

Completed Theses and Research Projects 2015



Title: Experience, Executive Functioning, and the Environment: An Analysis of Factors and their Impact on Scanning Performance

Researcher: Stephanie Nicole Biggs; Under the direction of Dr. Anne Dickerson

Purpose: This study examined the use of the computer-based assessment tool in determining relationships between scanning, environmental demands, and driver characteristics.

Method: Using a new screening tool, the Expert Search and Scanning Skills (ES3), was used to examine relationships and evidence for validity of the ES3. Each participant responded to four distinct videos that increased in environmental complexity. During each video, participants use a computer mouse to identify potential hazards or important "targets" in the driving environment. The ES3 generates the number of targets detected, the percentage of time fixating on certain areas, and the percentage of time spent either scanning or fixating on specific targets. Participants were grouped in terms of years of experience and if the young adults had a self reported condition or ADHD and/or ASD

Results: Although not all data is complete, preliminary results (N=81) suggest that the participants do not differ in their activity, fixation, and target perception performance. This suggests that the ES3 may benefit from continued research and may be better suited as an educational tool rather than a screening tool. Alternatively, it may also suggest that in terms of scanning, individuals with ADHD or ASD may not differ from neurological typical young adults in scanning and/or experience or driving/training is successful for high functioning young adults with conditions.



Title: Impact of the Alert Program on School Function for At-Risk Cohorts in the Kindergarten Classroom: A Four-Year Review of the Data

Researcher: Leslie LaBelle; Under the direction of Dr. Carol Lust

Purpose: To explore what components of school function are emphasized at the Kindergarten level and the impact the Alert Program has on those areas for identified at-risk Kindergarten students.

Method: Data was collected over the previous four years with the Sensory Processing Measure–Main classroom form and the School Function Assessment–Part III Activity Performance: Cognitive/Behavioral tasks. Both assessments were completed by the classroom teachers. An expert panel provided input into what components of school function are addressed, expected, and/or developmentally appropriate at the Kindergarten level.

Results: Review of the expert panel suggests that areas of school function most relevant to the Kindergarten age group include following social conventions, personal care awareness, behavior regulation, task/behavior completion, and positive interaction. Data analysis indicates significant

improvement in each of these areas for identified at-risk students after participation in the Alert Program.

Conclusion: Results suggest that classroom teachers under the direction of occupational therapists can implement the Alert Program as a general classroom approach to improving school function for at-risk students.



Title: **Wayfinding: Does GPS Improve or Impair Driving Performance?**

Researcher(s): **Lauren Cochran; Under the direction of Dr. Anne Dickerson**

Purpose: This study aims to answer: (1) How does driving performance on the route finding tasks of a simulator compare to on-road driving performance when wayfinding using printed directions? (2) Is there a difference in on-road driving performance when navigating with printed directions versus GPS guidance? (3) How do the outcomes of clinical assessments (e.g. Trails B, and UFOV) compare to the outcomes of the driving performance tests on-road and in the simulator?

Method: Participants were healthy, licensed drivers, ages 22-44. There were 8 conditions with 24 subjects, counterbalancing 2 unfamiliar, on-road routes (printed directions vs. GPS) and a simulated driving scenario using printed directions. Driving performance was measured using a modified Miller Road Test. Scores on clinical assessments were compared to driving performance.

Results: Analysis indicates that driving performance using printed directions on a simulator is significantly related to on-road driving performance. Driving performance was often improved when individuals were receiving directions from a GPS. The clinical assessment scores did not correlate with driving performance.

Conclusion: This informs occupational therapists and driving instructors of the potential for GPS use to increase driver safety and the potential for using a simulator to evaluate driving ability while wayfinding.



Title: **Handwriting in Young Adults in an Era of Technological Advancements**

Researcher: **Courtney N. Spencer; Under the direction of Dr. Denise Donica**

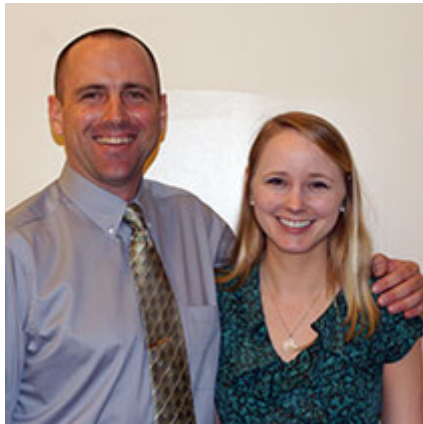
Purpose: The purpose of this study was to understand the role handwriting plays in the life of a college student. Furthermore, the study explored their preferences and attitudes toward handwriting and technology usage for education at the college level as it influences primary instruction.

Method: Data was collected through a Qualtrics survey created specifically for this study. The survey combined quantitative and qualitative responses.

Participants were a random sample of 1,800 East Carolina University students.

Results: Results indicate that most students still use handwriting in the classroom and for non-educational activities. Students also think both print and cursive should be taught at the primary level.

Conclusion: These results will enhance the understanding of handwriting with young adults enrolled in college. These findings can be used to support school based occupational therapists justification to school boards as to why handwriting should remain in the curriculums. School therapists can show support for the importance of addressing the skill if it is challenging for the student. Since handwriting is still important and used in higher level education, students should still receive the instruction.



Title: IADLs, Driving Simulation, & Cognitive Abilities: How Do They Compare?

Researchers: Gregory Blanchard & Sarah Stutts; Under the direction of Dr. Anne Dickerson

Purpose: Explore the use of the simulator as a driving assessment or screening tool as well as to compare the outcomes with other common screening and assessment tools for driving.

Method: Twenty community-dwelling older adults were tested on several common screening tools for driving, completed the Assessment of Motor and Process Skills, and completed several scenarios on the simulator. To score two of the longer simulation scenarios, a relatively new assessment tool, P-Drive, was used. P-Drive was developed for behind-the-wheel drives.

Results: Scores of the older adults on the screening tools were generally within the mean for older adults, although a few participants did score poorly on one or more tools. P-Drive scores were variable and show potential for use with the simulator.

Conclusion: The results of this study confirm that screening tools should not be used in isolation for making decisions about driving. However, demonstration of instrumental tasks of daily living appropriately supported driving ability. Driving simulator shows potential for use as an assessment tool with appropriate development of good observational tools.



Title: Common OT Practice in the NICU: A Survey of OTs with NICU Working Experience

Researcher(s): Catherine Hadley, Erica Hsia, Lauren Moore, and Amber Vaught; Under the direction of Dr. Denise Donica

Purpose: The purpose of this study was to expand the existing research by exploring the current

occupational therapy practices within the NICU environment.

Method: This study was conducted using a non-experimental design and a descriptive survey format. The survey was developed in Qualtrics and disseminated via mail-outs, online professional networks, and word of mouth. To establish validity, the survey was reviewed by four experienced NICU occupational therapists prior to its release.

Results: Interventions practitioners frequently use and found effective are supported by existing literature, but some assessments commonly used and NICU environmental factors differed. Clinical observation was the most preferred and familiar assessment reported. The literature supports single family rooms as the best family-centered care, but most NICU's have an open space design. Therapists' perceived parental barriers to involvement were consistent with the literature.

Conclusion: Interventions utilized by NICU occupational therapists are supported by evidence. Additional research should focus on evaluating why there is limited application of cue-based feeding as all respondents who indicated using this approach found it effective. Other research should explore therapists' perceptions regarding existing evaluation tools to determine variables preventing utilization of assessments found to be effective.



Title: Long Term Effectiveness of A Matter of Balance® in Reducing Fear of Falling, Anxiety, Depression, and Activity Restriction among Community-Dwelling Older Adults

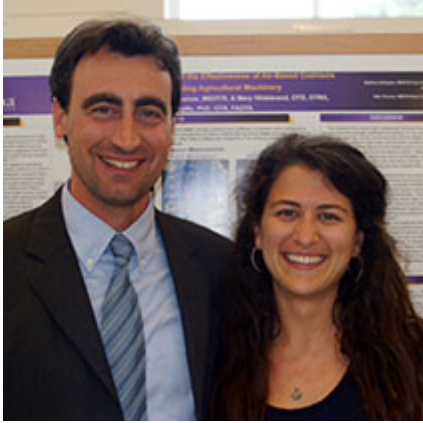
Researchers: Megan Brachna and Mariah VanStaalduinen; Under the direction of Dr. Jane Patton

Purpose: This longitudinal pre-post test study focused on whether A Matter of Balance®, an evidence based fall prevention program was able to produce long term effects on anxiety, depression, activity restriction, and fear of falling.

Method: One pre-test and three post tests were administered over a six month period to nine older adults ranging from ages 88 to 91 at Cypress Glen Continuing Care Retirement Community, Greenville, NC. Pre and post test assessments included: GAD-7, GDS-SF, SAFFE, and FROP-Com. The nine participants were enrolled in A Matter of Balance® program for 4 weeks, 2 times a week for 2 hour classes.

Results: Mixed results were found comparing mean average of fear of falling to anxiety, depression, activity restriction, and fear of falling.

Conclusion: A Matter of Balance® is a viable evidenced-based community education fear of falling program for occupational therapy practitioners to utilize in their practice.



Title: Assessing Farmers' Seated Pressure Distribution on Agricultural Machinery

Researcher: Matthew Gallagher and Allie Thomas; Under the direction of Dr. Leonard Trujillo

Purpose: Farmers experience lower back and hip pain from prolonged hours of exposure to whole body vibration while operating agricultural equipment. This encourages use of after-market cushions on their tractor seats to increase comfort. The purpose of this study was to compare tractor seats without after-market seat cushions to tractor seats with after-market seat cushions by using a pressure mapping system to measure pressure distribution.

Method: Two volunteers from the NC Cherry Research Farm in Goldsboro were mapped with the BodiTrak BT5010 system by Vista Medical. Three seat conditions were compared: the tractor seat with no added cushion, with the Roho Airhawk, or with the Roho 4-inch Quadtro. We also compared pressure while the tractor was sitting still with pressure moving over rough terrain.

Results: Higher than expected pressure measurements using the air cushions compared to pressure with the tractor seat alone. Limitations included pressure mat pinching when the tractor was moving, placing the cushion over the contoured seat, poor participant fit with the air cushion size, and the properties of “hysteresis” and “creep” that may influence results.

Conclusion: The results from this study indicate that any seating recommendations need to be customized to the environment and to the user. Further research is required for occupational therapy practitioners to be able to make accurate recommendations for seating options for farmers.



Title: Equine Assisted Activities and Therapies: Determining Best Fit

Researcher(s): Sarah J. Marsh; Under the direction of Dr. Anne Dickerson

Purpose: This poster explores the decision making process for deciding which of the disciplines of equine assisted activities and therapies (EAAT) is “right” for individuals with disabilities. EAAT consists of a diverse set of therapies, including therapeutic riding, hippotherapy, and vaulting, which meet different levels of needs or goals clients. Currently there are no methods or procedures to determine which of the therapies are the best fit for clients.

Method: In order to more accurately refer clients to the most appropriate discipline of EAAT, a variety of “decision trees” or algorithms were developed as a method of decision making for best practice. The algorithms are based on a review of existing literature, qualitative case studies, and expert knowledge. The case studies were based on observation and instructor notes from participants at Rocking Horse Ranch Therapeutic Riding Program in Greenville, NC.

Results: The designed algorithms support the hypothesis that different disciplines of EAAT may be more suitable for a participant based on specific client factors. An expert survey is also being designed to provide content validity.

Conclusion: The diverse disciplines of EAAT necessitates that therapists understand which discipline is a best practice fit and designed for their specific client. This poster will illustrate a method of making those decisions.



Title: Arthritis and Its Effects on Small Farmers' Abilities to Perform Activities of Daily Living, Work Tasks, and Their Overall Quality of Life

Researcher(s): Lauren Spake and Jenny Van Gils; Under the direction of Dr. Leonard Trujillo and Dr. Mary Hildebrand

Purpose: The purpose of this study was to explore how osteoarthritis affects small farmers' quality of life, ability to perform tasks, and how they acquire arthritis information.

Method: Data was collected through a survey of small and limited resource farmers at Eastern North Carolina farmers' markets who stated that they had arthritis: 13 women and 7 men. The survey was an adapted version of the Knee Injury and Osteoarthritis Outcome Score (KOOS).

Results: Sixty-two percent of participants reported that they experienced pain on a daily basis, 93% reported difficulty completing heavy farming duties, and 86% reported difficulty completing light farming duties. Seventy-five percent indicated that they modified their lifestyle to compensate for arthritis symptoms, but continue to experience pain and lack of confidence in their joints. Although the farmers had arthritis, 65% said that they had never received arthritis education and would like to know how to cope with their symptoms.

Conclusion: Our survey results provide further evidence that farmers could benefit from education on arthritis management to improve overall quality of life and ability to perform farm tasks.



Title: The Effectiveness of Implementing the Alert Program® into a Kindergarten Classroom: Lessons Learned

Researcher(s): Kansas Clarke, Meredith Hady, and Stacey Parker; Under the direction of Dr. Carol Lust

Purpose: This study explored the effectiveness of implementing the Alert Program® on

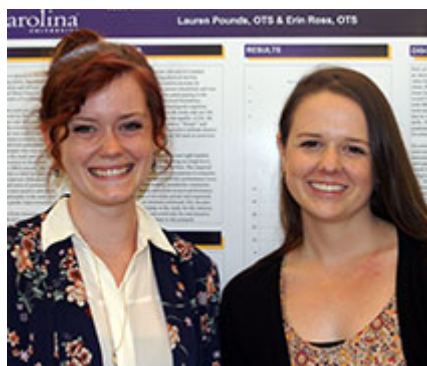
kindergarteners' ability to recognize their arousal levels and to apply strategies that they learned for self-regulation to improve their performance in the classroom.

Method: Participants were typical kindergarten students from two classes at a private school. Data was collected through standardized assessments, including The Sensory Processing Measure (SPM) –

School Form and the School Function Assessment (SFA)- Cognitive/Behavioral Tasks. Classroom teachers completed these twice, for pre- and post-test measurements.

Results: More than half of all students were identified as being “at-risk” in one or more categories in either the SFA or SPM pre-tests. 3/9 subtests in the SFA (following social conventions, task behavior completion, and positive interaction) were significantly improved following the Alert Program. 4/7 subtests in the SPM (social participation, vision, hearing, and body awareness), and total score, also were significantly improved.

Conclusion: Based on analysis of assessment questions, significant improvement in the body awareness subtest of the SPM is consistent with significant improvements in the task behavior completion subtest of the SFA, both of which are specifically addressed through activities in the Alert Program. The Alert Program was effective in generating improvements, despite a high proportion of “at-risk” students identified at pre-test.



Title: The Effectiveness of the Interactive Metronome with Healthy Aging Adults. Two case studies that examine the use of the IM Short Form test outcomes

Researcher(s): Erin Ross & Lauren Pounds; Under the direction of Dr. Leonard Trujillo

Purpose: The purpose of this study was to determine the effects of the Interactive Metronome (IM) on aging adults. Specifically, we aimed to determine:

1. Effects of motivation and attitude on results of general IM training
2. Effectiveness of Short Form (SF) testing as a pre-intervention evaluation as an indicator of overall client performance

Method: Two older adult volunteers, one male and one female, went through nine sessions of training with the IM. The IM treatment was provided in a private room with little distraction at Cypress Glen Retirement Community, the residence of the participants. The Short Form Assessment was used to compare the two individuals, as it was the most consistent evaluation tool used routinely throughout the IM sessions with both participants.

Results: It was noted that the male participant who was motivated to make use of the therapeutic potential for the study and completed all required sessions showed greater improvement in short form assessments (SFA) and Super Right On (SRO) percent. The female participant completed her sessions in order to fulfill her perceived obligation to complete the study and became too difficult to schedule to complete the intended second series of protocols.

Conclusion: The participant who had a more positive attitude as well as greater intrinsic motivation to participate in the study and completed all required sessions showed greater improvement in SF assessments and SRO%.



Title: Light or Sound: Does Different Cues Change Simple Brake Reaction Time?

Researcher: Kayla C. Smithson; Under the direction of Dr. Anne Dickerson

Purpose: Evaluate whether brake reaction time varies dependent on type of braking cue: light or sound in correlation with age, and self-reported health.

Method: Data was collected on over 100 adults on the RT-2S Simple Foot Brake Reaction timer using standardized protocols. Drivers' brake reaction time was recorded over 8 trials using the red light (sight) as a cue to brake, and a second round of 8 trials using the buzzer (sound) as a cue to brake. All participants were current drivers and included 10 individuals under 40 years of age, 17 between 41 and 64, 30 between 65-74, and lastly, 15 aged 75 and older. Each driver self-reported their health on a Likert Scale 1 being poor health and 5 being extremely healthy.

Results: An ANOVA of the simple (foot) brake reaction timer revealed a significant difference ($F=12.32$, $p < .001$) for light between groups when compared between the cue to brake (light first or sound first). Post-hoc tests indicated the differences were between individuals 50 years of age and below with all other age groups (51-74, and 75 and above). Using paired t-tests, a difference in mean reaction times overall was demonstrated ($t = -3.36$, $p < .001$). No significant difference was found between self-reported health and brake reaction time with light or sound. The order in which the braking cues were presented (light first or sound first) to the individual did not have a significant impact on results.

Summary: Results did not show any significant findings between self-reported health in brake reaction times. However, it did appear that light as a visual cue to brake results in quicker brake reaction time, as compared to sound as a cue to brake. Results also demonstrated the fact that normal aging slows brake reaction time, but healthy older adults have reaction times that are well within safe norms for driving.



Title: Community Mobility of Older Adults in Pitt County, NC

Researcher(s): Grace Ferrell & Kelsey Gwinn; Under the direction of Dr. Jennifer Radloff

Purpose: The purpose of this survey was to explore the necessity of community access as it affects continued health and wellness in the older population and uncover alternatives for addressing community needs in transportation and cessation counseling.

Method: Survey participants were volunteers, 55+, living in Pitt County, NC. Participants included individuals from an ECU Adult Participant Pool, community centers and a senior living center. Surveys were conducted over the phone, online through Qualtrics, and in person. Phone and in-person surveys were entered into Qualtrics by the researchers to ensure anonymity.

Results: 140 participants completed the survey. Out of 121 participants (88%) that stated their primary mode of transportation was personal vehicle-driver, 45% indicated they either strongly agreed or agreed that they would attend an education class about improving their health for driving safety.

Conclusion: Despite that the sample surveyed was primarily driving, these seniors are interested in education classes that provide 1) information about driving safety, 2) fitness targeting skills needed for community mobility, and 3) how to use public transportation.