Discussion

Welcoming a paradigm shift in neuropsychology

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In order to understand the relationships between brain structure and function, we need to appreciate both the biological and non-biological variables which can influence behavioural data. We do not dispute that mild brain injuries cannot, in principle, have lasting neuropsychological effects. We merely assert that, as injury severity becomes increasingly mild, the role of non-organic factors affecting performance increases commensurately. Among these factors is the phenomenon of incomplete effort. In the past decade, this topic has become a key focus in applied neuropsychological research. In our critique, we pointed out that Dr. Bigler has not addressed this phenomenon, although it is one that we cannot escape. It is now widely recognized that, if a patient does not put forth a full effort during testing, neuropsychological test scores will underestimate the person’s true capabilities. Whether in the single clinical case or in group studies, if such contaminated data go unrecognized and are incorrectly regarded as being valid, we will draw false conclusions.

In the case of patients with mild head injuries, poor effort on testing not only has some effect on neuropsychological test scores but it can easily override the effects of most other variables. Poor effort creates the illusion that people with mild head injuries have suffered far more severe neuropsychological impairment than patients with well established severe brain injuries or brain tumors. Accordingly, the title of the paper by Green, Rohling, Lees-Haley, and Allen (2001) was “Effort has a greater effect on test scores than severe brain injury in compensation claimants.” In this study, patients with mild head injuries performed on many neuropsychological tests at a level very close to the normal mean established by independent normative studies. This finding applied to those who passed effort testing with the Word Memory Test (Green, Allen, & Astner, 1996; Green & Astner, 1995; Green, Lees-Haley, & Allen, 2002). However, the group of mild head injury patients, who failed effort testing, showed a severe suppression of neuropsychological test scores. Their overall performance was, on average, 1.4 standard deviations below the normal mean. In contrast, the patients with the most severe brain injuries scored only 0.4 standard deviations below the normal mean. It is very difficult to develop a biological explanation for these findings.

The Word Memory Test effort subtests are so simple that even mentally retarded children or children with fetal alcohol syndrome can easily score almost 100% correct but adult patients with mild head injuries scored lower on the effort subtests than these children (Green & Flaro,
in press). A group of patients with relatively mild head injuries scored significantly lower on the same effort measures than patients with severe brain injuries (Green, Iverson, & Allen, 1999). A similar paradoxical phenomenon was observed with the Computerized Assessment of Response Bias (CARB; Conder, Allen, & Cox, 1992). When making an effort, patients with severe brain injuries obtain an average score of approximately 98% correct on CARB and it is, therefore, insensitive to the effects of brain injury. Yet in the study of Green and Iverson (2001), the group with the most mild head injuries scored significantly lower on CARB than the group with well-defined traumatic brain injuries. It is very difficult to explain these paradoxical results on the basis of biological differences between patients with mild head injury and those with severe brain injuries. On the other hand, the finding of significantly lower test scores in patients with mild head injuries compared with patients with severe brain injuries is easily explained by the phenomenon of poor effort associated with exaggeration of symptoms.

We would not wish to deny the possibility that future research could show, in principle, that some impairment results from a mild head injury, even one that does not involve loss of consciousness. However, we already know that, in many different conditions including mild head injury, symptom exaggeration plays a very significant role in the production of test scores in a substantial percentage of cases. How else can we explain lower scores on effort tests in patients with mild head injuries compared with patients with severe brain injuries? Because effort has a greater effect on test scores than severe brain injury in compensation claimants, it is essential when gathering neuropsychological test scores to measure effort thoroughly. We must take into account the extent to which the test scores reflect incomplete effort before attributing low test scores to brain injury.

It has been discovered that data from groups of patients can be severely distorted by the presence of poor effort. This may be illustrated by olfactory identification test scores in patients with varying levels of head injury severity (Green, Rohling, Iverson, & Gervais, 2003). In the patients of this study who failed effort testing, there was no relationship between olfactory identification ability and the severity of the head injury. However, in the cases who passed effort testing, scores on the smell test were found to be the strongest predictors of severity of head injury, in comparison with a wide range of commonly used neuropsychological tests. If we were to postulate a biological basis for the anosmia, we would probably produce different explanatory models, depending on whether we were trying to explain one set of data or the other. Whether or not we measure effort can influence our underlying models of brain function and so it is essential to measure effort in group studies.

Nowhere is this more clear than in the case of patients with mild head injuries. Larrabee (2000) estimates that suboptimal effort may be expected in as many as 40% of mild head injury cases who are involved in personal injury litigation or compensation claims. If so, we should expect that data from groups of patients with mild head injuries will be contaminated by poor effort because poor effort suppresses test scores more than severe brain injuries.

We are undergoing a paradigm shift in neuropsychology. Most of us recognize that, although effort is invisible on an MRI, it must be measured when conducting a neuropsychological assessment. Not to do so would leave the door wide open to artificially suppressed scores, resulting from poor effort and inevitably to false conclusions based on invalid data. Dr. Bigler seems to advocate leaving this door wide open but he has little company. Most clinical neuropsychologists are already using effort tests routinely. It is mainly clinicians who have driven
the paradigm shift, in which effort is now acknowledged as a major determinant of neuropsychological test scores. Dr. Bigler failed to take account of the extent to which effort affects neuropsychological test scores, even in his rebuttal of our critique. It is unscientific to ignore a variable that explains 50% of the variance in a neuropsychological test battery (Green et al., 2001). It is also misguided to accuse researchers of bias when they point out such findings, which are of widespread importance to neuropsychology.

References


