

Case Study of J. C.

Introduction to the Case of J.C.

Reitan and Wolfson, in their book *Mild Head Injury: Intellectual, Cognitive, and Emotional Consequences* (2000) have attempted to clarify a number of confusing issues regarding mild head injury. In order to do this, it was necessary to conduct a series of studies which are reported in the book. Among these studies was one that demonstrated that a proportion of persons who suffer mild head injuries have relatively significant neuropsychological losses. The research literature, however, suggests that recovery from mild head injuries occurs routinely, and that recovery is essentially complete in one to three months following the injury.

The reason for the conflict between results based on research studies and what actually happens in certain individual cases is that research studies generally access participants into the research effort on a sequential basis, and the occasional person with genuine impairment essentially falls through the cracks when included with the larger proportion of subjects who do recover quite well. While average trends, represented by group results, may serve as generalizations for research purposes, they do little to recognize and deal with the clinical problems of the occasional person with a mild head injury that suffers brain impairment and neuropsychological deficits.

A great deal of confusion has arisen from the failure of research studies to evaluate the full range of neuropsychological deficits shown by persons with mild head injuries. One of the major contributions of the book *Mild Head Injury* was to study a group of persons who had sustained mild head injuries, followed by developing and persistent problems, versus persons with mild head injuries who were accessed into a research study on a sequential basis (as is representative of most of the studies reported in the literature). The comparisons of these two groups showed that the Halstead-Reitan Battery was capable of differentiating these groups statistically as well as clinically. An example of an individual who sustained a mild head injury, without actual loss of consciousness but with continuing complaints, follows.

The Case of J.C.

Name:	J.C.
Gender:	Male
Age:	18 years
Education:	11 years
Handedness:	Ambidextrous, but writes with left hand
Occupation:	Student

Background Information

Seven months before this neuropsychological testing, J.C. was running when he slipped and struck the left anterior portion of his head on a corner of a building. He did not lose consciousness, and although dazed for several minutes and mildly confused for about two hours, he did not seek medical attention. He seemed to recover routinely, except for experiencing severe headaches.

About one month postinjury he also developed spells of dizziness. At first he felt he could live with these problems, but his school grades began to deteriorate, and he felt that he was not able to concentrate as well as he had before and had developed memory problems. He therefore decided to seek medical attention. The neurological evaluation and neuropsychological testing was not done until about seven months postinjury. Although the neurological examination was entirely normal, J.C. demonstrated significant neuropsychological deficits.

Neuropsychological Evaluation

On the WAIS, J.C. earned a VIQ of 101 (exceeding about 53% of the normative sample), a PIQ of 107 (exceeding about 68%) and a FSIQ of 104 (exceeding about 61%).

The scaled scores for the Verbal subtests indicate that there was a moderate degree of variability. Even though J.C. performed well on Information, Comprehension, and Digit Span (scaled scores of 11 on each of these subtests), he earned scores of 9 on Similarities and Vocabulary and a score of only 7 on Arithmetic. The Performance subtests were consistently done at a somewhat better level, with the range of scaled scores extending from 10 to 12.

It is apparent that one could not be confident that the scores on the WAIS reflected acquired impairment to any significant extent. It was also quite possible that the variability, which occurred especially among the Verbal subtests, was within the range of normal variation.

Despite these relatively normal IQ values, J.C. showed clear evidence of impairment on the neuropsychological evaluation. He earned a GNDS score of 39, a value that is indicative of mild neuropsychological impairment. The highest GNDS score in our initial validation sample of non-brain-damaged subjects was 34 (Reitan & Wolfson, 1988). In our sample of 20 mild head-injured persons referred for clinical evaluation, a GNDS score of 39 fell at the 42.5 percentile, indicating that J.C. was a little more impaired generally than the average for our subjects in this group.

The other four most sensitive measures in the HRB also tended to show evidence of impairment. The consistency of J.C.'s deficits, even though generally mild, was revealed by the Impairment Index of 1.0. He performed very poorly on the Category Test (72 errors) and on the Localization component of the TPT (0). However, he was able to demonstrate quickness, alertness, and flexibility in his thought processes, at least when dealing with certain types of tasks, by requiring only 59 seconds to complete Part B of the Trail Making Test.

With four of the five most sensitive measures clearly falling in the range characteristic of brain-damaged subjects, it definitely appeared that J.C. had sustained a degree of brain-related impairment. As would be inferred from the Impairment Index, J.C. tended to do somewhat poorly on most of the tests.

Lateralizing findings, implicating both the left and right cerebral hemispheres, tended to support the indications of mild impairment of brain functions. Although J.C. had mixed lateral dominance, the fact that he wrote with his left hand would predispose him toward performing unimanual tasks somewhat better with his left hand than with his right.

On the Tactual Performance Test, however, he showed relatively little improvement on the second trial (right hand) as compared with the first trial (left hand), improving from a score of 7.9 minutes to a score of 7.1 minutes. His ability to complete the task on the third trial (both hands) in only 3.5 minutes clearly indicates that he was capable of improving with practice. The relatively poor performance with the right hand as compared with the left hand may therefore have some significance for implicating the left cerebral hemisphere.

A more striking indication, however, was derived from testing for tactile finger localization. J.C. made 5 mistakes in 20 trials with his right hand, but only 1 mistake with his left hand, a finding that definitely deviates from normal expectancy and implicates the left cerebral hemisphere.

We did not conclude that J.C. had any definite symptoms of dysphasia, but from a clinical point of view, it should be noted that he had a little difficulty with simple reading. When asked to read, He is a friendly animal, a famous winner of dog shows, J.C. read, "He is a friendly animal and a famous winner of a dog show." When asked to read, Place left hand to right ear, J.C. read, "Please—Place left hand to right ear." These mistakes in reading are probably not a sufficient basis

to classify J.C. as having dyslexia, but they are consistent with the other indications of left cerebral hemisphere impairment.

Some of J.C.'s other performances implicated the right cerebral hemisphere. Although ambidextrous, the fact that J.C. wrote with his left hand would suggest that he probably should be somewhat faster in finger tapping speed with his left hand than with his right. However, his speed (48 taps) was identical with both hands. J.C.'s performance on grip strength was more striking. He was able to register 44.0 kg with his right hand, but only 41.5 kg with his left hand.

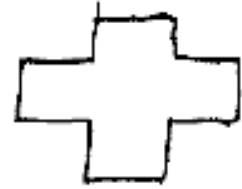
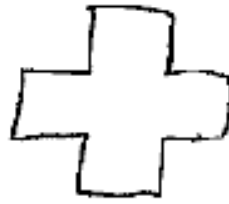
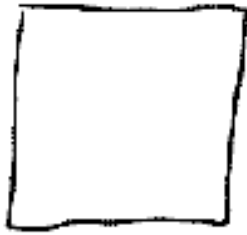
J.C. had some trouble copying simple spatial configurations. His first drawing of the cross was within normal limits, but the examiner had him repeat the task because he had performed slowly and seemed to be having difficulty. On his second attempt he performed more poorly than he had initially, clearly failing to estimate the full extension of the upper extremity.

If one inspects his drawing of the key carefully, additional indications of problems dealing with spatial configurations become apparent. The handle was somewhat small, but the difficulty J.C. had in achieving symmetry of the notches in the stem close to the handle represented a more significant error. Although he carefully drew in the notches on the upper part of the stem, he did not achieve a symmetrical representation on the lower part of the stem. He made the same type of mistake in his drawing of the "teeth." A failure to achieve symmetry can readily be observed by comparing the upper part of the "teeth" just below the "nose" on the left side as compared with the area just below the stem on the right side. While a casual observation of the drawing might suggest that the performance was within normal limits, a close inspection reveals the difficulties noted above, which are quite characteristic of persons with right cerebral damage.

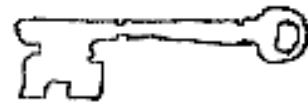
In summary, J.C.'s test results almost certainly indicate cerebral impairment, with both general and more specific (lateralizing) indicators. It is not surprising that J.C. had noticed deterioration of his school work, difficulty with concentration, and problems with memory.

The MMPI also yielded some deviant results. It would be difficult to be fully confident that J.C.'s results would have been normal even without having sustained a head injury, but it is likely that the elevations, at least in part, were associated with and derived from his cognitive impairment.

The results of the HRB make it perfectly clear that J.C. had not followed the usual pattern of recovery in cases of mild head injury, i.e., mild initial deficits and a full recovery in one to three months. At the time of this examination, seven months postinjury, J.C. showed very clear and serious indications of neuropsychological impairment.



Clock
square



He shouted the warning.

85
27

58

51

The Halstead-Reitan Neuropsychological Test Battery for Adults

Name _____ Age _____
 Gender _____ Education _____ Handedness: RH _____ LH _____
 Date _____

Neuropsychological Deficit Scale (NDS) Summary

General NDS

Level of Performance _____
 Pathognomonic Signs _____
 Patterns _____
 Right/Left Differences _____

Total G-NDS Score _____

Left NDS _____

Right NDS _____

WAIS

VIQ _____
 PIQ _____
 FSIQ _____

Verbal Subtests

Information _____
 Comprehension _____
 Arithmetic _____
 Similarities _____
 Digit Span _____
 Vocabulary _____

Performance Subtests

Digit Symbol _____
 Picture Completion _____
 Block Design _____
 Picture Arrangement _____
 Object Assembly _____

Minnesota Multiphasic Personality Inventory (MMPI)

	Hs	_____
	D	_____
? _____	Hy	_____
L _____	PD	_____
F _____	MF	_____
K _____	Pa	_____
	Pt	_____
	Sc	_____
	Ma	_____
	SI	_____

Strength of Grip

Dominant hand () _____ kg
 Non-dominant hand () _____ kg

Name Writing

Dominant hand () _____ sec
 Non-dominant hand () _____ sec

Category Test

Number of errors _____

Tactual Performance Test

Dominant hand () _____ Total Time _____
 Non-dominant hand () _____ Memory _____
 Both hands _____ Localization _____

Seashore Rhythm Test

Number correct _____

Speech-sounds Perception Test

Number of errors _____

Finger Tapping Test

Dominant hand () _____
 Non-dominant hand () _____

Impairment Index

Trail Making Test

Part A _____ sec _____ error(s)
 Part B _____ sec _____ error(s)

Bilateral Simultaneous Sensory Stimulation

RH _____ LH _____	Both: RH _____ LH _____
RH _____ LF _____	Both: RH _____ LF _____
LH _____ RF _____	Both: LH _____ RF _____
RE _____ LE _____	Both: RE _____ LE _____
RV _____ LV _____	Both: RV _____ LV _____
_____	_____
_____	_____

Tactile Finger Recognition

RH 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ RH ___ / ___
 LH 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ LH ___ / ___

Finger-Tip Number Writing

RH 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ RH ___ / ___
 LH 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ LH ___ / ___

Tactile Form Recognition Test

Dominant hand () _____ sec _____ error(s)
 Non-dominant hand () _____ sec _____ error(s)

**Reitan-Indiana
Aphasia Screening Test**

Form for Young Children

Name _____

Age _____ Educ _____ Date _____

Examiner _____

Write NAME	COUNT Fingers
Copy SQUARE	COMPUTE 2 + 2 (Verbal)
Copy CROSS	COMPUTE 2 + 1 (Written)
Copy TRIANGLE	COMPUTE 4 + 3 (Verbal)
Name BABY	Name KEY
Name CLOCK	Put FINGER on NOSE
Name FORK	Show TONGUE
Read 7 SIX 2	Where is EYEBROW?
Read MGW	Point to ELBOW
Read SEE THE BLACK DOG	Put RIGHT HAND on NOSE
Print SQUARE	Put LEFT HAND on HEAD