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High specificity for dementia with MSVT, NV-MSVT & WMT

Most effort tests are unable to differentiate between low scores from poor effort as opposed to genuine severe impairment (e.g. dementia). For example, the scores of someone failing the TOMM, ASTM, VSVT or RDS because of dementia are indistinguishable from the scores of someone making a poor effort.

The MSVT, WMT and NV-MSVT stand out because the outcome is not just pass or fail. The pattern of scores across subtests of differing levels of difficulty allows us to discriminate between low scores from poor effort as opposed to genuine severe impairment (e.g. dementia).

MSVT: In the Brazilian simulator study by Dr. John Courtney, described in the MSVT test manual (Appendix B), none of the 70 **simulators** was able to produce a credible dementia profile on the MSVT and only one out of 280 good effort volunteers produced a dementia profile. However, 97% of the simulators produced a simulator profile, suggestive of poor effort. In contrast, Howe *et al* (2007) found that 95% of **dementia** cases either passed MSVT or they failed MSVT with the specific profile characteristic of dementia (i.e. only a 5% false positive rate on MSVT in dementia). Howe *et al* (2007) showed that it is not sufficient to study whether the easy MSVT subtests are passed or failed. Instead, the profile of scores across MSVT subtests must also be analyzed.

See Howe et al.(2007) - Archives of Clinical Neuropsychology, Vol. 22, 6, pages 753-761

Some people with dementia will fail IR, DR or CNS on the MSVT but they will usually show a certain degree of advantage of the mean of the easy subtests versus the mean of the harder subtests. This was first noted in the original dementia sample studied by Dr. Robbi Brockhaus, in which more than 90% of dementia patients showed more than a certain advantage on the easy versus the harder MSVT subtests. The basic principle is that people who are so severely impaired that they cannot pass the easy subtests will score much lower on the harder subtests. This corresponds with the actual gradient of difficulty across these subtests. In contrast, simulators tend not to perform in keeping with the true difficulty gradient.

WMT: The same principles apply to the WMT, on which people with dementia will typically show a marked gradient of scores on the chart, with higher scores on easier

subtests and lower scores on harder subtests.

See "The Compendium of Neuropsychological Tests" by Strauss, Sherman & Spreen (2007, p. 1188), where proper interpretation of the WMT is encouraged (i.e. using all subtests and analyzing the profile).

In 64 cases of early dementia or MCI seen at a memory clinic for the elderly in Puerto Rico, Dr. Jorge Montijo found that WMT was failed in 14 out of 64 cases. However, all 14 cases showed a dementia profile, with more than a certain advantage of the mean of the easy subtests versus the mean of the harder subtests (i.e. zero false positives in dementia and MCI).

In the original simulator study, 26 out of 27 simulators failed the WMT. In 20 patients who took the WMT and were asked to fake memory impairment, all cases failed WMT and 9 of them (45% of sample) produced a possible dementia profile. Using this method, all or nearly all cases of dementia would not be classified as poor effort but about half of simulators would not be detected by this principle alone. Another principle which helps to identify invalid data is order violations (scoring lower on an easy task than on a harder task). 70% of simulators either produced a simulator profile or showed order violations on WMT (i.e. 70% sensitivity, 100% specificity).

100% specificity for dementia with NV-MSVT, using principles A, B1, B2 & B3

On the NV-MSVT, **criterion A** is met when the person scores below the cut-off on the mean of the easy subtests (see program); If A is met, we examine details of the profile (B1, B2 & B3) to determine whether the pattern resembles that seen in dementia or simulators; **Criterion B1** is met when the score on a certain subtest is not at least 11 points below the mean of another four scores in the chart (known as the Pinocchio principle); **Criterion B2** is met when the mean of the two easiest subtests is not at least 20 points higher than the mean of the two most difficult subtests; **Criterion B3** is met when the standard deviation of IR, DR, CNS, DRA & DRV is 12 or above.

No good effort volunteer was wrongly classified as poor effort (i.e. using criterion A alone) but 97.5% of simulators failed NV-MSVT; Using all four principles (A, B1, B2 & B3), *no dementia case was wrongly classified as poor effort* but 53% of simulators met all four criteria (i.e. 53% sensitivity, 100% specificity).

72.5% of simulators met all three of criteria A, B1 and B2 but only 5% of dementia cases did so.

Hence, the optimum formula for identifying simulators while minimizing false positives in dementia is to use these principles (A, B1 & B2).

Table 1: 100% SPECIFICITY IN DEMENTIA when applying criteria A, B1, B2 & N3 to NV-MSVT scores from 40 healthy volunteers, 40 simulators & 42 people with dementia.

Failure on NV-MSVT by criteria A, B1, B2 or B3	**40 GOOD EFFORT VOLUNTEERS**	**40 VOLUNTEER SIMULATORS**	**42 PATIENTS WITH DEMENTIA**
A	0%	97.5%	83%
A but not B1 or B2	0%	2.5%	64%
All of A, B1 & B2	**0%**	**72.5%**	**5%**
All of A, B1, B2 & B3	**0%**	**53%**	**0%**

The WMT, MSVT and NV-MSVT individually have a characteristic profile which is seen in dementia. People who are asked to take the test and fake impairment, as a group, have a different profile.

- Using any one of these tests, the vast majority of people with dementia will be identified as cases of possible genuine severe impairment. In contrast, most simulators do not produce the dementia profile on any of these tests.
- Unlike other effort tests, when we use the WMT, MSVT and NV-MSVT together, it is possible to decide in nearly all cases whether the profiles are from someone with dementia or from a case of poor effort.
- Data from numerous comparison groups are available within each test program to aid interpretation of the results of a single case, including

dementia patient groups and simulator groups.

- **<u>Conclusion:</u> No other effort test matches the very high specificity of WMT, MSVT and NV-MSVT in dementia (i.e. allowing us to recognize someone suffering from dementia or equivalent very severe impairment rather than poor effort) while simultaneously having high sensitivity to poor effort in non-demented populations. When used in conjunction with each other, these tests are very effective in differentiating between genuine low scores owing to dementia versus implausibly low scores resulting from poor effort.**

Note: Specific details about subtests and cut scores have been withheld from the above account for purposes of maintaining the integrity of the tests