Brief report

The effect of depression and anxiety on the TOMM in community-dwelling older adults

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Abstract

Tests of possible malingering are in increasing demand among neuropsychologists. The Test of Memory Malingering (TOMM) is resistant to many neurological conditions, including traumatic brain injury, dementia, and aphasia. Less clear is the impact of psychological conditions on TOMM performance. This study examined a sample of community-based older adults (55–75) to determine whether scores on the TOMM are influenced by the presence of symptoms of depression or anxiety, as measured by the Beck Depression Inventory (BDI) and State-Trait Anxiety Inventory (STAI), respectively. The results indicate that, regardless of BDI or STAI scores, all subjects scored above 45 correct out of 50 on TOMM Trial 2. These findings demonstrate that depression and anxiety levels in an older community-dwelling sample do not negatively affect performance on the TOMM.

Keywords: Malingering; Neuropsychological; TOMM; Depression; Anxiety

1. Introduction

The increased role played by neuropsychologists in the courtroom in recent years has led to a surge in interest in the detection of malingered neuropsychological deficits. In addition to routine evaluation, neuropsychologists also find the need to implement effort tests to determine whether the evaluées, often litigants, are putting forth their best effort. For this reason, a number of techniques for the detection of suspected malingering have arisen. One such technique is forced-choice testing, which is described by Pankratz and Binder (1997). In this method, an
individual who yields a below-chance performance on a forced-choice paradigm is suspected of malingering. A variation of this is seen in tests where a certain level of performance has been empirically established in patients with confirmed neurological conditions. In an individual case, poor performance is indicative of poor effort, and therefore may be used to detect possible malingering. One test which utilizes this method is the Test of Memory Malingering (TOMM; Tombaugh, 1996).

The TOMM is a 50-item forced-choice object recognition task consisting of two trials and a conditional Retention Trial. The Retention Trial need only be administered if the individual does not correctly respond to at least 45 items on Trial 2; a score of less than 45 on Trial 2 or the Retention Trial is considered to be suggestive of malingering (Tombaugh, 1996). The TOMM has been validated using normal college students, simulating college students, cognitively intact geriatric subjects, neurologically impaired patients (general cognitive impairment, dementia, aphasia, TBI), simulating TBI participants, and TBI litigants (Rees, Tombaugh, Gansler, & Moczynski, 1998; Tombaugh, 1997).

The validational patient populations for the TOMM were all neurological in nature, and little research has been done to examine the impact of psychological conditions on performance on the TOMM. Past research has shown that the individual’s affective state does influence performance on neuropsychological tests (Gfeller, Chibnall, & Duckro, 1994; Kizilbash, Vanderploeg, & Curtiss, 2002). Rees, Tombaugh, and Boulay (2001) examined the impact of depression as measured by the Beck Depression Inventory (BDI; Spreen & Strauss, 1998) on scores on the TOMM for a sample of inpatients. As their clinically depressed patients all scored a 49 or 50 on Trial 2 of the TOMM, the results suggest that level of depression does not influence TOMM performance in an inpatient sample.

In a large sample of litigants, Rohling, Green, Allen, and Iverson (2002) found that those who were suspected of poor effort on either of two effort tests, the Word Memory Test or Computerized Assessment of Response Bias, had significantly higher BDI scores than those putting forth sufficient effort. This suggests that those who display low effort may also be exaggerating mood impairment, or that those whose mood is more impaired are more likely to display poor effort.

An issue that has yet to be addressed in the literature is whether the levels of both anxiety and depression found in community-dwelling samples negatively influence performance on the TOMM. The present study examined this issue in a community-dwelling sample of older adults.

2. Method

2.1. Participants

Archival data on 197 (101 women and 96 men) community-dwelling older adults were analyzed. The participants were between the ages of 55 and 75 ($M = 64.57$, S.D. = 5.52). The participants were screened for major medical and psychological conditions prior to their participation in the original study, from which the archival data were gathered. Individuals reporting a history of any of the following conditions were excluded from the study: multi-
ple sclerosis, stroke, Parkinson’s disease, severe head injury, Alzheimer’s disease (or other
dementia), HIV/AIDS, and substance abuse. Individuals were also excluded if they reported
currently consuming at least five drinks of alcohol per day, or if they are currently being treated
for depression using antidepressants or therapy.

2.2. Material

For the original study each participant was administered a fixed battery of neuropsycho-
logical tests. The present study was merely interested in the performance of the participants
on the following measures: TOMM (Tombaugh, 1996), BDI (Spreen & Strauss, 1998) and
State-Trait Anxiety Inventory (STAI; Spielberger, 1983).

2.3. Procedure

After receiving IRB approval, an archival database was created with the participants’ infor-
mation and their scores on the TOMM, BDI, and STAI. Subsequently, the data were analyzed
using SPSS-10.

3. Results

On Trial 1 of the TOMM the mean performance of the 197 participants was 48.87
(S.D. = 1.64) and their scores ranged from 40 to 50. As seen in Table 1, all 197 partici-
pants obtained a score of at least 48 on Trial 2 of the TOMM (M = 49.95, S.D. = 0.25),
clearly surpassing the recommended cutoff score of 45, regardless of their BDI and/or STAI
scores.

Following the interpretation guidelines for the BDI, as suggested by Beck, Steer, and Garbin
(1988), 166 of the participants obtained scores that fell within the non-depressed (ND) range.
The ND group’s BDI scores ranged from zero to nine, M = 4.09, S.D. = 2.66. The remaining
participants’ (n = 31) scores suggested the presence of depression (DP). The DP group’s BDI
scores ranged from 10 to 24, M = 12.97, S.D. = 3.11. As Table 2 shows, further analyses
of the data revealed that the DP group and the ND group differed with respect to their BDI
scores, t(195) = 16.57, P < .001. However, the DP group’s performance was not different
from the ND group’s performance on Trial 1, t(195) = .250, P = .80, or Trial 2 of the TOMM,
\( t(195) = -0.450, P = .65 \) (see Table 2).

Himmelfarb and Murrell (1983, 1984) stated that a raw score above 44 on State-Anxiety
or Trait-Anxiety is suggestive of clinically significant anxiety in older adults. One hundred
seventy-four participants, whose scores ranged from 20 to 43, received a mean State-Anxiety
score that fell below the cutoff score of 44 (M = 29.16, S.D. = 7.13; Non-State-Anxious
group = NSA). Twenty-three participants, whose scores ranged from 44 to 54, received a
State-Anxiety score that was suggestive of clinically significant anxiety (M = 48.26, S.D. =
2.63; State-Anxious group = SA). Table 2 exhibits that although the SA group had significantly
higher anxiety than the NSA group, t(76.3) = 24.79, P < .001, the SA group performed
Table 1
Frequency distributions of TOMM scores for the different groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>TOMM</th>
<th>DP</th>
<th>ND</th>
<th>SA</th>
<th>NSA</th>
<th>TA</th>
<th>NTA</th>
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</thead>
<tbody>
<tr>
<td><strong>Trial 1</strong></td>
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<tr>
<td>50</td>
<td>14</td>
<td>81</td>
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<td>87</td>
<td>6</td>
<td>89</td>
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</tr>
<tr>
<td>49</td>
<td>8</td>
<td>39</td>
<td>5</td>
<td>42</td>
<td>7</td>
<td>40</td>
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</tr>
<tr>
<td>48</td>
<td>5</td>
<td>22</td>
<td>4</td>
<td>23</td>
<td>2</td>
<td>25</td>
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<tr>
<td>47</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>10</td>
<td>1</td>
<td>11</td>
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<tr>
<td>46</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>6</td>
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<tr>
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<td>1</td>
<td>3</td>
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<td></td>
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<td>0</td>
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<tr>
<td>40</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Mean (S.D.)</strong></td>
<td>48.9 (1.3)</td>
<td>48.9 (1.7)</td>
<td>48.3 (1.9)</td>
<td>48.9 (1.6)</td>
<td>48.7 (1.5)</td>
<td>48.9 (1.7)</td>
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<tr>
<td><strong>Trial 2</strong></td>
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<td></td>
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<tr>
<td>50</td>
<td>29</td>
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<td>19</td>
<td>171</td>
<td>16</td>
<td>174</td>
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<td>2</td>
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<td>3</td>
<td>2</td>
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<td>3</td>
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<td>48</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Mean (S.D.)</strong></td>
<td>49.9 (0.3)</td>
<td>50.0 (0.3)</td>
<td>49.8 (0.5)</td>
<td>50.0 (0.2)</td>
<td>49.9 (0.3)</td>
<td>50.0 (0.3)</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** DP: Depressed group; ND: Non-Depressed group; SA: State-Anxious group; NSA: Non-State-Anxious group; TA: Trait-Anxious group; NTA: Non-Trait-Anxious group.

One hundred seventy-nine participants scored below the cutoff score of 44 on the Trait-Anxiety measure, thus falling within the normal range (M = 29.67, S.D. = 6.00; Non-Trait-Anxious group = NTA); their scores ranged from 20 to 43. The rest of the participants’ (n = 18) Trait-Anxiety scores, which ranged from 44 to 49, fell within the clinically significant

equally well with the SNA group on both Trial 1, t(26.3) = −1.55, P = .13, and Trial 2 of the TOMM, t(22.7) = −1.78, P = .09.

Table 2
Means (S.D.) for the TOMM, BDI, and STAI

<table>
<thead>
<tr>
<th>Test given</th>
<th>TOMM Trial 1</th>
<th>TOMM Trial 2</th>
<th>BDI</th>
<th>State-Anxiety</th>
<th>Trait-Anxiety</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>DP (n = 31)</td>
<td>ND (n = 166)</td>
<td>SA (n = 23)</td>
<td>NSA (n = 174)</td>
<td>TA (n = 18)</td>
</tr>
<tr>
<td>TOMM Trial 1</td>
<td>48.9 (1.3)</td>
<td>48.9 (1.7)</td>
<td>48.3 (1.9)</td>
<td>48.9 (1.6)</td>
<td>48.7 (1.5)</td>
</tr>
<tr>
<td>TOMM Trial 2</td>
<td>49.9 (0.3)</td>
<td>50.0 (0.3)</td>
<td>49.8 (0.5)</td>
<td>50.0 (0.2)</td>
<td>49.9 (0.3)</td>
</tr>
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<td>BDI</td>
<td>13.0 (3.1) a</td>
<td>4.1 (2.7) a</td>
<td></td>
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</tr>
<tr>
<td>State-Anxiety</td>
<td>48.3 (2.6) b</td>
<td>29.2 (7.1) b</td>
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<td></td>
</tr>
<tr>
<td>Trait-Anxiety</td>
<td>46.0 (1.8) c</td>
<td>29.7 (6.0) c</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Means with same letter are significantly different, P < .001. DP: Depressed; ND: Non-Depressed; SA: State-Anxious; NSA: Non-State-Anxious; TA: Trait-Anxious; NTA: Non-Trait-Anxious.
anxiety range ($M = 46.00$, S.D. = 1.81; Trait-Anxious group = TA). Table 2 exhibits the TA group which had significantly higher anxiety scores than the NTA group, $t(67.1) = 26.35$, $P < .001$. However, the TA group was not statistically significantly different from the NTA group on Trial 1, $t(195) = -0.40$, $P = .69$, or Trial 2, $t(19.0) = -0.92$, $P = .37$, of the TOMM (see Table 2).

Of those who were in the DP group, 9 were also in the SA group, and 10 were in the TA group. Twelve individuals were in both the SA and the TA groups. Two individuals who received a 49 on Trial 2 of the TOMM were in the DP, SA, and TA groups; all others who were in multiple clinical groups received a 50 on Trial 2 of the TOMM.

4. Discussion

The aim of the present study was to investigate the impact of mild-to-moderate depression and anxiety, as measured by the BDI and STAI, respectively, on the TOMM performance in a sample of 197 older community-dwelling adults. In addition, the present study aimed to build on the work of Rees et al. (2001) who showed that the TOMM is insensitive to depression. Analyses of the data demonstrated that the TOMM is not only insensitive to the presence of depression but also to that of anxiety.

According to the results of this study, regardless of whether or not a participant displayed an elevated BDI or STAI score, all TOMM Trial 2 scores were 48 or higher, suggesting an absence of malingering. Despite an abundance of literature indicating a definite impact of anxiety and depression on neuropsychological test performance (e.g., Gfeller et al., 1994; Kizilbash et al., 2002), these findings suggest that the TOMM is not similarly affected.

This study supports the findings of Rees et al. (2001), which used a sample of psychiatric inpatients. The present study, on the other hand, examined a sample of community-dwelling, non-psychiatric individuals. An advantage of such a study is the use of a community-dwelling sample. In a population of participants who are theoretically motivated to perform well, we can test performance on the TOMM across depression and anxiety levels without the interference of potentially poor effort. This study also expands the literature supporting the use of the TOMM in individuals regardless of their levels of psychological distress, as it finds that the TOMM is resistant to both depression and anxiety.

The presence of comorbid symptomatology among a number of the participants should not be viewed as a cause for concern in the present study, as lifetime comorbidity of depression and anxiety has been commonly reported in the population; as many as 58% of those diagnosed with major depressive disorder have been found to have a comorbid anxiety disorder (Kessler et al., 1996).

Future research might aim to examine larger samples of clinically depressed and clinically anxious individuals residing in the community to allow for further examination of the present findings. Additionally, the exclusionary criteria for the present study may have restricted the range of scores and reduced the number of participants with elevated BDI and STAI scores; future research with the populations who were screened out, especially those individuals in the community who are currently taking psychotropic medications, would likely be beneficial.
In summary, the present findings demonstrate that levels of depression and anxiety in community-dwelling older adults do not influence performance on the TOMM.

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References


