Performance validity in clinical neuropsychological assessment

IMPACT PARAGRAPH

In neuropsychological assessment, performance tests (e.g., memory, attention, planning, or language) are used to assess cognitive functioning. For example, this performance-based approach is used in clinical practice for examining the consequences of a brain injury on patients' memory functioning and related learning potential. However, if patients do not perform to the best of their capabilities on these cognitive tests, this leads to invalid data and potentially inaccurate diagnostic conclusions and recommendations for treatment. This is illustrated in the case study from chapter 2, where a patient was incorrectly diagnosed with mild cognitive impairment (MCI) based upon invalid test performance. While clinical judgment alone is insufficient for determining the validity of a patients' test performance, the use of designated freestanding performance validity tests (PVTs) is essential. This dissertation focusses on (1) how often adult patients fail a PVT, (2) the impact of feedback interventions upon indications of invalid performance, and (3) the impact of performance invalidity on treatment outcome in routine clinical care.

Main Findings

First, a systematic review using meta-analyses was carried out to calculate pooled base rates of performance validity test (PVT) failure in adult patients seen for routine clinical care. We found an overall PVT failure rate of 16% (95% CI [14, 19]). Type of clinical context (e.g., medical hospital or mental healthcare institute), diagnosis group (e.g., ADHD or traumatic brain injury), presence of external gains (e.g., financial incentives), and psychometric properties of the utilized PVT (i.e., sensitivity and specificity) were found to impact the rate of PVT failure.

In the second part of this dissertation, we examined the impact of feedback interventions on subsequent test performance when patients failed a PVT. Such interventions might contribute to enhancing the overall quality of neuropsychological assessment outcomes and therewith improve appropriate diagnostic conclusions and treatment recommendations. We performed two studies: an observational cross-sectional study using retrospective archival data and a multicenter single-blind randomized controlled trial (RCT). In the observational study, we found that performance on a PVT equally improved during re-assessment in both the group that was provided with feedback versus the group in which invalid performance was left unaddressed. In the feedback group, a significant improvement on a repeated reaction time test was apparent compared to the no-feedback group. However, in the multisite RCT, we found that a brief neutral direct feedback intervention upon PVT failure had no effects on subsequent repeated and single-administered PVT performance or standard cognitive test performance. Combined, these results suggest that there might be limitations to using feedback upon indications of invalid performance for increasing patients' efforts to perform at the best of their capabilities.

In the final part of this dissertation, we examined the impact of performance validity on treatment outcome. Instead of employing a dichotomous pass/fail approach to PVT results, we utilized the complete range of scores from a freestanding PVT. This was done to enhance statistical power when examining its relationship with response and adherence to cognitive behavioral therapy (CBT) in patients with chronic fatigue syndrome (CFS). We found that CFS patients with low PVT performance (i.e., higher

likelihood of performance below best of capabilities) are more likely to attend fewer therapy sessions and not complete the follow-up assessment, indicative of limited adherence to treatment. However, for the for those patients who completed the intervention, their response to CBT was comparable to those who scored high on the ASTM, despite their initial lower performance on the PVT. Therefore, instead of being an indicator restricted to the assessment of the credibility of performance on cognitive tests, performance validity may also serve as a behavioral proxy about the level of engagement a patient has regarding a behavioral treatment intervention

Scientific Impact

Four of our five studies have been published in various international peer-reviewed journals. One study is submitted and under review. As such, our findings contribute to scientific research and clinical practice by providing freely accessible information regarding the base rate of PVT failure across relevant contextual, personal, and assessment characteristics (Table 2 from Chapter 3). These data provide clinicians and research alike with the opportunity for increasing the accuracy of performance validity determinations in neuropsychological examinations. Our studies on the effects of feedback following PVT failure and the impact of performance validity on treatment outcome, represent crucial initial steps towards advancing validity assessment in these areas. These findings provide valuable insights that may inspire future research on communicating and handling performance invalidity in clinical assessments. By shedding light on these aspects, our research contributes to the ongoing development of validity assessment practices.

Societal Impact

As all our studies concerned adult patients seen for routine clinical care, our study findings may have direct implications for current clinical (neuropsychological) practices. Our meta-analyzed results on how often adult clinical patients fail PVTs, can be directly implemented in both routine clinical care. To our knowledge, this study is the first to provide high-quality information about PVT failure that can be used for calculating clinically applied statistics (i.e., positive-/negative predictive values, likelihood ratios). Thereby, the diagnostic accuracy of performance validity determination can be increased for both research and clinical purposes. Illustratively, our review-study findings are currently displayed at a Dutch publishing house of commonly used PVTs (Hogrefe), highlighting its clinical implications (https://www.hogrefe.com/nl/nieuw/zijn-de-door-jou-gemeten-klachten-wel-valide). The research insights may potentially enhance the quality of diagnostic conclusions and the treatment recommendations derived from the neuropsychological assessment. Or to put in other words, misdiagnosis and inaccurate treatments may be prevented, ultimately leading to improved patient care.

In addition, current practices on feedback strategies for improving patients' test-taking behavior were empirically tested and found to have little to no impact. This urges for additional research and alternative approaches to dealing with invalid performance in clinical patients (e.g., patients may benefit from neuropsychological assessment after, rather than before, treatment). In the meantime, the apparent lack of influence that clinicians seem to have on test-taking behavior trough feedback

interventions, underlines the importance of assessing performance validity continuously during the neuropsychological assessment and in every test session.

Lastly, as response to treatment for patients who show indications of invalid performance is comparable to subjects who performed to the best of their abilities, low PVT performance should not be a reason to exclude patients from treatment. This is an important implication, as clinicians may view this behavior as a sign of non-compliance and consequently may question whether they would benefit from costly medical treatment. We, however, did find proof for the first notion that performing low on a PVT is in fact related to limited treatment adherence (i.e., completing fewer therapy sessions and study drop-out). As such, the clinician might instead view invalid performance as a behavioral proxy of how patients engage in treatment (e.g., having reservations about the communicated therapy proposal) that may need clinical attention, instead of losing empathy and abandoning attempts to provide clinical aid.

Dissemination Activities

The findings from the studies in this dissertation have been communicated in various ways. The results have been presented at **national and international conferences**. For fellow **researchers and clinicians**, an introduction into the topics of this dissertation and the study findings were communicated during a **webinar** of the Limburg Brain Injury Centre (2021). **Clinicians** (neuropsychologists, technicians, and interns) involved in the multicenter randomized controlled trial from this dissertation (chapter 5) conducted in seven hospitals in the Netherlands, were trained onsite on the study procedure but also on the (developing) concepts of performance validity and related feedback interventions. The proceedings of the studies in this dissertation were shared with **clinicians** through contributions to a local **science magazine** (VieCuri Medical Center), **(invited) oral presentations** at RINO Groep Utrecht, VieCuri Medical Center, Radboud University Medical Center; departments of Psychiatry, and Medical Psychology, Psychotrauma Expertise Center (Psytrec), Dutch Institute for Forensic Psychiatry and Psychology (NIFP), and clinicians working in occupational health services. The review-study from chapter 3 was awarded with the **research prize 2023** by RINO Zuid for being the most clinically relevant of all submissions. Three studies from this dissertation were **published open access** and are therefore accessible to the general public. In addition, these open access articles were also shared via online platforms such as LinkedIn and ResearchGate. As a **trainer and supervisor** for psychologists in training to become a registered health care psychologist and clinical neuropsychologist, the topics of validity assessment, approaches on how to manage clinical patients who show non-credible responding, and its potential influence on both assessment- and treatment outcomes were specifically addressed and incorporated the study findings as mentioned in this dissertation. Finally, the study findings related to validity assessment, diagnostic decision making, and managing invalid presentations were also integrated into the curriculum of the **postdoctoral training** to become a registered health care psychologist (2-year program) and registered clinical psychologist (4-year program) at the **Radboud Centre for Social Sciences (RCSW)**, Nijmegen.