

A large-scale cross-sectional and longitudinal study into the ecological validity of neuropsychological test measures in neurologically intact people

Wim Van der Elst^{a,*}, Martin P.J. Van Boxtel^a,
Gerard J.P. Van Breukelen^b, Jelle Jolles^a

^a Maastricht Brain and Behavior Institute, European Graduate School of Neuroscience (EURON), Faculty of Health, Medicine and Life Sciences, Maastricht University, The Netherlands

^b Department of Methodology and Statistics, Maastricht University, The Netherlands

Accepted 5 September 2008

Abstract

It is often assumed that neuropsychological measures are ecologically valid in ‘normal’ people, but this assumption has not yet been thoroughly evaluated.

The aim of the present study was to evaluate the cross-sectional and longitudinal ecological validity of individual neuropsychological test scores and their composites in a large sample of neurologically intact people. Three neuropsychological composite measures were established, i.e. a “Memory Quotient”, an “Executive functioning and Speed Quotient”, and a “General Cognitive Quotient”. The ecological validity of the individual neuropsychological measures and their composites was low to moderate. Multivariate models that included both neuropsychological and non-cognitive variables (i.e. demographic variables, depressive symptoms and anxiety) accounted for 4.6–21.4% of the variance in daily life functioning. The General Cognitive Quotient was the neuropsychological measure that was the most consistently related to daily life functioning.

© 2008 National Academy of Neuropsychology. Published by Elsevier Ltd. All rights reserved.

Keywords: Ecological validity; Assessment; Neuropsychology; Older adults; Longitudinal design

1. Introduction

Historically, neuropsychological tests have mainly been used to detect and localize brain pathology (Long & Kibby, 1995). As brain imaging techniques became more widely available in recent decades, the role of neuropsychological assessment in the diagnosis of neuropathology has gradually diminished (Johnstone & Frank, 1995; Rabin, Burton, & Barr, 2007). Today, referral questions in clinical neuropsychology are increasingly more focused on the functional implications of brain damage, such as whether or not a patient is able to follow a rehabilitation program, live independently, or return to work (Rabin, Barr, & Burton, 2005). The degree to which neuropsychological tests can make accurate predictions of a person’s behavior in real-world settings has been defined as the ecological validity of a test (Sbordone, 1996).

* Corresponding author at: Faculty of Health, Medicine and Life Sciences, Department of Psychiatry and Neuropsychology, Maastricht University, 6200 MD, Maastricht, The Netherlands. Tel.: +31 43 3884086; fax: +31 43 3884092.

E-mail address: Wim.vanderelst@hotmail.com (W. Van der Elst).

Various studies have evaluated the ecological validity of neuropsychological tests. For example, Chaytor, Schmitter-Edgecombe, and Burr (2006) evaluated the relationship between tests that measure executive functioning (such as the Trail Making Test) and everyday executive ability (as measured with informant ratings) in a sample of 46 mixed neurological adult patients. The authors found that the neuropsychological test scores accounted for about 20% of the variance in the measures of everyday executive ability. Farias, Harrell, Neumann, and Houtz (2003) evaluated the ecological validity of composite neuropsychological test scores in a sample of 42 people with Alzheimer's disease. The results showed that these neuropsychological composites accounted for about 20–50% of the variance in performance-based measures of daily living skills (e.g. dialing a telephone, counting currency), and for about 10–30% of the variance in informant-based functional ratings. These and similar studies suggested that the ecological validity of neuropsychological test scores is moderate, at least in clinical populations (for comprehensive reviews refer to Chaytor and Schmitter-Edgecombe (2003), Green, Kern, and Heaton (2004), and Kalechstein, Newton, and Van Gorp (2003)).

Until now, the ecological validity of neuropsychological instruments has not been carefully considered in 'neurologically intact' people (Spooner & Pachana, 2006). This is not surprising, as neuropsychology has traditionally been a discipline with a strong focus on neurologically impaired people. The ecological validity of neuropsychological tests in neurologically intact individuals, however, is an important issue that may have implications for studies in neuropsychology and related fields. For example, studies that evaluate the impact of pharmacological manipulations (such as tryptophan depletion; Evers, Van der Veen, Jolles, Deutz, & Schmitt, 2006), illegal drugs (such as marijuana; Ramaekers et al., 2006), medical variables (such as hypertension; Van Boxtel et al., 2006), or nutritional components (such as fatty acids; De Groot, Hornstra, & Jolles, 2007) on the cognitive abilities of neurologically intact people would be of limited value if the neuropsychological test scores were not related to real-world functioning.

The aim of the present study was to evaluate the cross-sectional and the longitudinal ecological validity of neuropsychological measures in neurologically intact mid-aged to older adults (aged between 49 and 81 years at baseline). Neuropsychological measures (assessed at baseline) were related to daily life functioning as assessed at baseline (i.e. cross-sectional ecological validity) and at several follow-up moments (i.e. longitudinal ecological validity). Both individual neuropsychological test scores and their composites were related to daily life functioning because previous studies have suggested that composite scores had higher ecological validity as compared to individual neuropsychological test scores (see the reviews of Chaytor & Schmitter-Edgecombe, 2003; Green et al., 2004; Kalechstein et al., 2003). As previous studies have suggested that demographical variables (Kalechstein et al., 2003), depressive symptoms (Chaytor, Temkin, Machamer, & Dikmen, 2007), and anxiety (Sbordone, 1996) may account for substantial parts of the variance in daily life measures (in addition to neuropsychological functioning), we also evaluated the contribution of these non-cognitive variables in the prediction of daily life functioning.

2. Method

2.1. Participants

Data were derived from the Maastricht Aging Study (MAAS), a prospective study on the determinants of cognitive aging. MAAS baseline measurements were conducted between 1993 and 1996 and involved four panels of approximately 465 people each (1856 individuals in total). The data were collected in four smaller panels instead of in a single large panel for logistic reasons. All participants were community dwelling, healthy people (aged between 24 and 81 years at baseline) who were without documented medical conditions that could interfere with normal cognitive functioning (i.e. individuals with chronic neurological pathology, mental retardation, psychopathology, or chronic psychotropic drug use were excluded). For the present study, we only included people who were aged 49 years or older at baseline because the follow-up frequency in the MAAS differed as a function of baseline age.

At baseline, all participants were administered the Stroop Color-Word Test (SCWT; Stroop, 1935), Concept Shifting Test (CST; Van der Elst, Van Boxtel, Van Breukelen, & Jolles, 2006a), Letter Digit Substitution Test (LDST; Van der Elst, Van Boxtel, Van Breukelen, & Jolles, 2006b), Verbal Learning Test of Rey (VLT; Van der Elst, Van Boxtel, Van Breukelen, & Jolles, 2005), Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975), and the depression and anxiety scales of the Symptom Checklist 90 (SCL-90; Derogatis, 1977). Data of people with

Download English Version:

<https://daneshyari.com/en/article/900844>

Download Persian Version:

<https://daneshyari.com/article/900844>

[Daneshyari.com](https://daneshyari.com)