

Completed Thesis and Masters Projects 2017

Thesis:



Examining Concurrent Validity of the Print Tool as Compared to the Test of Handwriting Skills-Revised

Researcher: Sarah Holt under the direction of Dr. Denise Donica

Purpose: The purpose of this study was to determine the concurrent validity of the Print Tool as compared to the Test of Handwriting Skills-Revised (THS-R) as well as examine the alignment of teacher perception of handwriting with components of the Print Tool.

Methods: The Print Tool and THS-R were administered to 17 first grade students and 29 second grade students (n=46) over a 6-week period. Teacher perception surveys were distributed to teachers of participating students (n=4). All student assessments were scored by 3 researchers, blind to student identifiers.

Results: The correlation between overall scores on the two assessments was found to be moderate to strong and was significant. ANOVA results of mean Print Tool overall scores

determined a significant difference between teacher rating classifications.

Conclusions: The correlations found between the Print Tool and THS-R scores suggest good concurrent validity between the two assessments. This study supports the use of the Print Tool by occupational therapy practitioners to identify potential handwriting deficits that also align with teacher perception of performance.



Effectiveness of Driving Intervention Using an Interactive Driving Simulator for Adolescents and Young Adults with Autism Spectrum Disorder

Researchers: Lea Taylor under the direction of Dr. Anne Dickerson

Purpose: The visual, cognitive, and motor deficits associated with autism spectrum disorders (ASD) have been shown to affect most occupations, including driving. Unfortunately, there is very little research regarding evaluation methods and effective interventions to enhance driving skills with this population. This presentation will describe the outcomes of a driving simulator intervention program for young adults with ASD.

Methods: Each participant was pre- and post- tested on 3 specific “test” drives, observed and scored using the P-Drive. The P-Drive is an assessment tool that uses calibrated raters and produces interval level outcomes. During the study, the participants used the simulator to learn and practice safe driving behaviors and techniques. Ten critical concepts were

addressed, including managing stop signs and traffic lights, lane maintenance, safe turning, and hazard avoidance.

Results: Using a 2-tailed t-test to compare the pre- and post-test means, there was a significant difference from pre- to post-test for all evaluation drives ($p < 0.001$). Data obtained from the driving simulator comparing pre- and post-test means showed significant differences for number of collisions ($p = 0.035$).

Conclusions: Although there was no control group to make meaningful comparisons, the results of this study suggest that driving intervention utilizing a driving simulator was effective. The simulator data showed only a few significant outcomes, indicating that observation of performance is more important than outcomes on the simulator.

Thesis and Project:



Implementing Keyboarding Without Tears in an 11-Week Community-Based Program Compared to a 36-Week Elementary School Setting

Researchers: Amber Faust (Thesis), Mary Beth Cole (Project), Lauren Collins (Project), and Ashlynn Faircloth (Project) under the direction of Dr. Denise Donica

Purpose: Students unable to meet standards for production and distribution of writing using digital tools due to gaps in education may require additional school-based

occupational services (Stevenson & Just, 2014). The present study sought to examine the effectiveness of implementing a grade-specific, game-based keyboarding program, Keyboarding Without Tears® (KWT), in two separate settings, a community program and public elementary schools.

Methods: Researchers initiated a pilot program at three local Boys & Girls Clubs through an intensive 10-week program during the summer of 2016. Information from this pilot was used to implement an approximately 32-week study with two experimental and two control schools in Mississippi over the 2016-2017 academic year. Before and after receiving KWT intervention, students' keyboarding speed and accuracy, and keyboarding technique were recorded. Findings from both studies were amalgamated to support several research hypotheses. One hypothesis addressed the potential effectiveness of a specific keyboarding intervention on improving the keyboarding abilities in elementary-aged children. Additionally, researchers compared the different implementation approaches between the pilot and full-term study.

Results: Results of the community-based program were not statistically significant, however students did show some improvement in keyboarding skills. Research is ongoing with the school-based study, with post-testing scheduled for May of this year.

Conclusions: Researchers concluded that a structured environment with supervision and scheduled delivery of the application produced the best results for participation. Researchers' experiences implementing the KWT application across different settings will contribute to the field of occupational therapy and education related to use of KWT for keyboarding instruction.



The Development and Application of Modified Constraint Induced Movement Therapy and Interactive Metronome as a Combined Intervention Strategy for Stroke Survivors

Researchers: Charis Capehart (Thesis) and Erin Park (Project) under the direction of Dr. Leonard Trujillo

Purpose: To develop and implement an intervention that combines Interactive Metronome (IM) and modified Constraint Induced Movement Therapy (mCIMT) to promote motor recovery after a stroke.

Methods: Through a single case study design, a 46-year-old Caucasian female completed a 3-hour combined IM and mCIMT intervention 3 times a week for 8 weeks. Sessions included 1-hour of IM,

1-hour of IM with a constraint, and 1-hour of mCIMT. A pre-test, mid-test, and post-test was performed using the Nine-Hole Peg Test (9-HPT), IM Short Form Test (SFT), IM Long Form Assessment, and the Wolf Motor Function Test. Daily progress was assessed through the 9-HPT and SFT. In addition, the Canadian Occupational Performance Measure was completed before and after the study to assess the participant's perception of change in occupational performance.

Results: The participant made clinical and statistically significant improvements in her upper extremity movements. Her daily progress was found to have a significance of 0.017 through a repeated measures ANOVA. The pre-test, mid-test, and post-test were found to have a significance of 0.009 through a repeated measures ANOVA.

Conclusions: The results indicate that a combined IM and mCIMT intervention for stroke motor recovery can increase motor movements in the affect extremity. Since this was a single case study, further research is warranted to determine generalizability of this intervention.

Master's Projects:



Reducing the Impact of Chronic Fatigue in People with Heart Failure via Telerehabilitation Interventions

Researchers: Brooke Biddle and Tom Barnum under the direction of Dr. Young Joo Kim and Dr. Jennifer Radloff

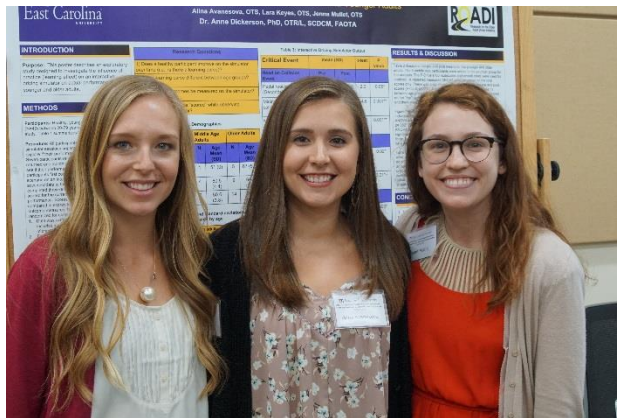
Purpose: Fatigue is one of the most frequently reported symptoms in heart failure (HF) patients. Health education (HE) is the common approach to treating HF-related fatigue. This study will examine the effectiveness of an intervention combining Energy Conservation education with Problem Solving Therapy (EC+PST) to reduce the fatigue impact and improve the level of

participation in people with HF-associated fatigue compared to a HE intervention.

Methods: This randomized controlled trial consisted of a pretest, 6-week telerehabilitation intervention, and a posttest. Individuals who were at least 6-months post HF diagnosis with fatigue were eligible to participate.

Results: Five individuals (three for EC+PST intervention and two for HE intervention) completed the intervention and the outcome measures. Individual data are reported without data analysis due to the limited number of participants.

Conclusions: The telerehabilitation delivery of EC + PST intervention and HE intervention is viable. Recruiting individuals from further distances and who have telephone access without internet access may increase recruitment rate. Both groups showed high satisfaction to the interventions. More data are needed for comparison results of EC + PST vs HE.



Driving Simulator Learning Curve for Older and Younger Adults

Researchers: Alina Avanesova, Lara Keyes, and Jenna Mullet under the direction of Dr. Anne Dickerson

Purpose: This study was designed to examine the performance of older and younger drivers on the simulator, in terms of the “learning curve” with this technology.

Methods: A total of 49 healthy younger and older adults were recruited for this study. All participants completed two driving simulator sessions separated

by seven to ten days to explore if their performance improved on the simulator. Seven participants (all in young age group) returned one month later to complete a third drive to see if their performance changed. There are two outcome measures: data extracted from simulator report and skilled observation scores. The data was analyzed to compare differences between gender, age, and time (i.e. first, second, and third events).

Results: Results from the observation scores showed no significant age or gender differences, but a significant difference between time 1 and 2. For the participants who came a third time, there was no difference between time 2 and 3. The simulator data results had some age differences that need further examination.

Conclusions: There appears to be a learning curve for all ages and gender. Thus, while using the driving simulator as a tool to assess older adults’ fitness to drive and intervention, even healthy adults made significant errors. Performance improved with practice, illustrating that use of the simulator, as a final determinant of fitness to drive may be unwarranted.



Effects of Interactive Metronome on Attention and Balance in Older Adults: A Pilot Study

Researchers: Mariel Murray under the direction of Dr. Leonard Trujillo

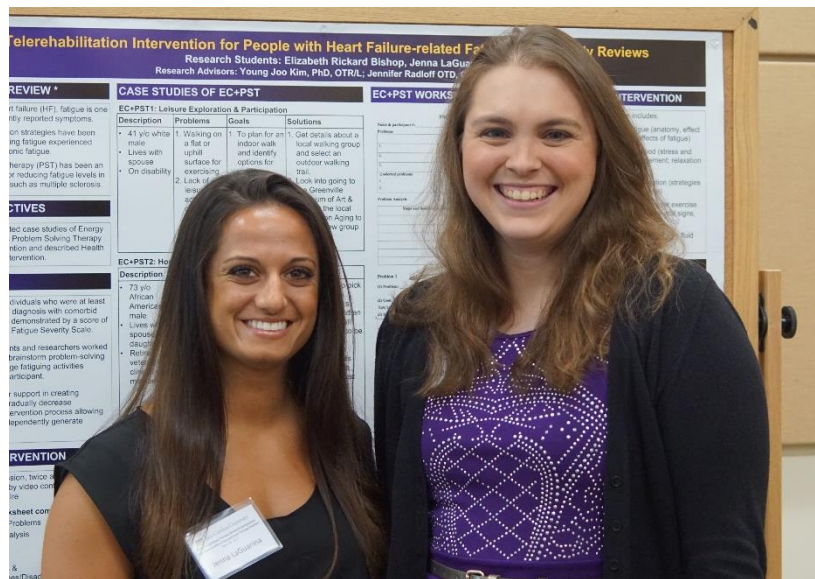
Purpose: This pre-test, post-test pilot study examined the effects of an Interactive Metronome® (IM) Protocol on attention and balance in older adults ages 65 and older in eastern North Carolina with a potential fall risk and/or fear of falling.

Methods: Three participants underwent pre- and post-test assessments to assess changes in attention span, motor planning, and balance. Two participants received IM interventions twice a week for seven weeks. The control participant did not receive the IM intervention. The d2 Test

of Attention and the 9-hole peg test were used to evaluate attention span and motor planning. The participants' scoring within the IM program was also examined. Balance was to be assessed with the collaboration of a Physical Therapy researcher using a series of Balance test protocols; however, due to organization of timing and completion of evaluation, the Physical Therapy researcher was unable to complete the post-test evaluations to assess changes in balance.

Results: The percentage of change for the d2 Test and the 9-hole peg test show improvement, but results were not statistically significant.

Conclusions: It is suggested that improvements in attention and motor planning may be due to a learning curve and not necessarily an improvement from the IM. Results from this study do not align with other research done by IM, however, due to the small sample size, future research should be performed.



Telerehabilitation Interventions for People with Heart Failure-Related Fatigue: Case Study Reviews

Researchers: Elizabeth Rickard Bishop and Jenna LaGuarina under the direction of Dr. Young Joo Kim and Dr. Jennifer Radloff

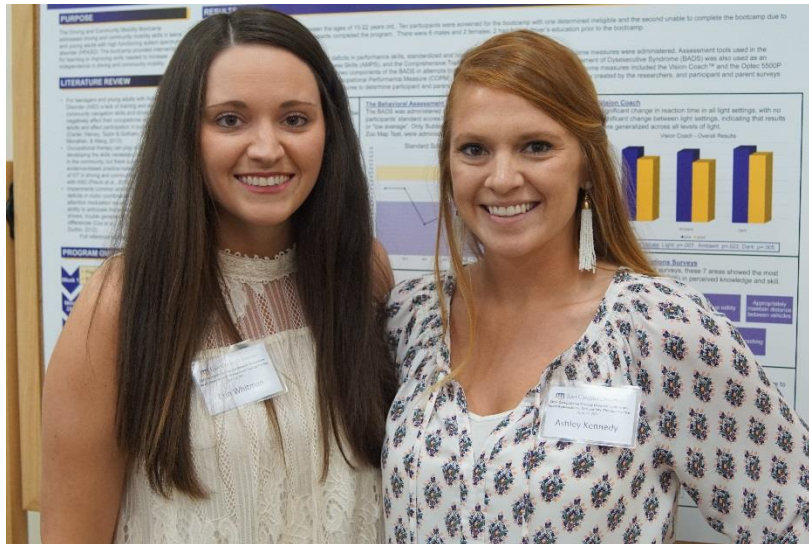
Purpose: Fatigue is one of the most frequently reported symptoms of heart failure and has a large negative impact on daily life. Interventions to treat fatigue often focus on health education and energy conservation strategies. This study reports case studies of Energy Conservation

plus Problem Solving Therapy (EC+PST) Intervention and contents of Health Education Intervention.

Methods: Three participants completed up to 12 sessions of the EC+PST Intervention via telerehabilitation. Participants worked collaboratively with OT or OT student to brainstorm problem solving solutions to manage fatiguing activities that were important to them. Interventionist support in creating solutions was gradually decreased throughout the intervention process.

Results: The case studies present the characteristics, problems, solutions, and outcomes of implemented solutions for each participant. Demographics, flow of sessions, amount of support, and qualitative experiences of each client varied yet all reported positive outcomes of the EC+PST intervention.

Conclusions: The fatigue-related problems identified were related to physical demands, leisure, and routine management. Some recurring solutions included rest breaks, better activity preparation, and asking others for help. The EC+PST intervention allowed each individual to develop an understanding of energy-conservation and problem-solving techniques to manage fatigue in their daily lives.



Outcomes of a Driving and Community Mobility Bootcamp for Teens with High Functioning Autism Spectrum Disorder

Researchers: Ashley Kennedy and Erin Whitman under the direction of Dr. Jennifer Radloff and Dr. Anne Dickerson

Purpose: The Driving and Community Mobility Bootcamp addressed driving and community mobility skills in teens and young adults with high functioning autism spectrum disorder. The bootcamp provided interventions for learning or improving skills

needed to increase independence in driving and community mobility.

Methods: The six-week bootcamp consisted of one week of pre-assessment; four weeks of small and large group interventions addressing driving and community mobility skills; and one week of post-assessment. Assessment measures included the Assessment of Motor and Process Skills (AMPS), Comprehensive Trail Making Test (CTMT), Behavioral Assessment of Dysexecutive Syndrome (BADS), Canadian Occupational Performance Measure (COPM), Optec 5500P, Vision Coach™, Performance Analysis of Driving Ability (P-Drive), and perception surveys.

Results: Eight participants completed the bootcamp. The COPM was found to be ineffective for this bootcamp. No changes were noted in BADS scores. Researchers found that 6 participants' CTMT scores showed a severe impairment, which may be correlated to impaired driving performance. Positive correlation between higher scores on AMPS and obtaining a driver's license. Significant improvements on Vision Coach ($p=.007$ full light, $p=.022$ ambient light and $p=.005$ dark). Participant and parent surveys demonstrated significant changes in perceived improvement of driving and public transportation skills. Three participants have achieved driver's license or permit.

Conclusions: Teens with HFASD that participated in the bootcamp made improvements that lead to increased independence in driving and community mobility.



Overview of Interventions Implemented during a Driving and Community Mobility Bootcamp for Teens with High Functioning Autism Spectrum Disorder

Researchers: L. Katie Reynolds and Lindsay Stinson under the direction of Dr. Jennifer Radloff and Dr. Anne Dickerson

Purpose: The Driving and Community Mobility Bootcamp was conducted to determine the efficacy of interventions developed to promote driving and community mobility skills for individuals with high functioning Autism Spectrum Disorder.

Methods: Activity-based interventions were developed and implemented to address pre-driving skills, simulated driving, and use of public transportation as part of a six-week bootcamp. Interventions were delivered two times per week over five of the six weeks and were conducted individually or in small groups. Pre-driving skills included use of the Vision Coach, addressing navigational skills for reading and understanding maps, following directions, and planning a series of errands. Use of Smartphone technology via various applications were included as a complement to both public transportation and mapping interventions. Intervention with the TRAN-SIT driving simulator with STISIM Drive-DT software and the Drive Safety RS200 simulator. Public transportation interventions included practice with a bus schedule, planning a trip, hazard detection, and using public transportation.

Results: Eight of ten participants completed approximately 33 hours of interventions during the bootcamp. Interventions proved to be effective in participants’ driving and community mobility results. One participant acquired a driver’s license, two participants acquired a driver’s permit, one participant improved independence in use of public transportation, and three participants improved pre-driving skills and continue to work towards their individual goals of independence in community mobility.

Conclusions: Interventions combining preparatory and occupation-based skills for improving independence in driving and community mobility prove to be effective when implemented during a comprehensive 6-week program.



Does Grasp Really Matter? A Quantitative Study Observing the Relationship Between Grasp and Handwriting Legibility

Researchers: Mary Jessup Gooden and Meghan Massengill under the direction of Dr. Denise Donica

Purpose: Occupational therapy practitioners are often consulted regarding pencil grasp and asked to determine its appropriateness for legible handwriting in order to provide best-practice in school and clinical settings. Previous and current literature has indicated conflicting results

in the relationship between immature versus mature pencil grasps and legible handwriting. Due to the inconsistency within the literature, this study is designed to contribute to this evidence regarding the relationship between pencil grasp and handwriting legibility.

Methods: First and second grade students ($N = 46$) were recruited from a private elementary school in Eastern North Carolina. The Print Tool and the Test of Handwriting Skills-Revised were administered to each student. A researcher-developed grasp checklist was used during administration for observation of student's working posture, finger and hand placement and movement, and pencil grasp.

Results: All students demonstrated a mature pencil grasp in completing both assessments except for one student and a lack of variation was observed between scores of handwriting legibility between the four types of mature pencil grasps demonstrated.

Conclusions: Therefore, the relationship between mature versus immature grasps and legibility is inconclusive; however, the researchers assume that legible handwriting is not dependent upon the type of mature pencil grasp demonstrated.