Practice Effects & Reliable Change in Repeat Neuropsychological Assessment

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What are practice effects in neuropsychological assessment?

Practice effects in clinical neuropsychology relate to the fact that an individual who has already undertaken a particular assessment may **do better** if they take the same or similar assessment again at a later date, because they have previously had **exposure to the test**.

Why do patients take similar neuropsychological tests repeatedly?

Patients may be asked to undertake similar tests in order that the neuropsychologist can **assess improvement or decline** in cognitive domains such as memory, executive function, language, visuo-constructional skills and so on. Improvement may be expected when patients are on a recovery trajectory following stroke or a traumatic brain injury, whereas decline might be the concern in patients complaining of memory or speed of processing issues, or where a brain scan already highlights neurodegenerative changes in the brain.

Do practice effects impact one cognitive domain differentially to another?

Whilst the figures demonstrating it are small, it appears that **practice effects impact tests of memory more** than tests of other cognitive domains.[1]

What can neuropsychologists do about possible practice effects?

If a neuropsychologist knows that a patient has already been exposed to a particular test, there are some options available to make the repeat assessment as “pure” as possible. For example, if

the test has an **alternative version** (known as a parallel form), this may be administered. This is however not always possible, and neither does it entirely eradicate the issue!

In some types of assessment, even a different test may not be as “pure” of an assessment as we need, because previous exposure to an alternative version, but comprised of similar content or requirements, **may confer an advantage at retest**. Furthermore, with alternative forms of tests comes **different comparison groups**, meaning that when interpreting results, we are no longer comparing exactly the same cohorts and experiences.

The neuropsychologist therefore, needs to be aware of and understand the likely impact of the repeated exposure to neuropsychological tests, and **apply statistical corrections** such that any comparison of performance over time displays **reliable change** rather than possible change plus error. The **reliable change index** provides the amount of change that would be anticipated in order to be able to confidently conclude that the change in a test score over two time points is a real change and not simply the result of previous exposures.

Neuropsychologist-patient relationship

The clinical neuropsychologist also needs to have an understanding of the patient’s background and what avenues of rehabilitation they are currently involved in. This is important in understanding change in test performance over time and for advising the possible benefit of continued or new therapies.

Limit unnecessary exposure to neuropsychological assessments

It is because of the impact of practice effects that neuropsychologists recommend that patients don’t undertake neuropsychological assessments unnecessarily or too frequently. If a patient needs to complete neuropsychological assessments for a real concern in the future (say because they are concerned about worsening memory or had a stroke), their performance, and therefore, inferences made about their brain and possible disease processes, will be less reliable with more exposure to tests over time.

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[1] NavNeuro. (2023, December 1). 132| Reliable Change – A Conversation With Dr. Kevin Duff · *Navigating Neuropsychology*. https://www.navneuro.com/132/