ELSEVIER

Archives of Clinical Neuropsychology 22 (2007) 753–761

Archives of CLINICAL NEUROPSYCHOLOGY

Characterization of the Medical Symptom Validity Test in evaluation of clinically referred memory disorders clinic patients

Laura L.S. Howe [a,*], Ashton M. Anderson [a], David A.S. Kaufman [a], Bonnie C. Sachs [a], David W. Loring [b,a]

[a] *Department of Clinical and Health Psychology, University of Florida, Gainesville, FL, United States*
[b] *Department of Neurology, University of Florida, Gainesville, FL, United States*

Accepted 6 June 2007

Abstract

We prospectively evaluated performance of 63 referrals to a memory disorders clinic who received the Medical Symptom Validity Test (MSVT) as part of their standard neuropsychological evaluation. The patients were grouped based on independent medical diagnoses and presence or absence of a potential financial incentive to under-perform. Twenty-seven patients (42.9%) scored below cutoffs on the MSVT symptom validity indices. Two individuals in the potential financial incentive group showed clear signs of invalid responding (18.2%). Twenty-two of the remaining 25 patients who failed the symptom validity indices corresponded to the dementia profile. Three individuals did not correspond to the dementia profile but are thought to have performed validly representing a 4.8% false positive rate. When considering all MSVT indices, the base rate of invalid responding in the potential financial incentive to under-perform group increased to 27.3%. Combining all groups our base rate of invalid responding was 4.8%. Specific performances are presented.

Keywords: Symptom validity; Dementia; Medical symptom validity test; Neuropsychological assessment; Forensic neuropsychology

1. Introduction

Symptom validity tests (SVTs) are commonly used in medico-legal contexts to assess response bias since a potential incentive to perform poorly exists. Malingering base rates in forensic neuropsychological evaluations have been estimated to be 30–40% (Larrabee, 2003; Mittenberg, Patton, Canyock, & Condit, 2002). The use of SVTs for routine clinical neuropsychological evaluations, however, is less universally agreed upon because a clear incentive to perform badly is not readily apparent in most cases and, unlike assessments performed in a medico-legal context, time and other assessment resources may be limited (Loring, Lee, & Meador, 2005). Thus, clinical test selection is often based upon expected cost–benefit relationships within the context of the specific clinical circumstances and referral questions.

Some recent studies have shown unexpectedly high rates of SVT failure levels in clinical populations without clearly identifiable incentives to perform poorly. Drane et al. (2006) reported 51% of patients with nonepileptic seizures (NES) failed a SVT compared to 8% of patients with epilepsy. One possible explanation for the high rates of SVT failure in selected clinical series is that patients may be either applying for or receiving disability payments, giving rise to a fear

* Corresponding author at: 205 SE 16th Ave., Apt. 3G, Gainesville, FL 32601, United States. Tel.: +1 631 365 3157.
E-mail address: lauralshowe@yahoo.com (L.L.S. Howe).

0887-6177/$ – see front matter © 2007 National Academy of Neuropsychology. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.acn.2007.06.003

of benefit denial or withdrawal. Gervais, Russell, Green, Ferrari, and Pieschl (2001) reported discrepant SVT failure rates based on disability seeking status. Of fibromyalgia patients either applying for or currently receiving disability benefits, 35% failed a SVT. In contrast, only 4% of the fibromyalgia group not seeking or receiving disability benefits failed. Interestingly, 44% of patients seeking disability failed the SVT while only 23% who were already currently on disability scored below cutoffs. Thus, in addition to patients currently applying for disability, there appears to be some perceived incentive for patients already on disability to alter their behavior on neuropsychological measures in order to maintain benefit continuation.

In a sample of epilepsy surgery candidates, Loring et al. (2005) observed SVT performances that were in either the questionable or invalid range in 24/120 patients, although information on disability status was not available to be analyzed. More recently, these same authors found that although intentionally distorted response profiles (i.e., less than chance responding) were rare in a mixed group of clinically referred patients, dementia patients often obtained scores that were below various empirically derived cutoffs (Loring, Larrabee, Lee, & Meador, 2007).

In order to better understand the implications of SVT failures, it is important to know the base rates and characterization of SVT performance in clinical populations without clearly established incentive to perform poorly. Failure to consider base rate information can lead to misdiagnosis and errors in clinical decision-making (Larrabee, 2005). In particular, practitioners may incorrectly question the validity of some neuropsychological results based on a perceived failed SVT performance when the SVT performance is actually valid and corresponds to a known characteristic profile of performance on that particular SVT (e.g., a dementia profile).

An individual giving valid test responses based on true abilities but identified as giving invalid data on a SVT is a false positive error. For SVTs with multiple indices and characterized response profiles, if a patient scores below cutoffs but the SVT profile corresponds to a known responding profile in neurological patients with good task engagement, the individual is not counted as a false positive because the validity of the neuropsychological data is not questioned. Practitioners unfamiliar with particular responding profiles on SVTs, however, may label cases as invalid when they are not. This underscores the importance of characterizing SVT profiles/performance in patient populations and the need for practitioners' to be familiar with the profiles. Symptom validity testing provides one form of verification of our clinical decision-making.

The HIV Neurobehavioral Research Center (HNRC) Group (2003) noted a need for base rate data on SVTs in clinical populations that may be likely to seek disability benefits (Woods et al., 2003). Many studies investigating SVTs in clinical and community dwelling populations have found performance above cutoff scores on the SVTs examined. For example, when investigating subjects with HIV-associated neurocognitive impairment, Woods et al. (2003) found only a 2% base rate of failure on the Hiscock Digit Memory Test (Hiscock & Hiscock, 1989). Similarly, all inpatients diagnosed with major depression (Rees, Tombaugh, & Boulay, 2001) and all community dwelling older adults with mild-to-moderate depression and anxiety (Ashendorf, Constantinou, & McCaffrey, 2004) scored above cutoffs on the Test of Memory Malingering (TOMM) (Tombaugh, 1996).

A recurring theme in the literature is that SVT performance may be impaired in patients with severe dementia or dense amnesia. SVTs are typically easy tasks that can be accomplished with great ease except for when significant cognitive impairment exists. When patients have significant neuropsychological impairment, even the most simple of tasks may be challenging. However, most SVT studies in clinical samples have utilized traumatic brain injury samples, with very few reports including patients with dementia or severe memory impairment.

Slick et al. (2003) reported Victoria Symptom Validity Test (VSVT: Slick, Hopp, Strauss, & Thompson, 1997) scores in six nonlitigating patients with dense anterograde amnesia or severe memory impairment; all patients scored above established cutoffs suggesting the VSVT is not affected by severe memory impairment. Similarly, the Hiscock Digit Memory Test had a correct classification rate of 95–100% in patients with severe but stable cerebral dysfunction and unequivocal memory impairment (Prigatano & Amin, 1993).

Various SVTs have differential sensitivity to invalid responding and task engagement (e.g., Gervais, Rohling, Green, & Ford, 2004). The Word Memory Test (WMT: Green, 2003) is a computerized 40-item word pair memory task that assesses a patient's memory and symptom validity based on level of performance on each trial and consistency of responding over trials. It has been shown in numerous studies to display high sensitivity to malingered neurocognitive deficits (e.g., Iverson, Green, & Gervais, 1999; Tan, Slick, Strauss, & Hultsch, 2002). The Medical Symptom Validity Test (MSVT: Green, 2004) is shorter but similar to the Word Memory Test. The MSVT is a short computerized verbal memory screening test with multiple subtests measuring memory and response consistency. Ten word pairs representing common objects that are easy to imagine (e.g., French-Fries) are presented over two trials. Following presentation,

Immediate Recognition memory (IR) is tested. After a 10-minute delay, Delayed Recognition memory (DR) is tested, followed by a Paired-Associates trial (PA) where the first word of each pair is presented and the ability to recall the second word is assessed. Finally, there is a Free Recall trial (FR). In addition to memory performance, a consistency variable (CNS) is calculated to reflect recall consistency across tasks.

There are few published MSVT studies. The clinical populations described in the MSVT manual show a ceiling effect on the first three symptom validity subtests (i.e., Immediate Recognition, Delayed Recognition, Consistency). For example, in a study of 33 children tested clinically with a mean age of 12, nearly all obtained almost 100% on the immediate, delayed, and consistency indices (Green, 2004). A cutoff score of 85 or less is suggested for these indices and performance at or below a score of 85 indicates a failure of the symptom validity subtests and further analysis of the profile and clinical factors must be considered. Compared to children and adults presented in the MSVT manual, a score of 85% on the MSVT IR or DR subtests reflects performance at least two standard deviations below the mean for adults and children responding consistently. Using this cutoff, Merten, Green, Henry, Blaskewitz, and Brockhaus (2005) investigated a German-language version of the MSVT in an analog study of experimental malingerers and reported 100% sensitivity and specificity between simulators and the control group. Simulators have been shown to have very different profiles than those with actual neurocognitive impairment (e.g., Green, 2004).

In regards to evaluative cases, when individuals involved in legal cases malinger neurocognitive impairment, the most frequently displayed symptom is memory impairment. Additionally, when individuals apply for disability, many also claim memory impairment. As such, these are two additional reasons why it is important to be able to distinguish between feigned and genuine memory impairment. The only clinical group shown to not consistently score in the normal range on MSVT validity measures due to neuropathology instead of diminished symptom validity is individuals diagnosed with dementia who have accompanying clinical correlates of significant disability. Although the MSVT contains a sample of patients with early and advanced dementia for comparative purposes, samples outside of those contained in the program have not been characterized. Since individuals with dementia are the only clinical group shown to score below established cutoffs due to genuine memory impairment it is important to characterize the profile of individuals known to have dementia and varying levels of memory impairment who have no known medico-legal or financial incentive to perform poorly. This will enhance the ability of individual clinicians to compare the data they obtain to known groups with particular neurological deficits in order to better understand their findings.

Increased understanding of how varying levels of memory impairment affect performance on the MSVT indices will increase the practitioner's ability to correctly classify potential false positives when they occur and enhance the utility of the measure in clinical and forensic settings. Thus, the primary aim of this study was to prospectively examine and characterize the MSVT performance profiles for clinical referrals to a memory disorders clinic, the majority of whom had dementia and no known medico-legal or financial incentive to perform poorly.

2. Method

2.1. Participants

Participants were 63 patients selected from consecutive referrals who consented to have their clinical data included in a research database and were evaluated between February and December of 2006 and administered the MSVT as part of their regular clinical neuropsychological examination. Eighty-four outpatients were referred to the memory disorders clinic during this time period due to potential memory difficulties. Seventy-six of those individuals consented to have their data included in the research database and all were referred from neurologists based at a large academic medical center. Of those 76 individuals, three individuals were not tested because the MSVT was not available at the time of the assessment, four were not tested because of severe dementia and aphasic problems, and one was not tested because the patient was only seen for the insurance pre-interview and an evaluation was not conducted. This resulted in an initial sample of 68 patients who consented to research and were administered the MSVT as part of their regular clinical evaluation. However, the administration of the MSVT was invalid for five people. One patient became ill during delayed recognition and the administration was stopped. Four additional administrations were invalid due to examiner error during test administration (i.e., examiner read the first word of the pair during the free recall, free recall was not administered, or examiner read the word list for the first viewing). These cases were not included in the analysis. The

Table 1
Demographic characterization of each sample

Sample	*N*	Age [*M* (S.D.), range]	Education [*M* (S.D.), range]	FSIQ[a] [*M* (S.D.), range]	WTAR[b] SS [*M* (S.D.), range]
All referrals	63	68.44 (12.92), 22–90	13.89 (3.01), 5–20	93.04 (13.77), 59–126	102.60 (16.57), 49–126
Disability	11	53.00 (11.11), 22–62	12.82 (2.86), 9–19	86.00 (9.06), 74–102	99.90 (16.15), 71–120
NCF	1	58	13	102	113
MCI	3	44.33 (19.50), 22–58	13.33 (2.31), 12–16	89.33 (9.02), 80–98	112.50 (10.61), 105–120
Dementia	5	56.60 (5.68), 47–62	11.60 (2.30), 9–14	82.20 (5.63), 76–89	95.20 (12.26), 81–113
UN	2	54.50 (4.95), 51–58	15.00 (5.66), 11–19	82.50 (12.02), 74–91	92.50 (30.41), 71–114
No Disability	52	71.71 (10.79), 39–90	14.12 (3.01), 5–20	94.76 (14.25), 59–126	103.14 (16.76), 49–126
NCF	5	57.20 (17.33), 39–81	15.40 (1.67), 14–18	107.80 (10.26), 102–126	112.50 (10.66), 101–126
MCI	16	69.50 (9.60), 51–90	15.75 (2.93), 12–20	100.94 (10.34), 85–118	107.00 (12.95), 78–123
Dementia	31	75.19 (7.85), 55–86	13.06 (2.83), 5–20	87.92 (13.71), 59–117	99.83 (18.56), 49–123
Early	13	73.54 (9.03), 55–85	12.00 (2.42), 5–16	89.27 (14.54), 66–117	98.77 (19.00), 49–120
Adv	18	76.39 (6.89), 64–86	13.83 (2.92), 11–20	86.77 (13.45), 59–104	100.65 (18.77), 50–123
UN	0				

Note. UN: Unclassified; NCF: Normal Cognitive Functioning; MCI: Mild Cognitive Impairment; Adv: Advanced.
[a] FSIQ estimates were only available for 56 of the 63 participants.
[b] WTAR scores were only available for 60 of 63 participants.

final sample size was 63 patients who were divided into two groups to be investigated separately based on presence or absence of a potential medico-legal or financial incentive to under-perform during a clinical evaluation.

The first group consisted of 52 patients with no medico-legal or known financial incentive to under-perform. The second group consisted of 11 individuals similarly referred but with a medico-legal or financial incentive to potentially under-perform. Eleven individuals were either currently on disability ($N = 7$) or applying for disability ($N = 4$) at the time of the evaluation. No other stand alone SVT measures were administered so the staging of the Slick, Sherman and Iverson (1999) criteria for malingered cognitive dysfunction were not determined.

The sample was predominantly Caucasian ($N = 60$; 95.2%). Two participants were African American (3.2 %) and one was Hispanic (1.6 %). Sixty-two percent of the sample was female ($N = 39$) and 38% of the sample was male ($N = 24$). Additional demographic information for each group is presented in Table 1.

2.2. Measures

The MSVT is a short computerized verbal memory screening test with multiple subtests measuring memory and response consistency. Full scale IQ was determined by prorating scores based on performance on selected Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) (Wechsler, 1997a,b) subtests (Vocabulary, Similarities, Digit Span, Block Design, Picture Completion, Digit symbol). One individual was given the Wechsler Abbreviated Scale of Intelligence (WASI: Wechsler, 1999) for clinical considerations. For seven patients a full scale IQ was not derived because due to the severity of cognitive impairments, they did not complete majority of the WAIS-III subtests.

Premorbid intellectual functioning was estimated by the Wechsler Test of Adult Reading (WTAR: Wechsler, 2001). Since the severity of the dementia was not consistently noted by the referring physician, severity of dementia was determined based upon delayed narrative story free recall age-adjusted scaled scores derived from the Logical Memory subtest of the Wechsler Memory Scales-Third Edition (WMS-III: Wechsler, 1997a,b). Individuals with scaled scores of 4 or less were grouped into the Advanced category and the remaining individuals diagnosed with dementia were placed in the Early category (mild-to-moderate impairment). For the age range of 85-years-old or older, the lowest score an individual can obtain on the delayed Logical Memory free recall index is a scaled score of 5 that corresponds to a raw score of 0 story items recalled. To take this psychometric issue into account, we examined individual patient scores in that age range. There were five participants in this group who did not have a potential financial incentive to under-perform. Two individuals had high scores (raw = 14, SS = 11; raw = 21, SS = 13) and three had low scores (raw = 0, SS = 5; raw = 0, SS = 5; raw = 1, SS = 5) on the Logical Memory free recall index. We reclassified the three patients who scored low (i.e., raw = 0, 0, 1) into the Advanced dementia category.

2.3. Procedure

Due to the severity of cognitive impairments sometimes seen in referrals to this clinic and the advanced age of some of the participants, standard MSVT administration was slightly altered in two respects. First, contrary to the standard administration procedures where the examiner leaves the room for part of the test, the examiners did not leave the room during administration of the MSVT. Second, many participants were not familiar with how to use a mouse and laptop computer. Therefore, if the patient was not well acquainted with a mouse, the examiner controlled the mouse for the participant. Other than those two minor alterations, standard administration procedures were followed.

Determination of a potential financial incentive to appear impaired was based on questions contained in the background questionnaire packet. Participants were specifically asked about their work status and if they were receiving any portion of their money from disability. If the participants did not complete their questionnaires, the information was obtained through follow up phone calls.

The sample was divided into individuals with a potential financial incentive to appear impaired due to either being on disability or currently applying for disability (Disability) and individuals without a known potential financial incentive to appear impaired (No Disability). The groups were further subdivided based on independent medical diagnoses given by the referring physician in the course of normal clinical care. The individuals were grouped into diagnostic categories of Normal Cognitive Functioning (NCF), Mild Cognitive Impairment (MCI), Dementia, and Unclassified (UN). The Unclassified group contains patients that the referring neurologist deferred a current diagnosis until further medical and neuropsychological workups were obtained because they had subjective complaints that did not coincide with present findings. Since we are reporting base rates and every referral seen within a time period, we did not think these individuals should be excluded. Within a memory disorders clinic, patients may present with ambiguous symptoms that are not readily explained or symptom clusters that may require a deferred or tentative diagnosis pending further tests or until things progress.

3. Results

3.1. MSVT profiles

The MSVT profiles including the mean, the standard deviation, and the range for all subtests are presented in Table 2. The two individuals whose performance indicated invalid responding were in the disability group. Therefore, the Disability group was subdivided based on validity of performance. The number of individuals obtaining specific scores for each of the MSVT variables for the No Disability subgroups is presented in Table 3.

Each of the groups within our sample displayed distinctive MSVT profiles. The Disability group was the only group containing individuals who clearly produced inconsistent and invalid test results. Although both individuals who displayed invalid test data were diagnosed with MCI, they performed much worse than individuals diagnosed

Table 2
MSVT profiles for each sample

Sample	*N*	IR [*M* (S.D.), range]	DR [*M* (S.D.), range]	CNS [*M* (S.D.), range]	PA [*M* (S.D.), range]	FR [*M* (S.D.), range]
Disability	11	90.00 (13.78), 60–100	90.00 (13.23), 60–100	86.36 (16.29), 50–100	74.55 (30.78), 10–100	43.18 (25.42), 10–80
Valid dis	9	93.33 (12.99), 60–100	92.78 (13.02), 60–100	91.67 (10.90), 70–100	73.33 (34.28), 10–100	41.67 (26.34), 10–80
Invalid dis	2	75.00 (0.00), 75	77.50 (3.54), 75–80	62.50 (17.68), 50–75	80.00 (0.00), 80	50.00 (28.28), 30–70
No disability	52	92.50 (10.12), 60–100	88.27 (12.83), 55–100	86.35 (13.90), 45–100	70.19 (30.39), 0–100	36.54 (26.80), 0–90
NCF	5	100 (0.00), 100	100 (0.00), 100	100 (0.00), 100	96.00 (8.94), 80–100	79.00 (8.94), 65–90
MCI	16	97.81 (3.64), 90–100	93.13 (8.73), 70–100	92.19 (8.75), 70–100	90.00 (13.66), 50–100	51.25 (20.04), 10–80
Dementia	31	88.55 (11.27), 60–100	83.87 (13.65), 55–100	81.13 (14.59), 45–100	55.81 (30.53), 0–100	22.10 (19.44), 0–75
Early	13	93.46 (7.74), 75–100	93.08 (8.55), 70–100	90.38 (8.53), 70–100	76.15 (27.85), 0–100	36.15 (18.73), 15–75
Adv	18	85.00 (12.25), 60–100	77.22 (12.86), 55–95	74.44 (14.54), 45–95	41.11 (23.49), 0–80	11.94 (12.62), 0–40

Note. Valid Dis: Disability cases hypothesized to indicate symptom validity; Invalid Dis: Disability cases indicating inconsistent response validity; NCF: Normal Cognitive Functioning; MCI: Mild Cognitive Impairment; Adv: Advanced.

Table 3
Frequency of patients obtaining specific scores on the MSVT indices for the No Disability sample

	NCF ($N=5$)					MCI ($N=16$)					Early Dementia ($N=13$)					Advanced Dementia ($N=18$)				
	IR	DR	CNS	PA	FR	IR	DR	CNS	PA	FR	IR	DR	CNS	PA	FR	IR	DR	CNS	PA	FR
100	5	5	5	4		11	5	5	8		5	5	2	4		2				
95						3	7	4			4	3	5			3	1	1		
90					1	2	2	5	3		1	3	2	1		5	3	4		
85											2	1	2			3	5	1		
80				1	3				4	2			1	4			1	1	1	
75							1	1			1				1	2	2	5		
70							1	1		3		1	1	1		1	2		2	
65					1										1			2		
60										2				1		2	2	2	2	
55																	2			
50									1	2				1	1			1	4	
45										1							1			
40										2				3				2	1	
35										1				1					1	
30										2				1				3	1	
25														2						
20																		1	1	
15														3					4	
10										1								1	2	
5																			2	
0													1					2	6	

Note. NCF: Normal Cognitive Functioning; MCI: Mild Cognitive Impairment; IR: Immediate Recognition; DR: Delayed Recognition; CNS: Consistency; PA: Paired Associates; FR: Free Recall.

with dementia on the easy symptom validity indices (i.e., IR, DR) but better then individuals diagnosed with dementia on the hard memory subtests (i.e., PA, FR). This is consistent with a pattern often seen in simulators (Green, 2004).

Within the No Disability group, all of the individuals with normal cognitive functioning scored perfectly and made no mistakes on the symptom validity subtests. Within the MCI group, two individuals scored below cutoffs on the symptom validity subtests. When looking at their complete records and medical charts, they are likely cases of dementia that have not yet been labeled as dementia cases by the neurologist. Based upon neuropsychological evaluation and clinical interview, one case was consistent with a frontotemporal dementia diagnosis and the other case displayed significant memory impairments with mild visual spatial, attention, and motor programming difficulties. Further, both individual's MSVT performance profile was consistent with the dementia profile. Base rate information is presented below.

3.2. Base rates of performance in a memory disorders clinic sample

Based upon established cutoff scores in the MSVT manual, failed performances on the symptom validity indices were calculated for each group (potential false positives). Then, for individuals who failed one or more of the symptom validity indices, we looked at internal consistency of the individual's performance in relation to known brain-behavior relationships, the rest of the neuropsychological profile, and clinical correlates to decide if the failure should be classified as a potential false positive or invalid responding (e.g., true positive and a real SVT failure). Cases were not classified as invalid responding unless clear evidence indicting an implausible profile was present. For example, one of the Disability cases was classified as invalid responding because their performance on the hard memory indices was greater then their performance on the easy SVT indices, a pattern inconsistent with true memory impairment. For the potential false positive cases, we determined if the case conformed to the program's classification criteria to categorize the case as a dementia profile. The rules recommended to classify a case as a dementia profile were: (1) a score of 85 or below on one of the symptom validity indices, (2) no scores below chance, (3) at least a 20-point difference between the mean of the easy items and the mean of the hard items (easy > hard), (4) IR and DR are greater than FR,

Table 4
Classification of actual false positives for each sample

Sample	*N*	Failed SVI	Invalid Responding[a]	Potential FP[b]	DP	Actual FP
All referrals	63	27 (42.9%)	2 (3.17%)	25 (39.68%)	22	3 (4.76%)
Disability	11	5 (45.5%)	2 (18.18%)	3	3	0
NCF	1	0				
MCI	3	2 (66.7%)	2 (66.7%)	0		0
Dementia	5	3 (60%)	0	3	3	0
UN	2	0				
No Disability	52	22 (42.3%)	0			
NCF	5	0				
MCI	16	2 (12.5%)	0	2	2	0
Dementia	31	20 (64.5%)	0	20	17	3
Early	13	5 (38.46%)	0	5	4	1
Adv	18	15 (83.33%)	0	15	13	2
UN	0					

Note. UN: Unclassified; NCF: Normal Cognitive Functioning; MCI: Mild Cognitive Impairment; Adv: Advanced; SVI: Symptom Validity Indices (i.e., IR, DR, or CNS); FP: False Positive; DP: Dementia Profile.

[a] Invalid responding refers to the number of patients in the sample who displayed clear evidence of response invalidity and distortion.

[b] Potential FP refers to the patients who failed one of the symptom validity indices but is hypothesized to have given valid performance and would be classified as a false positive if the profile does not meet the dementia profile criteria.

(5) PA is greater than FR, and (6) clinical correlates of significant disability exist (e.g., independent medical diagnosis of dementia). Potential false positive cases conforming to the dementia profile are not considered actual false positives because they correspond to known profiles and do not indicate poor task engagement or a true fail. We calculated the actual false positives found in our sample.

As shown in Table 4, we found an overall failure rate of 42.90% for the MSVT symptom validity subtests (i.e., scoring 85% or lower on IR, DR, CNS). Of these, two individuals had clear findings of inconsistent responding. Of the remaining 25 individuals, 22 of the profiles corresponded with the dementia profile and would be classified as having valid test results. The profiles of three individuals did not correspond to the known dementia profile but are thought to represent valid profiles. This represents an actual false positive rate of 4.76% in our sample. Three of 63 patients would be classified as producing invalid test results when they are thought to be valid results based on clinical judgment and case considerations. These three cases have some striking similarities and will be presented separately. They all had significant language and comprehension difficulties overlaying a diagnosis of dementia and they all failed to fit the MSVT dementia pattern because FR was greater than or equal to PA.

When our initial overall group was broken down into subgroups based on their potential financial incentive to perform poorly and independent medical diagnoses, several interesting patterns emerged. Both individuals with clear evidence of inconsistent task engagement were in the Disability group creating a base rate of 18.18% for symptom validity failure. When initially characterizing the potential false positives we only included individuals who first failed one of the symptom validity indices since this is how the test is frequently utilized. Secondarily, we looked at all profiles, even those that scored above cutoffs on the symptom validity indices, for internal consistency of results. One additional case emerged that displayed invalid responding because FR was greater than PA and there were no clinical correlates of significant disability which would explain this finding. Considering this additional case as invalid raises the base rate of inconsistent responding in our Disability sample to 27.27%. Even though the sample size of our Disability group is small ($N = 11$) and these were all clinical referrals, the percentage of cases indicating invalid profiles when a potential financial incentive to appear impaired exists is consistent with published estimates of 30% in disability cases (Mittenberg et al., 2002). This accentuates the importance of establishing disability status during clinical evaluations.

When patients were separated by disability status, no cases in the No Disability group had invalid MSVT scores. Combining all groups, we find a base rate of 4.76%, which is relatively consistent with previous estimates (8.0%) of invalid responding found in medical cases (Mittenberg et al., 2002).

Within the NCF group, no individuals failed the MSVT symptom validity indices. Within the MCI group, four individuals failed the MSVT symptom validity indices. The two in the Disability group had clear indications of invalid responding. The two in the No Disability group conformed to the dementia profile and as previously indicated, a review of their complete records and medical charts revealed they are likely cases of dementia that have not yet been labeled as such by the neurologist.

As expected, we found the highest level of symptom validity indices failure in the dementia group. However, the majority of the dementia cases that fell below cutoffs on the symptom validity indices fit the dementia profile and therefore would not be classified as actual false positives or indicate invalid data.

Contrary to studies that have shown mental retardation (FSIQ < 70) does not have a significant effect on WMT symptom validity subtests (Brockhaus & Merten, 2004), dementia appears to be a condition that suppresses scores on symptom validity indices for reasons unrelated to external incentives. Even so, individuals with dementia produce consistent, distinguishable profiles that can be used for comparison with new cases.

4. Discussion

Multiple diagnostic groups displayed different characteristic profiles on the MSVT indices. Twenty-seven patients in our sample (42.9%) scored below cutoffs for the MSVT symptom validity indices. If profile analysis is not taken into consideration, all of these individuals may incorrectly be labeled as producing invalid responding. This could have a profound effect on the individual if they are misclassified. Taking profile analysis into account, two individuals showed clear signs of inconsistent and invalid responding but 22 individuals conformed to the dementia profile. Additionally, one more case of invalid responding was determined when examining the complete profile.

These findings underscore the importance of giving all four subtests of the MSVT as directed in the manual. Failure on one of the first three indices does not yield enough information to determine if they should be classified as an actual false positive, invalid responding, or consistent with the dementia profile. The first two indices must be placed in the context of the last two indices to fully understand the profile. These profiles should aid practitioners in interpretation of the MSVT in clinical and nonclinical populations and assessments.

Two slight alterations in the standard administration were necessary due to the characterization of the clinical population investigated (i.e., severity of impairment and level of familiarity with a computer mouse) that could be construed as a weakness in the present study. However, we do not think the present alterations would negatively affect the study's ability to be generalized. Response time is not a variable for the MSVT so any delay created by the examinee having to convey the answer to the examiner does not impact the results. Additionally, although the examiners remained in the room, they did not give any verbal or nonverbal feedback to the examinee's regarding their performance. They were present for safety considerations and to assure the examinee completed the task. These same alterations would likely have to be made for patients with a similar level of impairment. For these reasons, we do not think the present alterations negatively impact the study's ability to generalize.

The relatively small size of the group with a potential financial incentive to appear impaired ($N = 11$) necessitates using caution when viewing those results. Although the trends mentioned may be interesting, further research with a larger sample would be needed to replicate the trends noted in this study.

Future research should investigate the classification accuracy of the MSVT's embedded dementia profile based on independent medical diagnoses. Additionally, future research should focus on the utility of the MSVT as a memory measure and the ability of the last two indices to add clinically useful information about memory performance. Further investigations grouping samples by dementia etiology may be of interest. Also, characterizing performance in populations known to have apathy and frontal pathology may again yield interesting patterns.

Overall, we provided data and base rate information on clinical referrals to our memory disorders clinic. As shown, assessing for symptom validity is important even in clinical referrals. Establishing disability seeking status and the presence of any medico-legal or potential financial incentive is needed in clinical as well as legal referrals. In our sample the presence of a potential financial incentive impacted performance on the MSVT. The importance of placing findings in the context of the clinical information was also highlighted and different diagnostic groups displayed characteristic profiles of performance on the MSVT. Furthermore, when SVTs have diagnostic profiles, the SVTs should be administered as intended and all indices required given so the clinician can correctly classify potential false positives and false negatives.

References

Ashendorf, L., Constantinou, M., & McCaffrey, R. J. (2004). The effect of depression and anxiety on the TOMM in community-dwelling older adults. *Archives of Clinical Neuropsychology*, *19*, 125–130.

Brockhaus, R., & Merten, T. (2004). Neuropsychologische diagnostik suboptimalen leistungsverhaltens mit dem Word Memory Test. *Nervenartz*, *75*, 882–887.

Drane, D. L., Williamson, D. J., Stroup, E. S., Holmes, M. D., Jung, M., Koerner, E., et al. (2006). Cognitive impairment is not equal in patients with epileptic and psychogenic nonepileptic seizures. *Epilepsia*, *47*, 1879–1886.

Gervais, R. O., Rohling, M. L., Green, P., & Ford, W. (2004). A comparison of WMT, CARB, and TOMM failure rates in non-head injury disability claimants. *Archives of Clinical Neuropsychology*, *19*, 475–487.

Gervais, R. O., Russell, A. S., Green, P., Ferrari, R., & Pieschl, S. D. (2001). Effort testing in patients with fibromyalgia and disability incentives. *Journal of Rheumatology*, *28*, 1892–1899.

Green, P. (2003). *Green's Word Memory Test for Windows: User's manual*. Edmonton, Canada: Green's Publishing.

Green, P. (2004). *Green's Medical Symptom Validity Test (MSVT) for Microsoft Windows: User's manual*. Edmonton, Canada: Green's Publishing.

Hiscock, M., & Hiscock, C. K. (1989). Refining the forced choice method for the detection of malingering. *Journal of Clinical and Experimental Neuropsychology*, *11*, 967–974.

Iverson, G., Green, P., & Gervais, R. (1999). Using the Word Memory Test to detect biased responding in head injury litigation. *Journal of Cognitive Rehabilitation*, *17*, 2–6.

Larrabee, G. J. (2003). Detection of malingering using atypical performance patterns on standard neuropsychological tests. *The Clinical Neuropsychologist*, *17*, 410–425.

Larrabee, G. J. (2005). *Forensic neuropsychology: A scientific approach*. New York: Oxford University Press.

Loring, D. W., Lee, G., & Meador, K. J. (2005). Victoria Symptom Validity Test performance in nonlitigating epilepsy surgery candidates. *Journal of Clinical and Experimental Neuropsychology*, *27*, 610–617.

Loring, D. W., Larrabee, G. J., Lee, G. P., & Meador, K. J. (2007). Victoria Symptom Validity Test performance in a heterogeneous clinical sample. *The Clinical Neuropsychologist*, *21*, 522–531.

Merten, T., Green, P., Henry, M., Blaskewitz, N., & Brockhaus, R. (2005). Analog validation of German-language symptom validity tests and the influence of coaching. *Archives of Clinical Neuropsychology*, *20*, 719–726.

Mittenberg, W., Patton, C., Canyock, E. M., & Condit, D. C. (2002). Base rates of malingering and symptom exaggeration. *Journal of Experimental Neuropsychology*, *24*, 1094–1102.

Prigatano, G. P., & Amin, K. (1993). Digit Memory Test: Unequivocal cerebral dysfunction and suspected malingering. *Journal of Experimental Neuropsychology*, *15*, 537–546.

Rees, L. M., Tombaugh, T. N., & Boulay, L. (2001). Depression and the Test of Memory Malingering. *Archives of Clinical Neuropsychology*, *6*, 501–506.

Slick, D. J., Hopp, G., Strauss, E., & Thompson, G. B. (1997). *Manual for the Victoria Symptom Validity Test*. Odessa, FL: Psychological Assessment Resources.

Slick, D. J., Sherman, E., & Iverson, G. L. (1999). Diagnostic criteria for malingered neurocognitive dysfunction: Proposed standards for clinical practice and research. *The Clinical Neuropsychologist*, *23*, 545–561.

Slick, D. J., Tan, J. E., Strauss, E. H., Mateer, C. A., Harnadek, M., & Sherman, E. (2003). Victoria symptom validity test scores in patients with severe or profound memory impairment: Nonlitigants case studies. *The Clinical Neuropsychologist*, *17*, 390–394.

Tan, J. E., Slick, D. J., Strauss, E., & Hultsch, D. F. (2002). How'd they do it? Malingering strategies on symptom validity tests. *The Clinical Neuropsychologist*, *16*, 495–505.

Tombaugh, T. N. (1996). *Test of Memory Malingering*. Los Angeles: Western Psychological Services.

Wechsler, D. (1997a). *Wechsler Adult Intelligence Scale: Third Edition manual*. San Antonio, TX: The Psychological Corporation.

Wechsler, D. (1997b). *Wechsler Memory Scale: Third Edition manual*. San Antonio, TX: The Psychological Corporation.

Wechsler, D. (1999). *Wechsler Abbreviated scale of Intelligence manual*. San Antonio, TX: The Psychological Corporation.

Wechsler, D. (2001). *Wechsler Test of Adult Reading Manual*. San Antonio, TX: The Psychological Corporation.

Woods, S. P., Conover, E., Weinborn, M., Rippeth, J. D., Brill, R. M., Heaton, R., et al. (2003). Base rate of Hiscock Digit Memory test failure in HIV-associated neurocognitive disorders. *The Clinical Neuropsychologist*, *17*, 383–389.