach using both qualitative and quantitative analysis, this study examined the millennial workforce and the desire for college graduates to have tangible hard skills. This research also studied the importance of internships in preparing millennials for the 21st-century workforce, while establishing a framework for increased employee engagement and retention. Given that recent graduates and employee supervisors are oft from different generations, this study aimed to provide insight into employer retention trends as well as millennial perceptions within organizational cultures. It is our hope that this data will provide a framework for educators and employers in recognizing the value of experiential learning and developing talent pipelines for long-term retention gains.

# **The Use of a Single focus Musical External Cue to Improve Functional Mobility in Individuals with Huntington's Disease: A Pilot Study**

Lisa Schwartz, Alyssa Brothers, Alex James, Katie Starr / Faculty Sponsors: Dr. Liz Ulanowski, Dr. Megan Danzl

Purpose/Hypothesis: Huntington's disease (HD) is a neurodegenerative disorder that results in loss of independence and chorea. Currently, there is no research exploring external cues for HD individuals to improve abnormal movement patterns. The purpose is to examine mobility with and without a single focus musical external cue from a drum by a Music Therapist (MT). It was hypothesized that the external cue would improve mobility. Subjects: 10 subjects living in a long-term care facility were recruited. 8 were ambulatory and participated in outcome measures. The mean age was 49 and all but one demonstrated chorea. Materials/Methods: Subjects were evaluated by a physical therapist (PT) using the Timed Up and Go (TUG) and the 10 Meter Walk Test (10MWT) outcome measures. The

data collection included outcome measures performed by PT alone then PT with MT and a drum. A retrospective video analysis was then done to look at subject's movement patterns. Results: Functional movement patterns notably improved movement control and diminished chorea with the use of the drumming cue. 7/8 participants increased their 10MWT times and 5/8 increased their TUG time when adding the drumming cues. Conclusions: While functional movement patterns appeared to improve, future research for development of clinically feasible and meaningful measures of movement pattern analysis is needed. The 10MWT and TUG results all indicated an increase in time with the drumming cue. Given that HD shows variable and uncontrolled movements, these findings demonstrate possible improvement in control. HD is an unusual case in which you may not want to improve speed.

Clinical Relevance: This study presents a PT/MT approach to influencing mobility in HD individuals. These preliminary findings support consideration by a PT to integrate a single focus external cue during treatment sessions to improve patient's movement pattern by enhancing controlled movements.

## **The Role of Music on Movement in Huntington's Disease: A Physical and Music Therapy Partnership**

Lisa Schwartz, Alyssa Brothers, Alexandra James, Katie Starr / Faculty Sponsor:  
Dr. Liz Ulanowski

Purpose: The implementation of music therapy in healthcare improves patient mood, movement patterns, and overall quality of life. To date there is no research exploring the use of music therapy as a co-treatment with physical therapy in individuals with Huntington's disease (HD). This report describes a novel physical and music therapy approach to working with individuals with late stage HD and explores the role of music on functional movements.

Description: Ten participants with HD living in a long-term care facility were evaluated by a Neurologic Certified Specialist Physical Therapist including observation of basic functional movements. Selections of movements were then chosen to trial with music. The treatment session included 3 functional movement conditions: physical therapy alone, physical and music therapy with a drum, and then a guitar. Observations of both sessions were collected in-person and through video analysis along with observational movement analyses from video review. An interview was then conducted with the PT and MT about their perceptions of the experience, the role of music on movement in HD, and co-treatment opportunities in HD rehabilitation.

Summary of Use: Findings suggest the MT/PT co-treatment was beneficial using a simple auditory cue such as a drum from the MT during functional tasks directed by the PT. The drum allowed the MT to evolve the rhythm to match the needs and variability of the pattern based on the movements. The cues allowed participants to demonstrate improved control over the hyperkinetic movements. The drum appears to be more effective than the guitar with participants demonstrating improved responsiveness to the drum cue but additional research is warranted. Further study is also needed to determine the effects of the auditory cue as a background cue versus a more cognitively mediated approach of asking the participants to directly focus on the musical cue during movement.

## **TUFF: A New Outcome Measure to Customize Treatment and Improve Fall Recovery in Adults with Neurological Disorders**

Mike Zylak, Brittany Back, Karianna Huff / Faculty Sponsor: Dr. Carrie Hawkins

Purpose/Hypothesis: The purpose of this research study is to determine if a short-term personalized intervention program based on a new outcome measure would affect the ability to rise from the floor.

Methods: twenty-one participants with various neurological/movement disorders, and/or a history of falls participated in four structured physical therapy (PT) sessions; eighteen participants completed the study. Participants attended four one-on-one sessions at a university-based PT clinic. At the initial and final visits, the participant's efficiency in rising from the floor was measured by a newly developed outcome measure, the Timed Up From the Floor (TUFF); fall concern was measured with the Falls Efficacy Scale- International (FES-I). An individualized program was developed (based on TUFF observations) and implemented for three sessions.

Results: A Pearson correlation was conducted to determine the relationship between the TUFF and FES-I outcome measure changes. This resulted in a moderately strong, inverse correlation with statistical significance ( $r = -0.532$ ,  $p = 0.028$ ). Conclusions: Based on analysis of the results, while TUFF scores decreased and participants were quicker to rise from the floor, FES-I scores increased and indicated a higher fear of falling during activities of daily living (ADL). The interventions provided to each participant were significant in that they were conducted in only three sessions, resulted in statistically significant data, and participant feedback indicated a change in both their physical and psychosocial well-being. Many people avoid activity for fear of falling and inability to rise from the floor independently. Interventions should be tailored based on specific deficits noted during administration of the outcome measure. With appropriate education, fall-rise technique training, and a thorough

HEP, improvements can be made in strength, coordination, and confidence, to decrease fear of falling even with limited intervention.

## **Power for Perfection: a pilot study measuring upper extremity power in female collegiate dancers over the course of a season**

Gwendolyn Casper, Taylor Dauphin, Natalie Schroll, Madelyn Vadney / Faculty  
Sponsor: Dr. Kate Crandell

The purpose of this study was to examine the effectiveness of the Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST) to detect changes in functional performance with the implementation of an exercise program in a Division II collegiate dance team over the course of one season. Compared to other athletes, dancers have lower aerobic fitness levels, decreased strength and joint hypermobility.<sup>1</sup> Collegiate dancers require significant upper body strength to execute modern dance techniques like partner lifts and acrobatic-like maneuvers. Upper extremity injury rates are reportedly high for both hip hop dancers (32% of total injuries)<sup>2</sup> and modern dancers (17.7% of total injuries).<sup>3</sup> There is currently no standardized tool for measuring upper extremity function in dancers. The CKCUEST is a performance test that provides quantitative data for an upper extremity task in a closed kinetic chain (CKC) measuring the average alternating touches in a push-up position over 15 seconds.<sup>4,6</sup> The CKCUEST has been shown to have good test-retest reliability and validity in other athletes,<sup>4-5</sup> however, it has not been tested in collegiate dancers. In this study, 13 collegiate dancers participated in a season-long exercise program consisting of resistive strengthening for upper and lower extremities, trunk-specific strengthening and plyometric exercises. The CKCUEST scores were collected at 4 intervals over 20-weeks and 5 female dancers (average age 19.2 years) completed all 4 testing dates. Data were analyzed using Prism (v. 7) software. One way ANOVA with multiple comparisons showed significant difference between the average number of touches from the CKCUEST Test 1 ( $15.2 \pm 1.8$ ) to Test 4 ( $20.7 \pm 2.4$ ) with a 36.2% increased change ( $P=0.0009$ ). Average power scores from Test 1 ( $36.8 \pm 8.2$ ) to Test 4 ( $50.4 \pm 12.2$ ) was also significant with a 37.0% increased change ( $P=0.0084$ ). Empirically, some dancers reported “feeling stronger” after the exercise program and there were no time loss injuries during the season.

## **A Comparison of the GAITrite® and the Virtusence Technologies VSTBalance in the Evaluation of Various Parameters of Gait**

Tyler Kornblum, Emily Barrett / Faculty Sponsors: Dr. Beth Ennis, Dr. Megan Danzl, Dr. Liz Ulanowski

Purpose/Hypothesis: Physical therapy evaluation requires the analysis of gait parameters to select appropriate interventions for individuals. Currently, clinicians are able to capture information with either affordable technology that provides limited accuracy or high cost technology that is accurate yet complex. GAITrite® is currently the gold standard in clinical gait analysis, but also challenging for clinicians. New systems, such as VSTBalance, aim to make accurate gait analysis readily available to more clinicians. The purpose of this study is to assess the accuracy of VSTBalance gait analysis parameters compared to the GAITrite® system. Number of Subjects: 66 healthy participants with no recent lower extremity injury, back pain, or recent surgeries. Materials/Methods: Both systems were arranged to collect data simultaneously. Each subject was asked to start walking two meters prior to the GAITrite® mat, over the 12 foot mat, and then two meters beyond the mat. The VSTBalance was placed near the end of the mat and captured the same footfalls of the GAITrite®. Data on multiple parameters were analyzed using the Intraclass Correlation Coefficient for each trial in normal and fast speeds. Results: Parameters with strong correlations [DDMM1] were gait velocity, step length, and stride length. Parameters with mild to moderate correlations were base of support, cadence, and cycle time. Poor or weak correlations were found with percentage of time in stance or swing, step time, double support, and single support. Conclusions: The clinically relevant parameters of gait velocity, step length, and stride length obtained by the VSTBalance strongly correlated to the GAITrite®. The other gait parameters from the VSTBalance potentially lack accuracy and warrant further investigation. Clinical Relevance: The VSTBalance provides a time, cost, and space effective option to capture this data and measure change. The GAITrite® provides a more accurate measure of the other gait parameters.

## **Using Logistic Regression to Predict Early Graduation Candidates**

Drew Thiemann / Faculty Sponsor: Dr. Grant Smith

Situated within academic momentum theory, this research seeks to explain the variance among undergraduate degree completers who elect to graduate early, i.e. in six or seven semesters instead of the traditional four years. These fast-track

students are an under-researched shadow population at many institutions, partly because federal and state compliance requirements lump them in with fourth-year graduation rates. The research question seeks to identify which pre-matriculation variables may predict the likelihood of a student self-selecting an accelerated pathway. Analysis includes a hierarchical binary logistic regression to test a stepwise model of first time, full-time students who elected to graduate early ( $n = 352$ , date range 2001-2017). Diagnostics indicate the model is robust to violations and explains the variance reasonably well (Nagelkerke's  $R^2 = 0.34$ , Wald chi-square(4) = 103.06,  $p < 0.001$ ). There is a significant association between the amount of transfer credits earned prior to matriculation, advanced standing credits awarded at the point of admission, the interaction of pre-matriculation transfer credits and enrolled credits in the student's first fall term, and the outcome of completing a first baccalaureate degree within six or seven semesters. The findings suggest that schools could develop a novel student success program and market it to specific students identified by these predictive variables. Such a program would encourage students to self-identify and ensure appropriate advising supports exist for "fast-track pathway" students. This is consistent with the literature around academic momentum theory, which shows that high-achieving first-year students who voluntarily participate in student success programming find the experience of college more challenging and more rewarding. Marketing an accelerated pathway could improve an institution's value proposition, thus boosting recruitment efforts at the undergraduate level as well as increasing awareness of dual degree Master's programs. Earlier identification would also improve enrollment projections for budgeting purposes.

## **College Affordability: A Case Study on Regional Higher Education State Agencies**

OJ Oleka / Faculty Sponsor: Dr. Donald Mitchell, Jr.

This article is an analysis on higher education state agencies in eight states in the Midwest and upper South. Analyzing these state agencies through a qualitative case study design, the purpose of this article is to develop an understanding on how a region might define and measure college affordability. The findings highlight that there is a broad understanding of what it means for a state to offer postsecondary education at an affordable level, but there is no consistent definition or formula in any state individually or within the region collectively. Recommendations going forward include developing comprehensive policies towards college affordability, as well as modifying and implementing in Kentucky policies that have been successful in other states.



Keywords: college affordability, financial aid, higher education, state government, state policy, student debt

## **Family and Child Education (FACE): A 2017 Report**

Stephanie Van Eps / Faculty Sponsor: Dr. Grant Smith

American Indian populations are currently among the most likely minorities to live in poverty circumstances. A complex history with the United States government, including policies of assimilation intended to dissolve American Indian cultures and identities, have created a landscape for poverty that continues into the present, impacting every aspect of life from healthcare to education. Family and Child Education (FACE) with the support of the National Center for Families Learning (NCFL) has recognized this as a critical problem. To this end, FACE has developed education and service programs for children and families of American Indian communities across the country. In 2017, the program served 44 schools, 2058 adults, 2109 children, and 1798 families within the American Indian community. In 2017, Research and Training Associates, Inc. prepared a report for the U.S. Department of Interior, the Bureau of Indian Affairs, and the Bureau of Indian Education. This BIE Family and Child Education Program Report acts as a record for NCFL and FACE to examine the year's progress. As part of a summer internship with NCFL and FACE, this poster will serve to analyze the report and create meaningful information for teachers and community members moving forward.

## **Delayed Diagnosis of Pulmonary Tuberculosis**

Taibah Alfarhan / Faculty Sponsor: Dr. Karen Golemboski

Tuberculosis (TB) is a severe infectious bacterial disease caused by *Mycobacterium tuberculosis* and mainly affects the lungs. TB is spread from one person to another through the air. This case is about a previously healthy 17-year-old male who has had recurrent pneumonia symptoms for the past year. He followed up with his doctor to get antibiotics, but he did not respond to the medications. The symptoms developed into a daily fever, productive cough, mild anemia, and shortness of breath. X-ray showed a significant progression of clinical scarring/ lung disease. Broncho alveolar lavage culture was positive for *Mycobacterium tuberculosis*. He has started the treatment and followed up with the health department for a continuation of the course of treatment. TB is a communicable disease, so it needs to be diagnosed and treated as soon as possible. Because TB is not a common disease in the United States, it may take a long time to be diagnosed especially with non-traveling peo-

ple. Delayed diagnosis of TB leads to worse outcomes and increases TB exposure in community and hospitals. Early diagnosis and early treatment help reduce the risk of disease outbreak. The more people know about TB and the importance of stopping the spread of the disease, the more focus can be shifted toward stopping it.

## **Poverty Alleviation Efforts for Women in India: The Impact of Catholic Salesian FMA Outreach Programs**

Gayle Bartilow / Faculty Sponsor: Dr. Grant Smith

The rapid, massive growth of India's economy has placed it among nations with the fastest developing economies of the twenty-first century. However, in spite of the unrestrained economic development, the number of women in the workforce have not increased commensurately. Traditionally perpetuated restrictions, discriminatory practices, limited education, and illiteracy rates continue to plague efforts to create employment opportunities for Indian women. The Roman Catholic Salesian order of nuns are well established nationwide and through educational and vocational program endeavors, they provide opportunities for indigent girls and women to gain avenues to sustainable employment. By means of unobtrusive observation and informal interview, this study details the multiple ways that FMA Sisters are instrumental in changing the lives of girls and women in poverty.

## **Assessment of Core Health Professional Curriculum and Elective Pain Neuroscience on Student Pain Neurophysiology Knowledge**

Milli Crowder, Madison Osbourne, Nathan Hobbs, Haley Holt / Faculty Sponsor: Dr. Sonja Bareiss

**Aim of Investigation:** Recent studies support that adequate pain education of health professionals plays an important role in efficient and effective management of pain. Although an interprofessional consensus of core competencies for prelicensure education in pain management have been established, the degree to which these have been incorporated into health sciences curriculum varies greatly. The purpose of this study was to assess students' pain knowledge following core physical therapy, nursing, and athletic training education, and determine if an elective course on Pain Neuroscience had an effect on student knowledge.

Number of subjects: 138 Doctorate of Physical Therapy (PT), 28 Nursing, and 12 Athletic Training students

Methods: The Neurophysiology of Pain Questionnaire (NPQ) was administered to students in their first and final semester of the Doctorate of Physical Therapy, Nursing, and Athletic Training programs.

Results: Entry level scores were similar among the programs of physical therapy (64% + 1.2), nursing (61.8% + 1.8), and athletic training (57.9 + 5.6). We found significant increases in mean NPQ (knowledge) scores in final semester PT students (75.8% + 1.2) compared to 1st semester students (63.0% + 0.9,  $p < 0.0001$ ). Additionally, PT students that participated in the Pain Neuroscience elective course scored significantly higher on the NPQ (86.3% + 1.2%) compared to those that choose other electives (81.2% + 1.1,  $p < 0.05$ ).

Conclusions: The data suggests that although core entry-level health sciences education improves student pain knowledge, students taking a pain elective significantly improved upon their knowledge of pain. This suggests that a stand-alone course on pain, as an addition to pain management concepts threaded throughout the curriculum, may enhance students' understanding of pain, which in turn may help ensure that entry-level clinicians are adequately prepared to optimize and direct treatments for patients with pain.

## **Analysis of the Potential State Takeover of JCPS: K-PAC and JCTA Recommendations**

Natalie Sajko / Faculty Sponsor: Dr. Grant Smith

How do we fix Jefferson County Public Schools (JCPS)? This has become a hot-button topic in Louisville as government officials, teachers, and community members try to find solutions to the achievement gap in our city. In light of the possible state takeover, about which the state and Jefferson County Board of Education (JCBE) recently made an agreement, it was pertinent to review recommendations given by two vocal entities in the debate: the Kentucky Pastors in Action Coalition (K-PAC) and the Jefferson County Teachers' Association (JCTA). Both of these groups have become influential in the communities in which they serve, having ties to the media and local politicians. The recommendations from both organizations were compared with available research to determine the effectiveness of each in the context of JCPS. While both organizations made student achievement the center of their arguments, each organization had one recommendation rooted in research which supported this goal. Some of the recommendations were presented to the community as a means of remedying the achievement gap, however research did

not support them and they appeared to be a benefit to the group itself.

## **Applications of Machine Learning to the Medical Field**

Jennifer Sproles / Faculty Sponsor: Dr. Muzaffar Ali

Artificial Intelligence (AI) is the process of programming machines to imitate human intelligence. This allows computers to perform tasks and make decisions that were thought to only be possible by the human mind. A branch of AI is machine learning. Machine learning involves “teaching” a computer an algorithm that the computer utilizes to complete tasks such as predictions and classifications. There are different types of algorithms in machine learning that can be applied to a variety of fields. The Nearest Neighbor algorithm is a supervised machine learning algorithm. This research looks at classifying breast tumors using the Nearest Neighbor algorithm. The dataset analyzed contains digitalized images of Fine Needle Aspirate Biopsies from the Wisconsin Diagnostic Dataset of breast masses. The Nearest Neighbor algorithm determines if the mass is benign or malignant at an average of 94.62%. Having more effective ways to determine the classification of a tumor without a surgical biopsy benefits both healthcare providers and patients.

## **A 2 Year Case Series Prospective Study Assessing an Injury Prevention Program for Collegiate Wrestlers**

Justin Youtsey, Grant Finlan, Elliott Reiff, William Montgomery / Faculty Sponsor: Dr. Paul Lonnemann

Functional screening tools have been utilized to assess asymmetries and dysfunctions with specific movements to assess injury risk in collegiate athletes. There is limited research with the implementation of an off-season training program as it relates to screening tools. Establishing a training program for injury prevention could lead to fewer wrestling injuries.

The purpose of this study is to determine if an individualized training program based on deficits, identified functional movement tests affects a wrestler’s risk of injury. Subjects included seven collegiate wrestlers.

The wrestlers each attended a pre-test and post-test where the FMS and Y-Balance tests were administered. An offseason exercise program was designed from impairments found during testing and was completed by the wrestlers between the two tests. Analysis of the FMS and Y-balance test results were compared across two

consecutive seasons to analyze the impact of the individualized training program. The movement tests were assessed from season one to season two. The results were analyzed across season one to season two. Although the statistical power was low due to the small number of participants and wrestlers that were assessed over more than one season, there was a reduction of total injuries by team from year one prior to the utilization of the injury prevention program (10 injuries out of 17 wrestlers in season one) compared to after the injury prevention program (2 injuries out of 18 wrestlers in season 2). Based on the results of this study, an individualized offseason exercise program has no significant change on the composite scores of the functional testing over the span of two consecutive wrestling seasons. There was an overall decline in total injuries following utilization of the injury prevention program. Efforts to extend data collection to a third season with the Bellarmine University wrestling team is taking place currently.

## **Mesodon zaletus and the Effects of Glyphosate**

Kathryn Grubb / Faculty Sponsor: Dr. Roberta Challener

Roundup use can show harmful effects in the user and invertebrates in the surrounding environment. Land snails absorb toxins from the soil. The species *Mesodon zaletus* is one of the most prevalent land snails in Kentucky and therefore is a main source of toxin removal. If glyphosate harms these land snails as it does other organisms, land snails would not be as available to remove toxins from soil. *Mesodon zaletus* were exposed to various levels of glyphosate in the form of Roundup. Twelve tanks were used with three tanks for each level of Roundup applied. Three of the twelve were control tanks. Each tank had the same amount of food and light. The effects of the applied glyphosate were observed by recording the number of deaths per tank, *M. zaletus* weight, food eaten, and number of juvenile snails found per tank. Snails who were exposed had brittle and weak shells, which was fatal. It can be concluded that the rate of death was much higher in tanks with higher amounts of glyphosate.

## **Mechanisms of Sensory Plasticity in the Development of At-Level Neuropathic Pain Following Spinal Cord Injury**

Nia Patel, Tammy Nguyen, Zane Sibalich, Haley Willow, Hailee Bray / Faculty Sponsor: Dr. Sonja Bariess

Purpose: Neuropathic pain following spinal cord injury (SCI) is highly prevalent and poses a significant clinical challenge. We have previously shown that sensory

afferent plasticity mediated in part by GSK-3 $\beta$  plays a key role in the development of pain following SCI. Here, we further define the role of GSK-3 $\beta$  signaling on CRMP-2 and  $\delta$ -catenin known mediators of neuronal growth with largely undefined roles with respect to sensory system function and expression in the spinal cord and dorsal root ganglia (DRG) following SCI. The purpose of this study was to 1. Define the expression pattern of CRMP-2 and  $\delta$ -catenin in the spinal cord dorsal horn and DRG 2. Correlate  $\delta$ -catenin and CRMP-2 expression changes to the presence and severity of at-level SCI pain.

Materials/Methods: SCI was induced via injection of quisqualic acid (QUIS) to produce pathological and behavioral sequelae mimicking those observed after human SCI including the development of pain. Long-Evans rats underwent spinal injection of QUIS (SCI) or saline (sham control) and were allowed to survive for 1, 14, or 22 days (n=5-12 per group). Animals were examined daily for onset and severity at-level dysesthesias/pain termed over grooming. Spinal cords and DRG were also analyzed for corresponding alterations in CRMP-2 and  $\delta$ -catenin signaling.

Results: SCI induced early (1 day) and persistent (22 day) alterations in CRMP-2 and  $\delta$ -catenin expression, which correlated with enhanced afferent growth and the presence and severity of pain (over grooming). Blocking GSK-3 $\beta$ - CRMP-2- $\delta$ -catenin signaling, via intrathecal delivery of LY294002, partially reversed these responses and reduced the development of pain 22 days post-SCI.

Conclusions: Our work shows a novel role for CRMP-2- $\delta$ -catenin signaling in mediating spinal afferent plasticity associated with SCI pain. Pharmacologically targeting this pathway prevented sensory growth and the development of pain.

Clinical Relevance: These results provide insight on new therapeutic targets in SCI pain.

## **Parental Mediation for Children's Internet Use**

Daeun Lee / Faculty Sponsor: Dr. Wuyu Rain Liu

This study explores the different communication strategies parents employ when speaking to their children about their Internet use. Parents have an obligation to educate their children about their online activities through effective mediation strategies. The goal of this study is to understand not only how parents speak to their children about their Internet use, but also how parents currently perceive the significance of these conversations. In addition, the study aims to discover whether there are any associations between parents' socioeconomic statuses and the type of

mediation strategy they prefer. The objective of the study is to help parents learn to communicate more effectively with their children about healthy Internet practices. Two divergent mediation strategies are discussed. Active parental mediation emphasizes parents engaging in active discussion with their children, as well as providing a warm, encouraging tone when speaking about Internet use. Restrictive parental mediation refers to primarily relying on household rules to protect their children from the negative influences of the Internet, as well as technological software that helps to protect them from inappropriate content. These communicative strategies not only help their children navigate the countless opportunities provided by the Internet, but also equip them to protect themselves against the dangers of the Internet that threatens their healthy cognitive, social, and emotional development. Research has found that the verbal component of communication has a greater impact than the behavioral component of parental influence. Therefore, the study also emphasizes the verbal component of parents' mediation strategies, including the frequency, conversation and conformity communication styles, and openness and honesty.

150 parents from a whole family unit (i.e., composed of the biological children of spouses in their first marriage) will be recruited to participate in an online survey. Data collection and analysis are expected to be completed by the end of this year.

## **Bystander Effect and the Risk Perception in Cyberbullying of Social Media**

Joseph Ray, Mikayla Johnson / Faculty Sponsor: Dr. Wuyu Rain Liu

Cyberbullying has brought a negative impact on children and young adults in the sphere of social media such as Facebook, Twitter, and Instagram. Hurtful comments and negative content addressed to individuals in the online community, especially made by people under anonymous profiles, gives the victim low self-esteem and increase in a variety of emotions including anger, sadness, and fear. To help find ways to intervene and prevent cyberbullying in social media outlets, we are conducting this study based on the theories of the Bystander Effect and Risk Perception to show how most social media users react to cyberbullying. Social norms, both descriptive (i.e., perceived prevalence of a certain behavior) and injunctive (i.e., perceived social approval of a certain behavior), play an important role in how users of social media perceive the cyberbullying that goes on in websites. In this study, we hypothesized that the more hurtful and abusive comments that are shown in a certain social media website, the more less likely a user of that website would intervene. Also, the more hurtful comments there is on a social media website,

it is more likely that there will be more perceived social approval among users.

## **A Case Report of a Clinical Decision Making Approach to Address Functional Limitations in an Individual with Kennedy's Disease, A Rare Neurological Disorder**

Emily Barrett, Daniel Ryan / Faculty Sponsor: Dr. Liz Ulanowski

Kennedy's disease (KD) is a rare, progressive X-linked motor neuron disease. The etiology of KD is described in the literature but evidence examining physical therapy (PT) interventions for KD is needed. Muscular endurance, task-specific training, strength training, and energy conservation is effective for other progressive neurological diseases such as Myasthenia Gravis (MG), Lower Motor Neuron (LMN) disorders, Parkinson disease (PD), Huntington's disease (HD), and Multiple Sclerosis (MS). The purpose of this case report is to describe a clinical decision-making approach and selection of interventions to meet patient-specific goals, improve function, and reduce fatigue in a person with KD. The patient is a 51-year-old male diagnosed with KD who participated in PT (2x/week, 12 weeks). The patient presented with weakness (core, upper extremities, lower extremities), fatigue, and activity limitations (stairs, sit to stands, long-distance ambulation). The plan of care was informed by literature in other progressive neurological diseases including task-specific training (PD and HD), fatigue management (MS), and strengthening recommendations (MG and LMN). In addition to these components, postural awareness, functional training, and balance exercises were included. Pre and post intervention outcome measures were the Functional Gait Assessment (FGA), 5 time Sit-to-Stand Test (FTSTS), Six Minute Walk Test (6MWT), Timed Up and Go (TUG), 10 Meter Walk Test (10MWT), and Single Leg Stance (SLS). The patient stated decreased fatigue post-testing. The TUG improved beyond the falls risk cut-off score. FGA and 6MWT results exceeded the minimally clinically important difference values. The 10MWT, FTSTS, SLS results improved but not significantly. This case indicates that PT focused on task-specific training including core strengthening, postural awareness, functional training, and balance exercises enhances function in a patient with KD. This clinical-decision making model of drawing upon literature in other progressive yet more common neurological disorders can be applied to patients with rare neurological disorders.



## **Smarter or Harder? Smartphones, Work, Stress, and Autonomy**

Jordan Kelch, Nolan Wesley / Faculty Sponsor: Dr. Wuyu Rain Liu

This study explores the prevalence and relevance of smartphone use in the modern workplace. Specifically the stress and perceived autonomy of individuals who utilize smartphones for work in a personal setting. Since their introduction to the market, these hand-held computers have continued to progress technologically. Existing literature suggests that, while the smartphone has led to increased communication and connectivity, it has also caused the traditional boundaries of work-life and home-life to become more porous. The resulting new, all-encompassing workplace allows users to access work at all times, including personal time; this blending of environments creates stress on the subject while creating imbalances of autonomy that may be detrimental to both work-life and home-life. Considering the great number of smartphone users, these complications, and resulting consequences, have the potential to affect workers around the world.

Review of existing literature led to two separate research questions, the first of which asks if workplace communication outside of the traditional workplace via smartphone creates stress in employees. The second asks if workplace communication outside of the traditional workplace via smartphone creates autonomy imbalance in employees. Subsequent hypotheses were formed, stating that workers who answer work-related messages on their smartphones outside normal working hours will experience higher stress levels compared to workers who do not engage in these activities. Secondly, workers who answer work-related messages on their smartphones outside of normal working hours self-report as having less autonomy compared to workers who abstain.

This study will collect data through an online survey detailing the influence of smartphones on users in the context of the workplace. Variables include: smartphone possession, smartphone use, stress level, autonomy level. The study is in progress and is expected to be completed by May 2019.

## **Use of the BNAT, a Novel Objective Physical Assessment Tool, to Discriminate between Specific Cancer Diagnoses and Their ECOG Performance Status Scores**

Reid Imel, Jarek Penney, Rick Swartz, Jessy Weiss / Faculty Sponsor: Dr. Kate Crandell

Individuals with cancer experience loss of function, disability and fatigue. There is

growing interest in functional and physical assessment as part of a comprehensive oncology care plan. No single comprehensive assessment tool is routinely applied to oncology care. The Bellarmine Norton Assessment Tool (BNAT) was developed to provide a new objective physical assessment tool for utilization among patients with cancer. The purpose of this study was to evaluate the BNAT and correlate its outcomes with ECOG scores across groups diagnosed with pancreatic (P), breast (B) and lung (L) cancers.

## **Trauma Informed**

Diane Courington / Faculty Sponsor: Dr. Corrie Block

Teachers may not be aware of the behaviors that children in classrooms demonstrate as a result of trauma which is problematic. Currently, there are many initiatives in Kentucky to make teachers aware of behaviors associated with trauma. A goal of these initiatives is to impact classroom level experiences with trauma informed practices. Because teachers are aware of behaviors related to a diagnosis of ADHD, diagnosis of ADHD was used to categorize children who have been exposed to trauma. The work seeks to disentangle behaviors that seem to be related to ADHD from trauma. The purpose of this work was to describe behaviors of children who have experienced trauma based on one of three categories; a diagnosis of ADHD (definite diagnosis), behaviors of ADHD and are not diagnosed (probable diagnosis) and those who have no behaviors and no symptoms of ADHD and are not diagnosed (not diagnosed). The data come from the Center on Trauma and Children (CTAC) in Lexington, Kentucky. CTAC serves children, ages six to eighteen, each child has experienced some form of trauma. There are 652 children in the sample. The number of children who have a definite diagnosis of ADHD is 91. There are 141 children with a probable diagnosis of ADHD and 420 who are not diagnosed and do not show behaviors or symptoms of ADHD. Most students being served by the CTAC are not diagnosed with ADHD nor do they exhibit behaviors of ADHD. The work strives to create awareness of behaviors that children in classrooms demonstrate as a result of trauma.

## **Walk with Ease™: A Community-Based Approach to Improving Physical Activity in People with Osteoarthritis**

Casey Gettelfinger, Danielle Backes; Grace Daly; Alicia Pollert; Chloe Zimmerman / Faculty Sponsors: Dr. Leann Kerr, Dr. Gina Pariser

Osteoarthritis (OA) is a major cause of impairment and disability. Adults with OA

display greater impairments in endurance, walking speed, and balance compared to adults without OA. These impairments, and arthritic symptoms, are barriers to participation in physical activity (PA) to improve health. Walk With Ease (WWE™), developed by the Arthritis Foundation, is a 6-week program that has been shown to increase participant's endurance, walking speed, and static balance and to decrease their arthritic symptoms and work activity limitations. The purpose of this study was to evaluate the effects of WWE™ on participant's dynamic balance, risk of falls, and self-efficacy for exercise. 23 participants completed the Functional Gait Assessment (FGA) and the Self Efficacy for Exercise Scale (SEE Scale) before and after WWE™ program. Additional measures included the Arthritis Impact Measurement Scale, gait speed, and Two Minute Walk Test. Scores were compared using paired t-tests and to minimal detectable differences (MDD) or important differences. A FGA score < 22 points is indicative of fall risk. Prior to WWE™ the mean FGA score was 21.4 (5.1 pts); 56% of the participants were at risk for falls. Afterwards the mean score was 24.2 (5.0 pts); 13% of participants were at risk of falls. The difference was significant and greater than the MDD for older adults. Consistent with previous studies, participants exhibited a decrease in arthritic symptoms and increases in endurance and gait speed. Participants in this study, who were more physically impaired than subjects in published studies about WWETM, exhibited positive changes in their dynamic balance and risk of falling, as well as their arthritic symptoms, endurance, and walking speed. Along with reduced impairments and risk of falls, there was a trend for improved self-efficacy for exercise. Studies on the long-term effects of WWE™ on impairments and participation in PA are needed.

## **Swing to Improve Functional Mobility: A Comparative Case Report**

Elizabeth Seewer, Thomas Wiseman / Faculty Sponsor: Dr. Leann Kerr

A diagnosis of Cerebral Palsy has significant effects on gait and transfers in a developing child. It is said that the incidence of CP is reported to be present in 2 to 3 children per 1000 live births, with increased rates being in those born prematurely. Of those diagnosed, two-thirds are ambulatory and demonstrate an altered gait pattern in a crouched posture. The recruitment of muscles used for postural control during ambulation are typically effected. Along with postural control differences, there is an excessive co-activation of hip flexors and hip extensors. This impedes adaptation to the demands of a specific task such as transfers and ambulating. The purpose was to examine the effects of dynamic abdominal strengthening through sports participation on the efficiency of gait and transfers in children with Cerebral Palsy.

The participants were two children diagnosed with CP that met all inclusion criteria. Examination procedures included pre- and post-intervention evaluation of the GMFM, Timed Up and Go, 5 time sit-to-stand, 6-minute walk test, and GaitRite analysis. The bi-weekly intervention of softball hitting was completed over a consecutive 8-week period and designed to increase in difficulty as the weeks progressed. The protocol focused on decreasing the amount of support provided while swinging a bat 30 reps in each of the following positions – half-kneeling, tall-kneeling, and standing. The support was provided by the LiteGait harness. Manual facilitation of the participant’s hips and lower limbs were provided by physical therapy students. Post-intervention testing demonstrated positive changes in step length, step differential, velocity, and step cadence. Both participants also improved in gross motor skills, cardiovascular endurance, anaerobic power, and mobility. An increase in walking and transfer efficiency allows for more community involvement and participation.

## **Walking Backward to Excel Forward: A Comparative Case Series**

Allison McKenna, Kathryn E. Wilson, Leslie R. Mead / Faculty Sponsor: Dr. Leann Kerr

Two-thirds of children with cerebral palsy (CP) are ambulatory and demonstrate a gait pattern in a crouched posture. The recruitment of muscles used for postural control during ambulation is altered; it is in a top-down fashion. Along with postural control differences, there is an excessive co-activation of hip flexor and hip extensor musculature. Altered postural control and muscle activation impedes adaptation to the demands of a specific task such as transfers and walking. Walking backwards has been shown to strengthen extensor musculature in the lower limbs and increase stride length in health individuals. The purpose of this case series is to examine the effects of reverse walking on the efficiency of transfers and gait in children with Cerebral Palsy.

We selected two children with a diagnosis of CP (1 M, 1 F; ages 9 and 10; GMFM Level 3) to participate. The bi-weekly intervention of reverse treadmill walking was tailored to the individual and completed over an 8-week period. The protocol focused on increasing the treadmill speed during the first session of each week, and the duration of the intervention during the second session. This was done in an effort to increase the child’s tolerance for reverse walking while at the same time reducing chances for excessive fatigue. Manual facilitation of the participant’s hips and lower limbs was provided. Outcome measures included the GMFM, Timed Up

and Go, 5 times sit-to-stand, 6-minute walk test, and observational gait analysis. Post-intervention testing demonstrated positive changes in both participants ability to walk including increases in their step length, step differential, step cadence, and gait velocity. Both participants' functional skills, endurance, anaerobic power, and mobility improved- specifically postural control and lower limb muscle activation. Per reports from the children's caregivers the positive changes in physical performance measures allowed for more participation in community activities.

## **The Impact of Education on Documentation Compliance among Hospice Nurses**

Jessica Aberli / Faculty Sponsor: Dr. Sherill Cronin

Medication reconciliation is a mandatory patient safety practice in home health. Hospice nurses providing care in homes and nursing facilities are responsible for documentation standards for medication reconciliation. After an audit for documentation compliance, this practice was found to be lower than the benchmark set by The Joint Commission. An educational intervention about medication reconciliation was completed between February and March 2018. The purpose of this study was to measure effectiveness of the educational intervention designed to impact documentation compliance of medication reconciliation among hospice nurses. A retrospective record review for pre-intervention and post-intervention periods of two months prior to and following the educational intervention was completed. Descriptive statistics about the nurses' roles and experience levels, as well as patients' location and length of stay was obtained in an attempt to account for any explanations in changes of compliance rates. A chi-square test of independence showed there was no statistically significant difference in compliance rates in the post-intervention period among any groups. Additionally, groups of nurses in the main team nurse role versus all other roles, did not show a difference, nor did hospice experience level of the nurse. So, no nurse related factors can be attributed to the lack in improvement for compliance rates. Only one community, Hosparus of Southern Indiana, had a statistically significant improvement in compliance rates over the communities. Also, patient triage phone logs were analyzed for any change in number of calls related to medication refills in the post-intervention period. A reduction in calls by 5% could improve satisfaction and clinical outcomes for patients. While the educational intervention was completed, this study found a need for more education or other interventions to see a change in documentation of medication reconciliation and therefore, improve patient safety in the home.

# Implementation of Simulation in New Graduate Nurse Orientation

Becky Smith / Faculty Sponsor: Dr. Kelly Ruppel

**Background:** New graduate nurses have greater potential to miss deteriorations in patient conditions due to their inexperience. Simulation in the clinical setting is not typical; however studies have shown strengthened critical thinking skills, confidence, and leadership skills when utilized in new graduate orientation. Although results thus far have been positive, most studies have used original surveys to evaluate simulation's effectiveness.

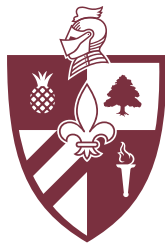
**Purpose:** The purpose of this project was to implement a simulation with new graduate nurses in hospital orientation and evaluate their perception of its effectiveness using a standardized evaluation tool: the Simulation Effectiveness Tool-Modified (SET-M).

**Project Methods:** This project involved the development and implementation of a hypoglycemia simulation for new graduate nurses on a telemetry unit at Norton Audubon Hospital. The expectation was for the new graduates to recognize hypoglycemia, treat accordingly and recheck a blood glucose following their intervention. Afterwards, the participants were given the SET-M to evaluate their perception of the simulation experience. The SET-M is a 19-item valid and reliable evaluation tool that has 4 subscales: Pre-briefing, Learning, Confidence and Debriefing (overall Cronbach's alpha = .852).

**Findings:** All participants (N=6) were Caucasian females, new graduates of BSN programs, and had experienced simulation in their undergraduate educations. Means were nearly the highest values in each subscale, meaning participants strongly agreed with nearly all items. Adequate variability was only present for the Confidence subscale (Cronbach's alpha = 0.83).

**Conclusions:** Reliability of the findings was somewhat limited due to the decreased variability in the SET-M scores and small sample size. However, the consistently positive SET-M scores further contribute to existing literature that values simulation in new graduate nurse orientation. Evidence is strong enough to suggest an advantage for hospitals to incorporate simulation into orientation.





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