GOAL -- Genuine, Trusted Neuropsychological Test Performance as the basis for Neuropsychological Decision Making is Essential

Passed SVT/PVT/Effort testing as currently in use may be the best method to infer valid psychological/neuropsychological test performance.

At or below chance SVT/PVT/Effort testing scores are indicative of invalid test performance, with below chance performance indicative of malingering.

HOWEVER,

SVT/PVT/Effort testing has a relatively recent history. There are numerous major questions that must be addressed. There are few critical studies that challenge some of the assumptions for the general use and clinical interpretation, particularly for the intermediate group where SVT/PVT/Effort performance is far above chance, but below the designated cut point. It is unsatisfactory to simply conclude “invalid” test performance without answering “why?”

Detecting Deception and SVT/PVT/Effort testing

Deception in the Broader Context of Psychological Science
“Deception is a ubiquitous aspect of every day human interaction and remarkably varied in the forms it can take, the contexts in which it can occur and the motives ascribed to its perpetrators (p. 2)” as quoted from Wright et al. (2013). Deceptively simple … The “deception-general” ability and the need to put the liar under the spotlight. Frontiers in Neuroscience. DOI:10.3389/fnins.2013.00152

“… the ways in which deception is operationalized in the laboratory setting are still hugely varied, and almost universally problematic in some regard.”

“… there is a deceiver and the deceived – the liar and the lie detector.”
Determining Validity of Neuropsychological Test Performance is of Paramount Importance if test findings are going to have relevance for diagnosis, disability determination and making prognostic statements about treatment and outcome.

The challenge for Neuropsychology as outlined by Millis (Methodological challenges in assessment of cognition following mild head injury. *Journal of Neurotrauma*, 26: 2409 -2410, 2009) : “All cognitive tests require that patients give their best effort when completing them. Furthermore, cognitive tests do not directly measure cognition: they measure behavior from which we make inferences about cognition. People are able to consciously alter or modify their behavior, including their behavior when performing cognitive tests. Ostensibly poor or “impaired” test scores will be obtained if an examinee withholds effort [e.g., reacting slowly to reaction time tests (p.2409)].
What is in a name?

LETTER TO THE EDITOR

Effort – What is it, How Should it be Measured?

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(RECEIVED November 12, 2010; FINAL REVISION March 16, 2011; ACCEPTED March 16, 2011)

Short List of Some of the Problems

What is the agreed upon term or terms? What is the universally accepted operational definition? SVT/PVT/Effort? IOM uses the term “Symptom Validity” - is this the appropriate term?

If one looks at titles in the Psychological and Neuropsychological SVT/PVT/Effort literature often there is a very loose association with terms that typically are ill-defined but often used interchangeably like exaggeration, poor effort, embellishment, malingering, non-credible, biased, non-reliable, etc., where the ONLY support for the terms comes from below cut-point SVT/PVT/Effort performance. Circular reasoning abounds in some studies.

The field clearly lacks agreed upon research design and uniformity in how to approach the topic.
There are numerous SVT/PVT/Effort measures without clear understanding of which one should be used in what circumstance in association with what neuropsychological measures. Most SVT/PVT/Effort measures are not embedded and are external.

Research Designs are mostly samples of convenience with retrospective classification where the methods lack independence. The majority of SVT/PVT/Effort publications are samples of convenience by individual practitioners and therefore open to issues of sampling bias. Studies that are not institutionally based have not had to deal with IRB or grant funding issues with regards to design, methodological rigor and the like.

There are no NIH-funded studies of SVT/PVT/Effort measures and their use.

Development of SVT/PVT/Effort testing has been driven by test developers and forensics. How are financial issues acknowledged?

No studies have systematically examined neuroimaging identified pathology that may be associated with SVT/PVT/Effort performance.

Almost all SVT/PVT/Effort studies have been examinee focused and have not examined examiner circumstances and characteristics. In forensic settings, there may be an examiner bias to interpret SVT/PVT/Effort issue as merely “Malingering” and “Invalid.”

Proprietary (Copyright) nature of SVT/PVT/Effort measure preclude typical analyses.
SVT/PVT/Effort researchers have all but ignored the neurobiology effort

The ONLY cognitive task that requires “no effort” is an alerting/orienting

Cognitive Neuroscience – Manipulation of effort

If performance improves under incentive, does that invalidate reduced performance when incentive is low or absent?

Incentive relates to the integrity of white matter cingulum bundle.
What is the “Effort” Network?
Mental effort and cognitive neuroscience studies have been conducted using functional neuroimaging techniques for over 30 years all demonstrating this basic pattern as shown below:


Neurobiology of “effort” involves frontotemporolimbic and basal ganglia, regions that are key in understanding most neurological and neuropsychiatric disorders that would be assessed with psychological and neuropsychological techniques.


Symptom Validity Testing, Effort, and Neuropsychological Assessment

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(RECEIVED November 14, 2011; FINAL REVISION February 4, 2012; ACCEPTED February 8, 2012)
TOMM                       Word Memory Test
Trial 1       45               IR         78               FAILURE
Trial 2       50               DR       85           PASS
CNS     78               FAILURE

Fig. 2. MRI showing partial temporal lobectomy. Pre-Surgery Test of Memory and Malingering (TOMM): Trial 1 = 50/50; Trial 2 = 50/50; Test of Neuropsychological Malingering (TNM) = 90% correct (see Hall and Pritchard, 1996). Post-Surgery: TOMM Trial 1 = 42/50; Trial 2 = 46/50; Delayed = 44/50; Rey 15-Item = 6/15; Word Memory Test (WMT): IR 67.5%, 30 min delay 75%; Free Recall 5%; Free Recall Delay = 7.5%; Free Recall Long Delay = 0.0.

L

DOI

2 Weeks Post-Injury

Fig. 3. The fluid attenuated inversion recovery (FLAIR) sequence magnetic resonance imaging (MRI) was performed in the sub-acute stage demonstrating marked involvement of the right (arrow) medial temporal lobe region of this patient (see arrow). The patient was attempting to return to college and was being evaluated for special assistance placement. On the Wechsler Memory Scale (WMS-IV) he obtained the following: WMS-IV: Audio Memory = 87; Visual Memory = 87; Visual Word Memory = 73; Immediate Memory = 86; Delayed Memory = 84. Immediate Recall: 77.5% (Fail); Delayed Recall: 72.5% (Fail); Consistency: 65.0% (Fail); Multiple Choice: 50.0% (Warning); Paired Associate: 50.0% (Warning); Free Recall: 47.5%; Test of Memory and Malingering (TOMM): Trial 1: 39, Trial 2: 47.
Classic Diminished Performance Curve Related to Effort, BUT, WHAT DOES IT MEAN?

So, group wise all MS patients have reduced performance, regardless of their SVT/PVT/Effort scores. Clearly, not “passing” a SVT measure is associated with substantially lower performance, but if the determination is just for whether memory performance is reduced in patients with MS, whether SVT/PVT/Effort tests were passed or not, MS patients perform below the comparison group.
Neuroimaging Based Methods for Detecting Valid Performance

Schematic paradigm of the directed lie task.

A

Cue

Face

Lie

Response

1000ms

600ms

1200ms

<1000ms

Time

B

Accuracy (%)

100

95

90

85

90

95

100

Reaction Time (ms)

600

550

500

450

95

90

85

F

U

T

L


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Rusconi E, Mitchener-Nissen T. Prospects of functional magnetic resonance imaging as lie detector. Front Hum Neurosci. 2013 Sep 24;7:594


The Future

Cognitive assessment is moving away from traditional “paper-and-pencil” neuropsychological tests.

Virtual assessment tools are being developed that will be integrated with neuroimaging with likely greater ecological validity than traditional methods.

Quantitative and functional neuroimaging algorithms interfaced with cognitive assessment will become techniques that directly assess brain structure and function. The will likely become diagnostic for several neurological and neuropsychiatric disorders.

Whatever SVT/PVT/Effort measures become the standard they will need to take into consideration where the field is headed and be adaptive.