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Title: Assessing the eCOA User Experience (UX) for Evaluating Virtual Functional Outcomes

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Methodological Question:

Evidence for using digital technologies to improve outcomes in health care is growing at a rapid rate. “Applied games” (computerized) have the potential to assess the impact of therapeutic interventions by improving engagement through both game-based and motivational dynamics. The Virtual Reality Functional Capacity Assessment Tool (VRFCAT) is an “applied” game-based tool to assess functional capacity. It is reliable, valid, and sensitive to changes in function across populations (Keefe et al., 2016; Atkins et al., 2018). Using a virtual environment, the VRFCAT assesses a subject’s ability to complete instrumental activities associated with a shopping trip and has the potential to greatly enhance the delivery and impact of health care in individuals with varying levels of functional disabilities. Assessing and applying knowledge about User Experience (UX) was a fundamental part of this process, and a key step in refining the VRFCAT’s ability to be utilized across various populations. UX on the VRFCAT and other game-based systems is an important aspect to help users (clinicians, researchers, subjects, therapeutic developers) achieve the suggested goals. To our knowledge, there are no guidelines or validated questionnaires for testing usability or satisfaction for “applied” game-based systems.

Aims: To investigate the effectiveness of UX (usability evaluation and cognitive interviewing) methods as part of scale validation for the VRFCAT.

Methods: 651 participants (591 healthy control adults (HC), 72 individuals with subjective cognitive decline (SCD)) were enrolled. Participants with SCD had total scores of ≥ 4 on the Cognitive Function Instrument (CFI). UX methods included: 1 – 7 point questionnaires completed by subjects (higher scores indicating better experience), and interviewers on overall computer usage, and on their experience with the 12 objectives of the VRFCAT. Subjects’ judgment of how well they think the VRFCAT objectives reflect their real-life functioning was also assessed.

Results: Results show that overall, 75.78% (HC) and 64.00% (SCD) of subjects found the VRFCAT to be pleasant, with only 1.30% (HC) and 4.00% (SCD) of subjects reporting the VRFCAT to be unpleasant. Additionally, 95.50% (HC) and 70.00% (SCD) found the instructions easy to understand, while only 0.02% (HC) and 4.00% (SCD) found the instructions difficult. As the VRFCAT represents real life activities,

when asked how realistic did the subject find the task, 86.16% (HC) and 78.00% (SCD) found the tasks completely realistic, with 0.06% (HC) and 0.00% (SCD) group reporting the task was unrealistic. For tasks related to finding ingredients and finding the appropriate bus, over 90% of subject in both groups found these tasks at least somewhat realistic. Interviewer debriefing evaluation reported that 85.15% (HC) and 62.50% (SCD) has no difficulties with any of the 12 VRFCAT objectives. In both groups, most difficulties were reported for VRFCAT objectives performed in the Apartment (9.63%) and the Grocery Store (6.47%). These data enabled a revised version of the VRFCAT to be developed for SCD and MCI trials.

Conclusions: This study identifies a user-centered design approach implemented in assessing UX to inform scale refinement and scale validation. Adopting UX research methodologies will help ensure that game-based and virtual assessments satisfy usability evaluation, and meet the needs of users.

References:

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