

Precision in neuropsychology

Four challenges when using simplified assumptions

Akademisk avhandling

Som för avläggande av medicine doktorexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentlig försvaras i hörsal Arvid Carlsson Medicinareg. 3A, måndagen den 10 Jun 2019, klockan 09:00

av Jacob Stålhammar

Fakultetsopponent:
Professor Ove Almkvist
Karolinska Institutet, Sverige

Avhandlingen baseras på följande delarbeten

- I. Stålhammar, J., Nordlund, A., Wallin, A. An example of exceptional practice effects in the verbal domain *Neurocase* 2015; 21(2):162-8
- II. Stålhammar, J., Rydén, I., Nordlund, A., Wallin, A. Boston Naming Test automatic credits inflate scores of nonaphasic mild dementia patients *J Clin Exp Neuropsychol.* 2016; 38(4):381-92
- III. Stålhammar, J., Hellström, P., Joas, E., Göthlin, M., Rolstad, S., Eckerström, C., Eckerström, M., Wallin, A. From slow and stable, to abrupt and variable; the range of mild cognitive impairment-to-dementia neuropsychology change scores Submitted online 2019-03-03. *Applied Neuropsychology: Adult.*
- IV. Stålhammar, J., Hellström, P., Eckerström, C., Wallin, A. Neuropsychological test performance of middle aged native and non-native Swedish speakers: No executive advantage. Manuscript.

**SAHLGRENKA AKADEMIN
INSTITUTIONEN FÖR
NEUROVETENSKAP & FYSIOLOGI**



Precision in neuropsychology

Four challenges when using simplified assumptions

Jacob Stålhammar

Avdelningen för psykiatri och neurokemi, Institutionen för neurovetenskap & fysiologi, Sahlgrenska akademien, Göteborgs universitet, Sverige.

Abstract

Cognition comprises all thought processes, from perception to memory. Neuropsychological tests are the gold standard (= best way) to measure cognition. However, clinical assessment may at times have to rely on simplified assumptions. This work addresses potential risks of four such assumptions through neuropsychological tests and statistical analysis from: a case report (Paper I); participant data from the Gothenburg Mild Cognitive Impairment study (Papers II, III); and the Swedish Cardio Pulmonary bioImage Study (SCAPIS Pilot, Paper IV).

Paper I showed transfer effects from memory training may affect memory tests. Paper II showed that giving free credits for items not administered inflated the scores of those most impaired in the Boston Naming Test (BNT). Paper III showed practice effects could not be ruled out in mild cognitive impairment, and that mean Δ -scores described change better than isolated Δ -scores. Paper IV showed that administering neuropsychological tests in Swedish to non-native speakers gave lower results in tests tapping speed and attention, and that vocabulary testing may enhance precision.

Conclusion: the four assumptions save time at the cost of precision. In the greatest need for precision, (e.g. for detection of gradual change before manifest loss), considering the above findings will improve assessments.

Keywords: Neuropsychology, practice effects, mild cognitive impairment, dementia, second language effects, bilingualism