

Raw WMTIR	WMT Fail	Failure #	PTA Severity		Pass WMT-IR		PTA Severity
7	Fail WMT-IR	1	Mild (<= 1 hr)	40	Pass WMT-IR	21	Mild (<= 1 hr)
10	Fail WMT-IR	2	Mild (<= 1 hr)	40	Pass WMT-IR	22	Mild (<= 1 hr)
19	Fail WMT-IR	3	Mild (<= 1 hr)	40	Pass WMT-IR	23	Mild (<= 1 hr)
22	Fail WMT-IR	4	Mild (<= 1 hr)	40	Pass WMT-IR	24	Mild (<= 1 hr)
23	Fail WMT-IR	5	Mild (<= 1 hr)	40	Pass WMT-IR	25	Mild (<= 1 hr)
27	Fail WMT-IR	6	Mild (<= 1 hr)	40	Pass WMT-IR	26	Mild (<= 1 hr)
27	Fail WMT-IR	7	Mild (<= 1 hr)	40	Pass WMT-IR		
28	Fail WMT-IR	8	Mild (<= 1 hr)	40	Pass WMT-IR		
28	Fail WMT-IR	9	Mild (<= 1 hr)				
29	Fail WMT-IR	10	Mild (<= 1 hr)				
29	Fail WMT-IR	11	Mild (<= 1 hr)				
29	Fail WMT-IR	12	Mild (<= 1 hr)				
30	Fail WMT-IR	13	Mild (<= 1 hr)				
31	Fail WMT-IR	14	Mild (<= 1 hr)				
33	Fail WMT-IR	15	Mild (<= 1 hr)				
33	Fail WMT-IR	16	Mild (<= 1 hr)				
35	Pass WMT-IR	1	Mild (<= 1 hr)				
35	Pass WMT-IR	2	Mild (<= 1 hr)				
35	Pass WMT-IR	3	Mild (<= 1 hr)				
36	Pass WMT-IR	4	Mild (<= 1 hr)				
36	Pass WMT-IR	5	Mild (<= 1 hr)				
37	Pass WMT-IR	6	Mild (<= 1 hr)				
37	Pass WMT-IR	7	Mild (<= 1 hr)				
38	Pass WMT-IR	8	Mild (<= 1 hr)				
38	Pass WMT-IR	9	Mild (<= 1 hr)				
38	Pass WMT-IR	10	Mild (<= 1 hr)				
38	Pass WMT-IR	11	Mild (<= 1 hr)				
38	Pass WMT-IR	12	Mild (<= 1 hr)				
38	Pass WMT-IR	13	Mild (<= 1 hr)				
38	Pass WMT-IR	14	Mild (<= 1 hr)				
39	Pass WMT-IR	15	Mild (<= 1 hr)				
39	Pass WMT-IR	16	Mild (<= 1 hr)				
39	Pass WMT-IR	17	Mild (<= 1 hr)				
39	Pass WMT-IR	18	Mild (<= 1 hr)				
39	Pass WMT-IR	19	Mild (<= 1 hr)				
39	Pass WMT-IR	20	Mild (<= 1 hr)				

## IS WMT IR FAILURE GREATER IN MILD OR IN MODERATE-SEVERE TBI?

The critical question to ask of these data is whether there are more WMT failures in the least severe cases of TBI (as claimed by Green et al) or the reverse (as claimed by Bowden et al).

In the “mild” TBI group of Bowden to the left and above, we find that **16 cases fail WMT** and **26 cases pass WMT**.

This represents a **failure rate of 38%**. On the next page, we see equivalent data for the moderate to severe TBI cases.

Raw WMTIR	WMT Fail	Failure #	PTA Severity
37	Pass WMT-IR	1	Moderate (= 1-24)
39	Pass WMT-IR	2	Moderate (= 1-24)
39	Pass WMT-IR	3	Moderate (= 1-24)
39	Pass WMT-IR	4	Moderate (= 1-24)
40	Pass WMT-IR	5	Moderate (= 1-24)
40	Pass WMT-IR	6	Moderate (= 1-24)
40	Pass WMT-IR	7	Moderate (= 1-24)
40	Pass WMT-IR	8	Moderate (= 1-24)
26	Fail WMT-IR	1	Moderate (= 1-24)
14	Fail WMT-IR	2	Severe (> 24)
18	Fail WMT-IR	3	Severe (> 24)
21	Fail WMT-IR	4	Severe (> 24)
25	Fail WMT-IR	5	Severe (> 24)
27	Fail WMT-IR	6	Severe (> 24)
28	Fail WMT-IR	7	Severe (> 24)
28	Fail WMT-IR	8	Severe (> 24)
29	Fail WMT-IR	9	Severe (> 24)
30	Fail WMT-IR	10	Severe (> 24)
30	Fail WMT-IR	11	Severe (> 24)
31	Fail WMT-IR	12	Severe (> 24)
31	Fail WMT-IR	13	Severe (> 24)
33	Fail WMT-IR	14	Severe (> 24)
33	Fail WMT-IR	15	Severe (> 24)
35	Pass WMT-IR	9	Severe (> 24)
35	Pass WMT-IR	10	Severe (> 24)
35	Pass WMT-IR	11	Severe (> 24)
35	Pass WMT-IR	12	Severe (> 24)
37	Pass WMT-IR	13	Severe (> 24)
37	Pass WMT-IR	14	Severe (> 24)
37	Pass WMT-IR	15	Severe (> 24)
38	Pass WMT-IR	16	Severe (> 24)
39	Pass WMT-IR	17	Severe (> 24)
39	Pass WMT-IR	18	Severe (> 24)
39	Pass WMT-IR	19	Severe (> 24)
39	Pass WMT-IR	20	Severe (> 24)
39	Pass WMT-IR	21	Severe (> 24)
39	Pass WMT-IR	22	Severe (> 24)
39	Pass WMT-IR	23	Severe (> 24)
39	Pass WMT-IR	24	Severe (> 24)
39	Pass WMT-IR	25	Severe (> 24)
40	Pass WMT-IR	26	Severe (> 24)
40	Pass WMT-IR	27	Severe (> 24)
40	Pass WMT-IR	28	Severe (> 24)
40	Pass WMT-IR	29	Severe (> 24)
40	Pass WMT-IR	30	Severe (> 24)
40	Pass WMT-IR	31	Severe (> 24)
40	Pass WMT-IR	32	Severe (> 24)
40	Pass WMT-IR	33	Severe (> 24)
40	Pass WMT-IR	34	Severe (> 24)
40	Pass WMT-IR	35	Severe (> 24)
40	Pass WMT-IR	36	Severe (> 24)
40	Pass WMT-IR	37	Severe (> 24)
40	Pass WMT-IR	38	Severe (> 24)
40	Pass WMT-IR	39	Severe (> 24)
40	Pass WMT-IR	40	Severe (> 24)
40	Pass WMT-IR	41	Severe (> 24)
40	Pass WMT-IR	42	Severe (> 24)
40	Pass WMT-IR	43	Severe (> 24)

In the moderate-severe TBI cases of Bowden et al, we see that 15 cases fail WMT. However, 43 cases pass WMT.

**This represents a failure rate of 26% in the moderate to severe TBI group, which is lower than the 38% failure rate in the mild group.**

These data are from the whole sample of 100 cases tested with WMT, including 16 children. They show a clear tendency towards more WMT failures in the least severe TBI cases.

Parametric statistics (e.g. ANOVA) are not suitable for WMTIR analysis because this variable is not normally

distributed. However, we may use nonparametric statistics to determine if the 38% rate of WMT IR failure in the mild TBI group is significantly greater than the 26% rate in the moderate to severe TBI group.

**The excess of WMT failures in the mild TBI group is significant at p=.013**

### Mann-Whitney Test

Test Statistics<sup>a</sup>

	WMTIRPCT
Mann-Whitney U	866.000
Wilcoxon W	1769.000
Z	-2.495
Asymp. Sig. (2-tailed)	.013

a. Grouping Variable: PTAHILO

The classification “mild” versus “moderate” or “severe” was taken directly from the Bowden et al spreadsheet.

Past studies showing higher WMT failure rates in mild than in moderate to severe TBI, include the following:-

Iverson, G., Green, P. & Gervais, R. Using the Word Memory Test to detect biased responding in head injury litigation. The Journal of Cognitive Rehabilitation, 17 (2), 4-8, 1999

Green, P., Iverson, G. & Allen, L. Detecting malingering in head injury litigation with the Word Memory Test. Brain Injury, 1999, 13 (10) 813-819

Green, P, Rohling, ML, Lees-Haley, PR & Allen LM. (2001) Effort has a greater effect on test scores than severe brain injury in compensation claimants. Brain Injury, 15 (12) 1045-1060

Flaro, L., Green, P. & Robertson, E. (2007) Word Memory Test failure 23 times higher in mild brain injury than parents seeking custody: The power of external incentives. Brain Injury, 21, 4, 373-383.

Green, P. (2007) The pervasive influence of effort on neuropsychological tests. Physical Medicine Rehabilitation Clinics of North America, 18 (1), 43-68.

A greater failure rate on a numerical SVT (CARB) in mild than in severe TBI was also reported in this study:-

Green, P. and Iverson, G. (2001) Validation of the Computerized Assessment of Response Bias in litigating patients with head injuries. The Clinical Neuropsychologist, 15 (4), 492-497.

When all WMT subtests are administered, we can study the patterns in the individual case to determine whether failures are due to poor effort or very severe impairment equivalent to that found in dementia. There are distinctive profiles of score on the WMT (and on MSVT and NV-MSVT) which occur in dementia but not in simulators. For example, see the abstract from Howe et al (in press) summarized at the bottom of the page at [www.wordmemorytest.com](http://www.wordmemorytest.com) Their study showed that, in people with dementia, there was less than a 5% false positive rate using the MSVT and the possible dementia formula. In comparison, the false positive rates with other effort tests in people with dementia would be more like 50% and above.

The WMT, MSVT and NV-MSVT are unique among SVTs because, in most cases of failure on easy subtests, they allow us to differentiate between failure owing to poor effort versus dementia. In the Bowden data, only the first WMT subtest is presented and so we are unable to analyze the patterns of scores on easy versus harder subtests.