learning algorithms to identify neurocognitive strengths and weaknesses in a fraction of the time of typical assessment approaches. For our initial pilot project, we developed a preliminary VR task that involved a brief game-like military "shoot/no-shoot" task that collected data on hits, false alarms, discriminability, and response times under a context-dependent rule set. This prototype task will eventually be expanded to include a significantly more complex set of tasks with greater cognitive demands, sensor feeds, and response variables that could be modified to fit many other contexts. The objective of this project was to construct a rudimentary pilot version and demonstrate whether it could predict outcomes on standard neuropsychological assessments.
Participants and Methods: To demonstrate proof-of-concept, we collected data from 20 healthy participants from the general population (11 male; age=24.8, SD=7.8) with high average intelligence (IQ = 112, SD=10.7). All participants completed the Wechsler Abbreviated Scale of Intelligence-II (WASI-II), and several neuropsychological tests including the ImPACT, the Attention and Executive Function modules of the Neuropsychological Assessment Battery (NAB), and the VR task. Initially, we used a prior dataset from 359 participants (n=191 mild traumatic brain injury; n=120healthy control; n=48 sleep deprived) to serve as a training sample for machine learning models. Based on these outcomes, we applied machine learning, as well as standard multiple regression approaches to predict neuropsychological outcomes in the 20 test participants.
Results: In this limited study, the machine learning approach did not converge on a meaningful prediction due to the instability of the small sample. However, standard multiple linear regression using stepwise entry/deletion of the VR task variables significantly predicted neuropsychological performance. The VR task predicted WASI-II vocabulary (R=.457, p=.043), NAB Attention Index (R=.787, p=.001), and NAB Executive Function Index (R=.715, p=.002). Interestingly, these performances were generally as good or better than the predictions resulting from the ImPACT, a commercially available neuropsychological test battery, which correlated with WASI-II vocabulary (R=.557, p=.011), NAB Attention Index (R=.574, p=.008), and NAB Executive Function Index (R=.619, p=.004).
Conclusions: Our pilot VR task was able to predict performances on standard neuropsychological assessment measures at a level comparable to that of a commercially available computerized assessment battery, providing preliminary evidence of concurrent validity. Ongoing work is expanding this rudimentary task into one involving greater complexity and nuance. As multivariate data integration models are incorporated into the tasks and extraction features, future work will collect data on much larger samples of individuals to develop and refine the machine learning models. With additional work this approach may provide an important advance in neuropsychological assessment methods.

Categories:
Assessment/Psychometrics/Methods (Adult)
Keyword 1: assessment
Keyword 2: computerized neuropsychological testing
Keyword 3: technology
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59 A Preliminary Investigation of Digital Clock Drawing in Fibromyalgia Patients Versus Non-Fibromyalgia Peers

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Objective: Widespread musculoskeletal pain disorders like fibromyalgia are often accompanied by varying levels of cognitive dysfunction. Fibromyalgia research suggests that around the time of diagnosis, typically 30-50 years of age, many patients are already showing cognitive difficulties on various neuropsychological assessments. It is unknown, however, how older adults with fibromyalgia perform on rapid cognitive screeners in clinical settings. The present study compared older adults with and without fibromyalgia on a digitized version of a classic neuropsychological screener, the clock drawing test.
Participants and Methods: Participants aged 65+ were recruited as part of a larger IRB-approved and federally funded investigation within the preoperative surgical center at the

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University of Florida (UF) and UF Health. Participant data were obtained with Health Insurance Portability and Accountability Act (HIPAA) waiver and honest broker medical extraction from January 2018 to December 2019 (N=14,807). Based on medical record diagnostic code, participants were categorized into fibromyalgia or non-fibromyalgia groups, then propensity score matched based on age, ethnicity, race, sex, and years of education. The final sample contained 718 older adults (mean age= 71.3±4.89, education years= 13.7±2.62, female= 98.1%, white= 87.9%) (*n*=359 in each group). All participants completed the command and copy condition of the digital Clock Drawing Test (dCDT). Variables of interest for both conditions included: total completion time (TCT), pre-first hand latency (PFHL), clock face area (CFA), and digit misplacement. These variables were chosen to represent two latency and two graphomotor variables. A natural log transformation was applied to all dCDT variables to achieve normality of the distribution.
Results: We confirmed that there was no significant group difference in age, ethnicity, race, sex, and years of education following the propensity match. Fibromyalgia patients had higher comorbidity scores on American Society of Anesthesiologists Classification (ASA) (p= 0.003). Analysis of variance (ANOVA) showed a significant group difference in TCT for both command [F(1,637)= 5.13, p= 0.024, d=0.178] and copy conditions [F(1,466)= 4.03, p= 0.045, d=0.179]. Controlling for ASA, a repeated measures analysis of covariance (ANCOVA) showed that groups still differed in TCT in the command condition [F(1,630)= 4.21, p= 0.041, η^2= 0.007; Fibromyalgia > Non-Fibromyalgia], but not in the copy condition.
Conclusions: In our sample, older adults with fibromyalgia showed slower TCT to command by approximately three seconds compared to non-fibromyalgia peers. Since TCT to command taps into multiple domains of cognitive functioning, our results are consistent with previous work demonstrating poorer performance across many cognitive domains in fibromyalgia. Future research should continue investigating digital cognitive assessments to identify older adults with fibromyalgia who may be at higher risk for cognitive change. Data acquired through NIH R01 AG055337.

Categories:
Assessment/Psychometrics/Methods (Adult)

Keyword 1: neuropsychological assessment
Keyword 2: chronic pain
Keyword 3: cognitive functioning
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60 Associations Between Motor Task Deficits and Uneven Scores Across WISC-V Coding and Symbol Search Subtests

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Objective: Deficits in visual-motor coordination and/or fine motor dexterity are often present in pediatric neurological and neurodevelopmental conditions and may adversely affect performance on tests with motor demands. This consideration is relevant when interpreting discrepant scores across Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V) Processing Speed Index (PSI) subtests, specifically Symbol Search and the more motorically demanding Coding. Although test developers maintain that motor ability is unlikely to significantly impact Coding performances, clinicians often consider whether uneven WISC-V PSI subtest scores (Coding<Symbol Search) may in part be attributed to motor-related difficulties, when indicated. This has important clinical implications, as WISC-V Coding may then be omitted or substituted when calculating FSIQ. Thus, the present study aims to evaluate the role of motor task deficits in uneven PSI subtest scores in a sample of clinic-referred youth.
Participants and Methods: Participants were 238 children and adolescents (M_{Age}=10.62 years; 65.5% male; 60.5% white) referred for neuropsychological assessment. All participants completed the Coding and Symbol Search subtests of the WISC-V and at least one of two motor tasks: the Beery-Buktenica Developmental Test of Visual-Motor Integration

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