Performance of Substance Abusers With Memory Deficits on Measures of Malingering

Peter A. Arnett
Washington State University

Michael D. Franzen
Medical College of Pennsylvania and Hahnemann University

The effects of memory impairment on various malingering indices were assessed in a substance abusing population. Groups were formed by using scores from the Delayed Memory Index of the Wechsler Memory Scale-Revised and selecting individuals from an addictions recovery unit in the top and bottom quintiles. Quintile group differences were found for number correct on free and forced-choice recall on the 21-Item Wordlist; total time for grouped and ungrouped dots on the Rev Dot Counting procedure; and addition errors on the Memorization of 16 Items test. All differences found were in the direction of better performance by subjects with better Delayed Memory Index scores; however, all of the differences were small. With the exception of the free recall index from the 21-Item Wordlist, all subjects had scores on the malingering measures beyond the cutoffs typically used to detect malingering in clinical populations. These findings suggest that, even in memory-impaired populations, memory measures of malingering are valid. © 1997 National Academy of Neuropsychology. Published by Elsevier Science Ltd

A variety of memory measures have been developed to assist in the detection of exaggerated memory impairment (Brandt, 1988). However, because many neurologically impaired individuals suffer from significant memory impairment, the use of measures designed to detect malingering has the potential limitation of identifying false positives (i.e., truly memory-impaired individuals being misidentified as giving exaggerated impairment). This outcome may occur because the tests used to evaluate biased responding are designed to be similar to memory tests so that subjects will perceive the tests as having adequate face validity. Given the highly undesirable outcome of identifying someone who is producing optimal memory performance as malingering, it is important to use measures that minimize the identification of false positives. For a detection device to be maximally useful, even individuals with
significant memory impairment should be able to achieve scores beyond the cutoffs established to detect dissimulators.

The purpose of the current study was to evaluate subjects from an inpatient population of substance abusers with impaired and unimpaired delayed memory on three measures typically used to detect malingering. It was predicted that although subjects with unimpaired delayed memory would perform better on the malingering measures than subjects with poor delayed memory, even subjects with poor delayed memory would perform above the cutoffs used to detect malingerers. Differential effect sizes for the tests were predicted. The tests specifically designed for the detection of biased responding in memory, the 21-Item Wordlist (Iverson, Franzen, & McCracken, 1991) and the Memorization of 16 Items (MSIT; Paul, Franzen, Cohen, & Fremouw, 1992), were predicted to have a greater effect size associated with actual memory impairment than the test used for detection of biased responding in general neuropsychological assessment, the Rey Dot Counting procedure (Rey, 1941).

**METHOD**

**Subjects**

An initial sample of 149 subjects (103 males, 46 females) was drawn from successive admissions to an addictions recovery unit. The mean age of the sample equaled 42.3 (13.6) and mean education was 13.0 (3.3). Only subjects who could be assumed to be performing at their optimal effort were used. Subjects generally were motivated to perform, given the rehabilitative focus of the program, and no patient who was pursuing disability was included. Subjects were otherwise excluded if test data, observations, or judgment of the attending physician or neuropsychologist indicated malingering. The vast majority of subjects abused alcohol. Approximately 20% abused alcohol and other substances, with marijuana being the primary “other” substance and less frequent reports of cocaine, benzodiazepine, or narcotic use. Very few subjects exclusively used substances besides alcohol. Overall, abuse patterns were very similar to those reported by Franzen, Wilhelm, and Haut (1995); samples for both studies were drawn from the same addictions recovery program. No subjects were included if they carried diagnoses of major depression or schizophrenia because these diagnoses have neuropsychological correlates.
The distribution of scores obtained on the Wechsler Memory Scale-Revised (WMS-R; Wechsler, 1987) was examined in this sample. Groups were formed by using scores from the Delayed Memory Index of the WMS-R and selecting subjects in the top and bottom 20% (Standard Score <80 and >106, hereafter referred to as the quintile groups). See Table 1 for demographic characteristics of these two groups. The Delayed Memory Index was used to form groups instead of the General Memory Index because, as Lezak (1995, pp. 503–505) notes, the Delayed Memory Index tends to be the most sensitive index of memory impairment on the WMS-R across a variety of populations. She also notes that it is a more sensitive measure of what is generally considered to be memory than the immediate recall indices that comprise the General Memory Index. Nonetheless, it is worth noting that Franzen et al. (1995) reported that both the Delayed Memory Index and the General Memory Index loaded on the same factor in a factor analysis of the WMS-R in a population of recently detoxified substance abusers similar to ours. Additionally, Ryan and Lewis (1988) reported very similar differences between recently detoxified alcoholics and controls on both the Delayed Memory Index and General Memory Index. Thus, our decision to use the Delayed Memory Index instead of the General Memory Index to select our groups was based primarily on theoretical rather than empirical reasons; however, consistent with previous research, the majority of our subjects performed similarly on both indices and similar groups would have been formed had we used the General Memory Index.

MEASURES

The subjects were administered the following tests as part of an initial evaluation: The Wechsler Memory Scale-Revised (WMS-R; Wechsler, 1987), the 21-Item Wordlist (Iverson et al., 1991), the MSIT (Paul et al., 1992), and the Rey Dot Counting procedure (Rey, 1941). Also included in the test battery, but not reported in this paper were the Knox Cube Test (Stone & Wright, 1980), the Trailmaking Test, Forms A and B (Reitan & Wolfson, 1985), as well as alternate forms C and D (McCracken & Franzen, 1992), and the Stroop Color/Word Test (Golden, 1978).

Memory-impaired and memory-unimpaired groups were compared on the following indices: Omission errors, addition errors, and number correct from the MSIT; number correct on free and forced-choice recall of the 21-Item Wordlist; and total time for grouped and ungrouped dots, and number of trend reversals on the Rey Dot Counting procedure. For the MSIT and the Rey Dot Counting procedure, malingering cutoffs for comparison with group means and individual scores were taken from Paul et al. (1992); for the 21-Item Wordlist, cutoffs were selected from Iverson et al. (1991).

Procedures

Before testing began, subjects gave written informed consent with the knowledge that some of the data might be used at a later date for research purposes; however, nothing specific was mentioned about a malingering study. The current study was archival in nature. Prior to testing, subjects were encouraged to put forth their best effort and were told that the test results would be used to assist in their rehabilitation.

All subjects were administered the tests by psychometrists under the supervision of a Ph.D. clinical neuropsychologist. The evaluations were conducted within 1 week of admission to the addiction recovery unit, and at such time as the attending physicians determined the detox period to be complete. All subjects were encouraged to perform to the best of their ability. Tests of malingering were given first in the neuropsychological battery.
TABLE 2
Malingering Index Scores

<table>
<thead>
<tr>
<th>Quintile Groups</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Memorization of 16 Items test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omission errors</td>
<td>.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Addition errors</td>
<td>.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Number correct</td>
<td>14.9</td>
<td>1.1</td>
</tr>
<tr>
<td>21-Item Wordlist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free recall correct</td>
<td>7.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Forced-choice correct</td>
<td>18.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Dot counting procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time, grouped dots</td>
<td>14.8</td>
<td>7.5</td>
</tr>
<tr>
<td>Time, ungrouped dots</td>
<td>39.1</td>
<td>13.7</td>
</tr>
<tr>
<td>Trend reversals, both</td>
<td>1.2</td>
<td>.9</td>
</tr>
</tbody>
</table>

Note. Quintile groups represent subjects with Wechsler Memory Scale-Revised Delayed Memory Index scores in the upper (High) and lower (Low) 20% of the distribution. n = 29 for high quintile group, 28 for low quintile group. “Cutoff” refers to the cutoff scores for detecting malingering suggested by Paul et al. (1992) for the MSIT and the Rey Dot Counting procedure, and by Iverson et al. (1991) for the 21-Item Wordlist. aGroup effect significant, p < .05. bGroup effect significant, p < .001. cIndicates that adjusted means from covariate analyses are reported. Effect size = mean of group difference divided by overall standard deviation (Hall, Tickle-Degen, Rosenthal, & Mosteller, 1994). Adjusted means used to determine group differences for variables on which covariate analyses were conducted.

RESULTS

Preliminary Analyses/Analytic Strategy

For the demographic variables, significant group differences were found for age, F(1, 55) = 13.63, p < .005, and education, F(1, 55) = 22.14, p < .001. Because both age [r (57) = −.49, p < .0001] and education [r (57) = .54, p < .0001] were significantly correlated with WMS-R Delayed Memory Index scores, correlational analyses were conducted between age/education and the malingering indices. Significant correlations (p < .05) for both age and education were found for all three indices from the MSIT and number correct on the 21-Item Wordlist. Additionally, a significant correlation was found between age and total time for grouped dots on the Rey Dot Counting procedure, and between education and number of trend reversals on the Rey Dot Counting procedure. Therefore, age and education were used as covariates in the analyses where appropriate below. Chi-square analysis revealed no differences in gender distribution between the groups.

Hypothesis Testing Analyses

Statistically significant group differences were found on the 21-Item Wordlist for number correct on free recall, F(1, 53) = 4.31, p < .05, and forced-choice recognition, F(1, 55) = 7.14, p < .001; on the Rey Dot Counting procedure for total time for ungrouped, F(1, 55) = 5.64, p < .05, and grouped, F(1, 54) = 4.92, p < .05, dots; and on the MSIT for addition errors, F(1, 53) = 4.37, p < .05 (see Table 2 for comparison of means and range of scores between memory-impaired and unimpaired subjects in relation to established cutoffs for each measure). All differences found were in the direction of better performance by subjects with better Delayed Memory Index scores; however, all of the differences were small.
Effect sizes were calculated by taking the mean of the group difference divided by the overall standard deviation for each scoring index (Hall, Tickle-Degen, Rosenthal, & Mosteller, 1994). Contrary to predictions, the effect sizes for the indices from the Dot Counting procedure were similar to those from the MSIT and 21-Item Wordlist (see Table 2).

It is more clinically relevant that in only two cases did a subject have a score on any of the malingering measures beyond the cutoffs suggested to detect malingering. Specifically, two subjects from the memory-impaired group scored one point below the established cutoff on the free recall index from the 21-Item Wordlist. One of these subjects had completed only 6 years of education, had a Delayed Memory Index score (62) nearly two standard deviations below the mean of the memory-impaired group, had the lowest score of any subject on forced-choice recognition from the 21-Item Wordlist, the third worst score within the memory-impaired group on addition errors and number correct from the MSIT, and the second worst score within the group on total time for ungrouped dots on the Rey Dot Counting procedure. Thus, for at least this subject, poor performance on free-recall from the 21-Item Wordlist might reflect global cognitive impairment combined with minimal education. As Arnett, Hammekes, and Schwartz (1995) have suggested, interpreting malingering indices such as those used in our study in patients who have severe problems with amnesia, dementia, or emotional disorders may require special precautions. The other subject scoring below the suggested cutoff on free-recall from the 21-Item Wordlist was unremarkable, having an educational level (12) and a score on the Delayed Memory Index (75) slightly above the mean of the memory-impaired group, and scores near the mean of the group on all other malingering indices.

Our findings from the 21-Item Wordlist suggest that free recall measures may be more sensitive to actual memory impairment in some subjects than the other malingering indices. In fact, the correlation of the Delayed Memory Index with the free-recall index of the 21-Item Wordlist \[ r (57) = .52 \] was higher than with any other malingering index. All of the other indices appeared relatively insensitive even to significant clinical memory impairment. For these indices, our results suggest that currently established cutoffs will not identify even individuals with substantial memory impairment as malingerers. In other words, the false positive rate (proportion of subjects who were simply memory-impaired identified as malingerers using any of these other indices in isolation) in our study is 0%: no memory-impaired subject was identified as a malingerer.

**SUMMARY AND CONCLUSIONS**

This study was conducted to evaluate three measures of malingering in memory-impaired and memory-unimpaired subjects from an inpatient population of substance abusers. Consistent with hypotheses, the patient group with unimpaired delayed memory performed better than the patient group with impaired delayed memory on several of the malingering indices; however, with the exception of the free recall index from the 21-Item Wordlist, the impaired delayed memory group performed beyond the cutoffs used to detect malingerers. Especially significant was that, with the exception of the free recall index from the 21-Item Wordlist, no subject in the memory-impaired group had a score on any of the malingering indices beyond the cutoffs established to detect malingering. Contrary to predictions, the tests specifically designed for the detection of biased responding in memory, the 21-Item Wordlist and the MSIT, did not have a greater effect size associated with actual memory impairment than the test used for detection of biased responding in general neuropsychological assessment, the Rey Dot Counting procedure (see Table 2). This suggests that the indices from all three measures should be about equally useful in the detection of malingering.
Overall, our findings demonstrate that the MSIT, the forced-choice index from the 21-Item Wordlist, and the Rey Dot Counting procedure are only weakly sensitive to true memory impairment and thus are valid for use in detecting malingering even among inpatient substance abusers with significant memory impairment. Further research is needed to determine if actual malingerers in substance abusing populations perform beyond the cutoffs established for these three measures. However, the base rate for performing in the range of exaggerated impaired performance in memory-impaired and unimpaired substance abuse recovery patients appears to be limited.

REFERENCES