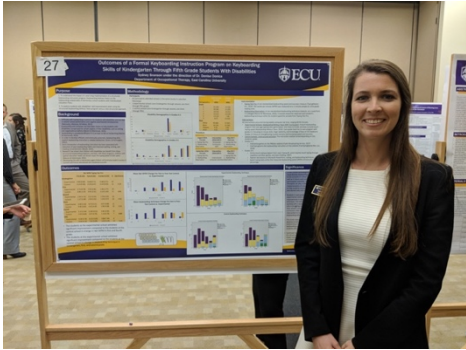


# Completed Theses and Projects 2018

## Theses:



### *A Comparison of the Efficacy of the Keyboarding Without Tears® Program and Mixed Method Instruction*

**Researcher:** Sydney Branson under the direction of Dr. Denise Donica

**Purpose:** This study examined the 2-year impacts of implementing a developmental-based keyboarding instruction application, Keyboarding Without Tears (KWT) compared to a mixed method keyboarding instruction approach within the elementary school setting for grades

kindergarten through fifth.

**Method:** This study utilized a quasi-experimental pre-test-post-test study design over a two-year intervention period. Two different keyboarding instruction approaches were used at four public elementary schools in Mississippi (two kindergarten through second grade schools and two third through fifth grade schools). The KWT group had 600 students complete Typing Test 1, 601 students complete Typing Test 2, and 618 students scored on keyboarding technique at both pre-test and post-test. The mixed methods group had 725 students complete Typing Test 1, 719 students complete Typing Test 2, and 771 students scored on keyboarding technique at both pre-test and post-test.

**Results:** Results revealed that students in the Keyboarding Without Tears group had significant improvements in their keyboarding speed in second and third grade and their keyboarding technique in all grades as compared to students in the mixed methods group. Results also indicated that both forms of keyboarding curriculum are effective at significantly improving students' keyboarding speed and technique.

**Conclusion:** Occupational therapists and teachers can utilize this information to support the implementation of a keyboarding curriculum in schools and improve the keyboarding skills of students that need improvement with this skill.



### *Comparing the Effectiveness of Video Training Alone Versus Hands-on Training for Older Adults Using GPS Technology*

**Researcher:** M. Chandler Coleman under the direction of Dr. Anne Dickerson

**Purpose:** The purpose of this study was to examine whether one-to-one, hands-on training is more effective in training older adults to program a GPS device as compared to video training alone and to no training.

**Method:** A posttest only design that included three groups was used: two interventions (video-only training and one-to-one, hands-on training), and a control group was used. Participants were 60 adults over the age of 60,

and all unfamiliar with GPS technology. The two intervention groups used the same videos with the one-to-one, intervention providing opportunities for a hands-on/interactive experience. The video tutorials provided information on how to set up and drive with a GPS unit. The control group watched unrelated videos. Participants in all three groups completed nine destination entry tasks on the GPS unit without any assistance. Outcomes were compared between the three groups. A one-way ANOVA was used to compare total time on each of the nine destination entry tasks between the groups and chi-square tests were used to determine the accuracy of entry method.

**Results:** There were significant differences among the groups on the outcome measure of time for four of the nine destination entry tasks; the one-to-one, hands-on group had significantly lower times on three of those tasks while the video-only group had significantly lower times on one.

**Discussion:** These results support the use of a one-to-one, hands-on training method when educating older adults to use technology systems such as GPS. The use of a training method which meets the unique needs of older adult learners may increase performance and confidence when using in-vehicle technologies, and therefore may promote on-road safety and allow older adults to remain driving for longer.



***The Effectiveness of Visual Scanning Training to Improve Functional Performance Post-Stroke: A Case Study in Eastern North Carolina***

**Researcher:** Rachel Gartz under the direction of Dr. Anne Dickerson

**Purpose:** The current case study explored the differences between using a component-based, occupation-based, or combination training intervention to improve the visual scanning of one post-stroke participant.

**Method:** A 55-year-old female who had a mild, bitemporal visual field loss from a stroke 7 years prior completed three interventions (component-based, occupation-based, and combined), each lasting 2 times per week for 4 weeks. At the pretest and after each intervention, the Assessment of Motor and Process Skills (AMPS) was used to score her motor and process skills as measures of occupational performance during instrumental activities of daily living. Application of intervention was examined with simulated driving and eye tracking technology.

**Results:** The participant's performance in motor skills showed an observable improvement after the individual interventions, with greater change with the component-based intervention. The participant's performance in process skills showed an observable improvement between the pretest and posttest, suggesting the combined intervention offered the greatest gain. The participant's reaction time also improved over time. However, eye tracking illustrated continued scanning deficits.

**Conclusion:** The individual component-based and occupation-based interventions showed to be useful in improving this participant's motor skills, but not process skills. To make process gains, it appeared that the intervention needed both component-based and occupation-based strategies. These results suggest that occupational therapists use a combined component-based and occupation-based program to improve compensation for visual scanning deficits. Eye tracking on the simulator appears to be a useful measuring for assessing these types of deficits.



### ***Effects of Music on the Driving Performance of Young Drivers with and without Autism Spectrum Disorder***

**Researcher:** Brittany Goehmann under the direction of Dr. Anne Dickerson

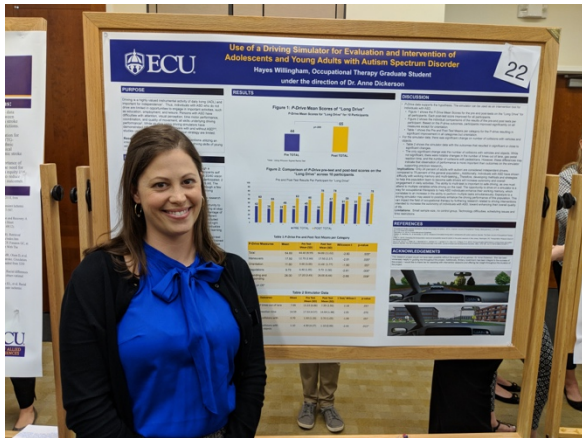
**Purpose:** The purpose of this pilot study was to investigate the effects of background music on the driving performance of Autism Spectrum Disorders (ASD) individuals as compared with neurotypical individuals.

**Method:** A quasi-experimental 2 (ASD/not ASD) X 3 (music condition: no music, light classical, and self-selected) factorial design was used. The dependent variable of driving performance was measured by a quantitative score from a standardized observational tool for driving, the Performance Analysis of Driving Ability (P-drive). Eighteen participants with ASD (Mean age = 17.7) and fifteen neurotypical participants (Mean age = 19.1) were observed under the three conditions on a driving simulator.

**Results:** Repeated measures ANOVA showed no overall difference between conditions ( $p=.204$ ) or between groups ( $p=.272$ ). However, within the ASD group, there was a statistically significant difference between music conditions ( $p=.017$ ), with the group demonstrating better driving performance under the self-selected condition.

**Conclusion:** These results suggest playing background music may not hinder driving performance, providing contesting evidence against the common assumption that music is a distraction while driving. For individuals with ASD, self-selected background music offers the most promise in modulating their environment to allow for better processing and performance in the complex daily activity of driving.

## **Projects:**



### ***Use of a Driving Simulator for Evaluation and Intervention of Adolescents and Young Adults with Autism Spectrum Disorder***

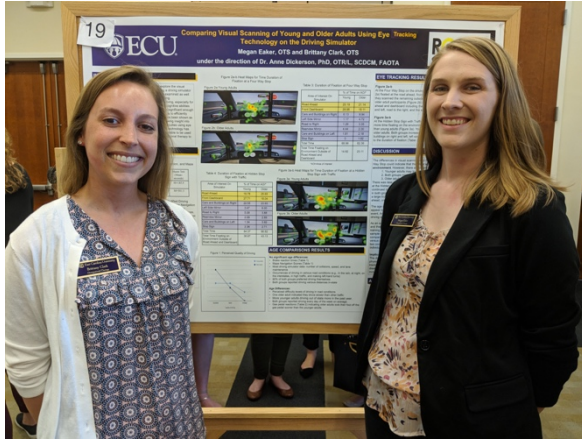
**Researcher:** C. Hayes Willingham under the direction of Dr. Anne Dickerson

**Purpose:** The goal of this project was to determine if with 8-10 intervention sessions on a driving simulator for individuals with Autism Spectrum Disorders (ASD) learned strategies and improved their driving performance as measured a standardized, observational tool called Performance

Analysis of Driving (P-Drive).

**Method:** All participants were pre- and post-tested on one specific drive, observed and scored via the P-Drive. The intervention consisted of 8-10 one hour sessions which addressed Important skills related to safe driving including turning, lane maintenance, changing lanes, yielding to pedestrians and other vehicles, as well as avoiding hazards.

**Results:** A total of ten individuals with a diagnosis of ASD participated in the project, with only two of the participants having taken driver's education, and only one receiving a permit. Thus, all participants' driving experience consisted of only the simulator. The results of the analysis are discussed with paired t-tests and with descriptive summaries of their experiences.



### ***Comparing Visual Scanning of Young and Older Adults Using Eye Tracking Technology on the Driving Simulator***

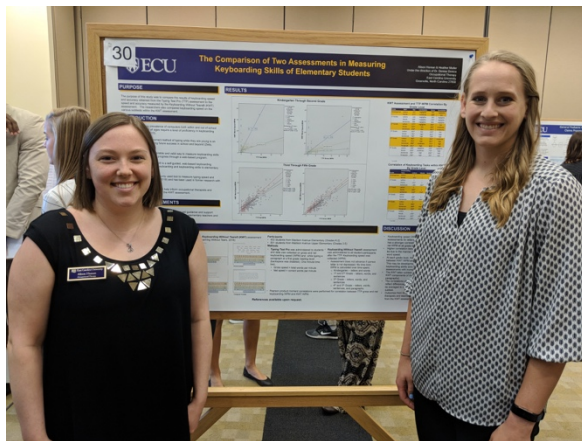
**Researcher:** Brittany Clark and Megan Eaker under the direction of Dr. Anne Dickerson

**Purpose:** This study explored the differences in the visual scanning outcomes of healthy younger and older drivers using a driving simulator and the use of eye tracking technology.

**Method:** A convenience sample included ten younger adults (five females/five males, ages 23 to

32 yrs.) and 10 older adults (seven females/three males, ages 52 to 75yrs.). Each participant completed a driving history questionnaire, a brake reaction test, a maze navigation test, and a complete drive on the simulator while wearing Tobii eye tracking glasses. Data was analyzed from each assessment tool, simulator results, and tracking software.

**Results:** The driving habits, perceived abilities, and preferences between the two groups were similar with no significant age differences on brake reaction times or mazes. However, there were age differences in scanning the environment at a stop sign, suggesting that older adults scanned more of the environment. Implications of these trends are discussed.



### ***The Comparison of Two Assessments in Measuring Keyboarding Skills of Elementary Students***

**Researcher:** Alison Homan and Heather Muller under the direction of Dr. Denise Donica

**Purpose:** The purpose of this study was to compare the results of keyboarding speed and accuracy obtained from the Typing Test Pro (TTP) assessment to the speed and accuracy measured by the Keyboarding without Tears (KWT) assessment. The researchers also compared keyboarding speed within Keyboarding without Tears when presented

with various keyboarding tasks (words, sentences, paragraphs).

**Method:** TTP keyboarding assessment was administered to students of Madison Avenue Elementary (grades K-2) and Madison Avenue Upper Elementary (grades 3-5) schools in Madison, Mississippi. The appropriate grade level assessment of KWT was administered to all students. Pearson product moment correlations were computed to determine correlation between TTP gross and net keyboarding words per minute (WPM) and keyboarding speed (WPM) measured by KWT assessment. Additional analysis was used to compare individual keyboarding tasks presented within the KWT assessment.

**Results:** Keyboarding speed (WPM) measured by the KWT assessments for letters, words, sentences, and paragraphs have a stronger correlation to the TTP gross WPM than the net WPM at both schools. At each grade level, there is an increase in the correlation between KWT WPM and TTP gross WPM. This may be due to more consistent keyboarding ability and attention span while taking the assessments. In addition, the KWT letter task has a weak correlation to the other KWT components of the assessment.

**Conclusion:** At the upper school, each keyboarding subtest within KWT showed a stronger correlation with gross and net WPM from TTP than at the lower school. The correlations of WPM between each subtest of KWT were significantly different and should not be averaged to reflect the overall WPM for students. Individuals using KWT as a measure of WPM should be aware that WPM is calculated per typing subtest, unlike TTP, and does not represent an overall WPM. Outcomes from this study will help inform occupational therapists and teachers of the ways to use the data obtained from the KWT assessment.



***The Effectiveness of Telerehabilitation Interventions for People with Heart Failure and Fatigue***

**Researcher:** Jenny Chiariello, Nicole (Nikki) Faust, and Madison Wilcox under the direction of Dr. Young Kim

**Purpose:** This study compared the effectiveness of the Energy Conservation + Problem Solving Therapy (EC+PST) to Health Education (HE) in reducing fatigue impact and increasing activity participation in people with heart failure (HF) and fatigue.

**Method:** This study is a two-group randomized controlled trial (EC+PST and HE). Participants were at least 6 months post-HF diagnosis and 3 months post-hospitalization, and had moderate to severe fatigue according to Fatigue Severity Scale (FSS) score and intact or questionable cognition according to Short Blessed Test (SBT) score <9. Participants were referred by clinicians in Greenville, NC. Participants received a 6-week intervention through video conferencing via a tablet. The EC+PST group learned to manage their fatigue through problem solving, whereas the HE group learned about health topics relevant to HF. Pretest and posttest were completed before and after receiving the intervention, and outcome measures included PROMIS-Fatigue Scale, Fatigue Impact Scale, and Activity Card Sort.

**Results:** Twenty-one participants completed the study (11 in EC+PST and 10 in HE). The mean scores for FSS and SBT were 5.71 (SD = 0.58) and 1 (SD = 1.18) for the EC+PST group and 5.92 (SD = 0.80) and 1.5 (SD = 2.32) for the HE group. We found significant improvement in the PROMIS-Fatigue Scale score between pretest and posttest in the EC+PST ( $p = .036$ ) and HE groups ( $p = .009$ ). We also found significant differences in changes of Activity Card Sort-low demand leisure subscale between the EC+PST group and HE group ( $p = .029$ ), favoring the HE group.

**Conclusion:** This study displays benefits of telehealth rehabilitation services in rural areas with minimal access to health care; however, it may also indicate the necessity of an additional remediating aspect in the rehabilitation intervention for people with heart failure and fatigue.



## *Activity and Participation Levels During and After a Cardiac Rehabilitation Program: A Feasibility Study*

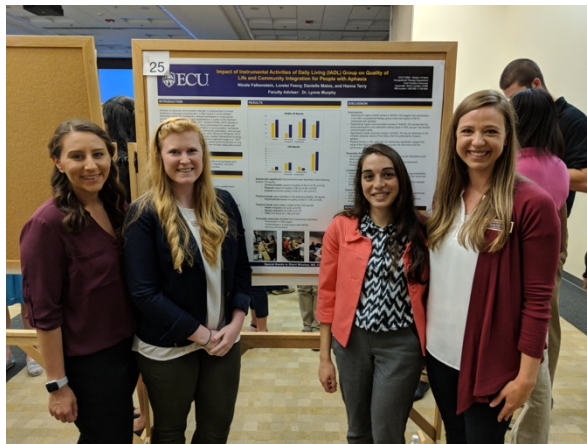
**Researcher:** Courtney Race under the direction of Dr. Young Kim

**Purpose and Method:** This prospective observational study aimed to investigate the body function, performance, and participation in daily activities in people with chronic cardiac conditions during and after cardiac rehabilitation. The purpose of this study was to examine the feasibility of recruiting and retaining participants with chronic

cardiac conditions, determine appropriate measurement times and outcome measures for body function, activity, and participation, and determine acceptability and compliance of using a Fitbit as an activity tracker in those with cardiac conditions.

**Results:** Overall, recruiting and retaining participants with chronic cardiac conditions through cardiac rehabilitation program were successful, although challenging. One more recruiting cite geographically more convenient is being added to resolve the issue. Assessment times have been modified to capture the longer-term changes. Outcome measures have been adjusted to more realistically fit time constraints and encompass the participant characteristics and outcomes desired related to body function, activity level, and participation following cardiac rehabilitation. CHAMPS, BREQ-3, PASS self-report and two categories from PASS-HOME were eliminated, while Activity Measure for Post-Acute Care and PROMIS-Fatigue Scale were added. Fitbit acceptance and compliance were high amongst the two participants.

**Conclusion:** For future studies, additional recruitment methods, incentives, and networking with cardiac rehabilitation facilities are indicated.



## *Impact of Instrumental Activities of Daily Living (IADL) Group on Quality of Life and Community Integration for People with Aphasia*

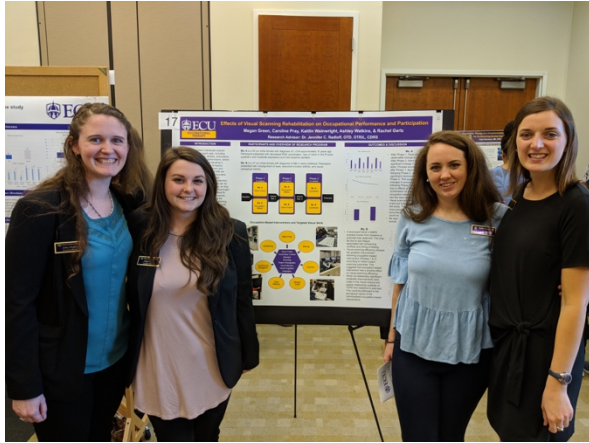
**Researcher:** Danielle Matos, Hanna Terry, Lorelei Feeny, and Nicole Falkenstein under the direction of Dr. Lynne Murphy

**Purpose:** This study explores the impact of group-based IADL intervention on perceived QoL, community integration, and IADL participation in the home for individuals living with aphasia.

**Method/Results:** Participants engaged in group IADL activities over eight, one-hour, sessions (n=3). The Stroke and Aphasia Quality of Life Scale-39 (SAQOL-39) and Community Integration Questionnaire (CIQ) were used as pre- and post-test measures. Paired sample t-tests identified statistically significant differences between SAQOL overall mean scores ( $t=11.33$ ,  $p=.008$ ), physical scores ( $t=4.449$ ,  $p=.047$ ), and communication scores ( $t=6.764$ ,  $p=.021$ ) after group participation. No significant differences were found in SAQOL psychosocial score

or CIQ measures of participation in IADLS, social activities (home and community), and productive activities (work and volunteerism).

**Conclusion:** This study supports the positive impact of group-based IADL intervention on perceived communication skills, such as being understood through speech, and perceived physical skills required to complete daily tasks. Most importantly, overall perceived quality of life for these individuals living with aphasia improved, as measured by the SAQOL. Limitations related to the small sample size and potential for errors in data collection could be addressed in a future study.



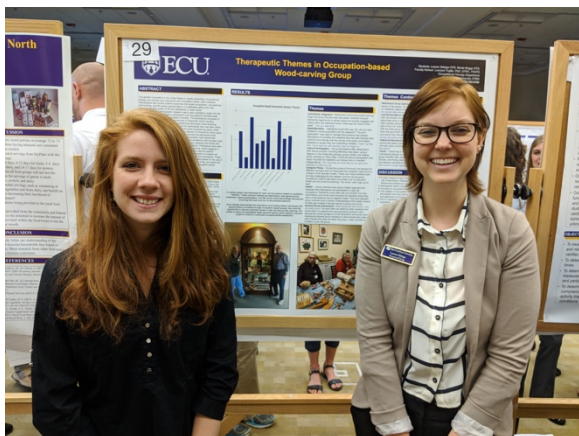
### ***Effects of Visual Scanning Rehabilitation on Occupational Performance and Participation***

**Researcher:** Ashley Watkins, Megan Green, Kaitlin Wainwright, and Caroline Pray under the direction of Dr. Jennifer Radloff

**Purpose:** This study intends to compare the effectiveness of occupation-based intervention and preparatory intervention (Vision Coach intervention) for visual scanning retraining in clients with ABI.

**Method/Results:** Two case studies were conducted to compare the effectiveness of two visual impairment interventions. A randomized crossover design was used in which participants were randomly assigned to one of two intervention orders: Occupation-based intervention followed by Vision Coach intervention or Vision Coach intervention followed by occupation-based intervention. Each of these paths ended with a four-week period of treatment combining both Vision Coach and Occupation-based intervention in each session. The Test of Visual Perceptual Skills-4 (TVPS), the Assessment of Motor and Process Skills (AMPS), and Vision Coach were used as outcome measures. This study provided clients with visual scanning re-training to facilitate participation in meaningful occupations and inform the field of occupational therapy about potentially effective visual retraining interventions for the ABI population.

**Conclusion:** Although analysis of the two case studies has yielded mixed results, it supports the initial hypothesis in that functional improvements in visual scanning performance can be attributed to a combination of occupation-based and preparatory interventions.



### ***Therapeutic Themes in Occupation-Based Woodcarving Group***

**Researcher:** Nicole Briggs (Gamez) and Lauren Selingo under the direction of Dr. Leonard Trujillo

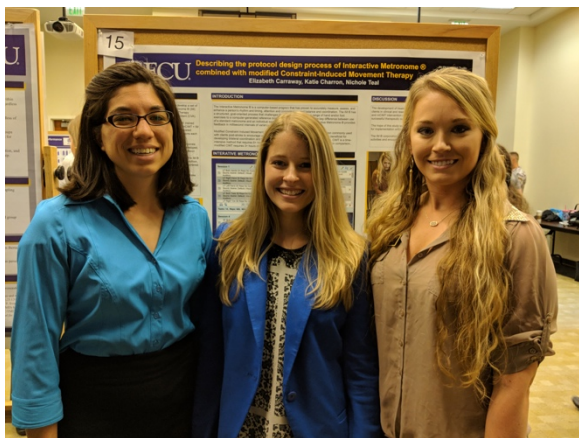
**Purpose:** The purpose of this ethnographic research was to gain qualitative insight into the individual experiences of elderly participants in an occupational therapist-lead woodcarving group over approximately 9 months.

**Method:** The participants consisted of several men living in a retirement community in Greenville, North Carolina. Beginners were taught the basics of woodcarving techniques while receiving support from the occupational therapist and the participants

who had been within the group longer. New members started on the same woodcarving piece, while those who had been in the group longer got a selection of choices for which piece to do next. Each week, attending students documented the discussions that occurred and assigned to the major conversation topic trends that emerged.

**Results:** Themes that emerged throughout the conversations held included: past life experiences, family, travel, community events, new residents and those who had passed away, and the prospect death. Participants were able to develop their physical fine-motor skills needed for carving, while engaging in critical socialization and life review opportunities. Of note was the positive influence on self-actualization and personal pride in completion of creative artwork that previously had never been believed possible by the participants.

**Conclusion:** These findings support and expand upon previous research that advocates for the use of occupation-based interventions in improving overall quality of life, and opens the door to future research on geriatric occupational therapy occupation-based groups.



***Describing the Protocol Design Process of Interactive Metronome® Combined with Modified Constraint-Induced Movement Therapy***

**Researcher:** Katie Charron, C. Nichole Teal, and Elizabeth (Liz) Carraway under the direction of Dr. Leonard Trujillo

**Purpose:** The purpose of this study was to develop a set of protocols that combined the Interactive Metronome and Modified Constraint-Induced Movement Therapy (mCIMT) for client's post-cerebral vascular accident.

**Method:** A series of meetings were held by IM trained professionals to develop the sequence of IM, mCIMT + IM, and mCIMT routines. Sessions would be completed during a four-week intervention time frame, 3 sessions each week with sessions lasting 3 hours in length.

**Results:** Protocols have been developed that incorporate the IM with the mCIMT. The mCIMT exercises developed, compliment the IM exercises for the proposed protocol. The addition of the mCIMT produces an increased neurological challenge to the client's system where the IM serves as a foundation for that change to occur. In addition, the occupational focus of the mCIMT adds a client-centered component to the session.

**Conclusion:** The protocols developed for this study have been reviewed by experts in the field. The expected outcome is that the combination of IM and mCIMT exercises provide a challenging method for rehabilitation of fine and gross motor skills for those with upper extremity hemiparesis.