A Comparison of Self- and Other-Rated Forms of the Neuropsychology Behavior and Affect Profile in a Traumatic Brain Injury Population

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The current study is the first reported use of both the other-rated and the self-rated forms of the Neuropsychology Behavior and Affect Profile (NBAP; Nelson, Satz, & D’Elia, 1994). Twenty-eight adult patients who were 7 to 27 months post predominantly mild closed head injury completed the self-report form of the NBAP, and their identified relatives/close friends completed the other-rated form of the NBAP. Patients and their relatives endorsed more items on the Inappropriateness and Depression scales for “now,” as compared to “before” the injury. Only the patients endorsed more items on the Pragnosia scale for “now” as compared to “before.” Comparisons of the NBAP pairs found no significant differences between the patients’ self-reports and those of their significant others for “before” the injury. Patients endorsed more items on the Indifference and Pragnosia scales for “now,” as compared to their relatives. © 2000 National Academy of Neuropsychology. Published by Elsevier Science Ltd

Keywords: traumatic brain injury, neuropsychology behavior and affect profile (NBAP)

It is well-known that traumatic brain injury (TBI) may result in psychological and behavioral sequelae. Some have found that increasingly poor emotional adjustment may occur as the patient becomes aware of chronicity of deficits, with greater degrees of psychological disturbance found in self and relative reports of patients more than 6 months postinjury, as compared to earlier measures (Fordyce, Roueche, & Prigatano, 1983). In contrast, some patients may develop anosognosia, a denial of actual deficits, or may tend to rate themselves more positively than do their relatives and treatment staff (Prigatano, 1996; Prigatano, Altman, & O’Brien, 1990; Prigatano et al., 1986).

A frequently used tool to evaluate a patient’s self-perception is the Patient Competency Rating Scale (PCRS; Prigatano et al., 1986). This scale involves the rating of various activities according to how well they are currently performed by the patient. In most cases, it has been found that moderately to severely injured TBI patients tend to overestimate their emotional control and social interaction abilities, as compared to ratings by family members or staff (e.g., Prigatano, 1996; Prigatano & Altman, 1990; Prigatano.
et al. (1990). Unfortunately, the standard administration of this measure does not yield reports of premorbid abilities.

Recently, Leathem, Murphy, and Flett (1998) reported the use of the PCRS with mild, moderate, and severe TBI patients, controls, and informants. In addition, 28 of the 53 TBI patients and their informants also completed the inventory for “before” the brain injury. Results did not parallel those of Prigatano’s, as patients and their informants did not differ on the items previously used to assess awareness. In no cases after the TBI did patients report more of a problem than did their informants; however, patients tended to endorse more problems for “before” as compared to their informants’ ratings. The control group’s self-ratings also indicated greater difficulties than those of their informants. Leathem, Murphy, and Flett suggested that preinjury and control group self-rating versus informant-rating differences may reflect the individual’s internal perceptions, but intact control over overt demonstration of these experiences. Following brain injury, this control may be reduced, allowing the behavior (e.g., “controlling laughing”) to be more readily apparent to the informants. Leathem, Murphy, and Flett concluded that the PCRS was sensitive to this lack of control and associated lack of awareness in the severe injury group and is useful for determining current functioning after TBI, but they caution against its use for rating before-TBI levels of functioning.

Another inventory that may prove useful in assessing pre- and post-TBI functioning is the Neuropsychology Behavior and Affect Profile (NBAP; Nelson, Satz, & D’Elia, 1994). The NBAP originally was developed as an inventory completed by a relative or close friend, consisting of five behavioral and affective domains: Depression, Mania, Indifference, Inappropriateness, and Pragnosia. Depression is defined as “dysphoric mood and/or loss of interest or pleasure in most usual activities” (Nelson et al., 1989, p. 267). Items from this scale include: “My relative seems depressed, sad, or blue” and “My relative feels useless and defeated much of the time.” Mania is defined as “elevated, expansive, or irritable mood, sustained high energy, and high levels of activity” (Nelson et al., 1989, p. 267). Items for this scale include: “My relative’s enthusiasm is almost continuous or unceasing” and “At times my relative is full of grandiose ideas.” Indifference is defined as “a tendency to minimize a disability or current condition, an indifference to or denial of an illness” (Nelson et al., 1989, p. 267). Examples of Indifference scale items include: “My relative seems unconcerned about events around him” and “At times my relative seems to deny having any health problems which actually exist.” Inappropriateness is defined by Nelson et al. (1989, p. 267) as “behavior which is inappropriate to the context in which it is occurring or to an outside event.” Items on the Inappropriateness scale include: “My relative behaves in a manner that causes others to wonder why he acts that way” and “My relative tells jokes and teases others excessively and at the wrong time.” The final scale measures Pragnosia, defined by Nelson et al. (1989, p. 267) as “a defect in the pragmatics of communication style.” Pragnosia scale items include: “My relative’s telephone behavior seems awkward and inappropriate and sometimes even sounds insulting” and “In beginning and ending conversations, my relative doesn’t use the right everyday phrases.”

In completing the NBAP, the respondent reports whether or not the target behavior was present, for both before and after the brain injury. The self-report inventory has the items written in the first person; the other-report form uses the term my relative.

The NBAP has demonstrated moderate levels of internal consistency across the five scales and has shown high test-retest reliability (Nelson et al., 1989). Content validity was assessed through blind-sort of the items into five forced categories (i.e., the five scales) by six doctoral level professionals in the field of clinical psychology. Twenty-five of the 91 clinical items did not meet the criterion, but were retained, to allow for further
statistical analysis in subsequent development studies (Nelson et al., 1989). The scale also includes 15 “neutral” items, which are not scored, but were included to break away from the “yes” response set (“no” is the expected response for the neutral items, with “yes” indicating abnormality on the clinical items). Subsequent study (Nelson, Mitrushina, Satz, Sowa, & Cohen, 1993) found improved internal consistency when these items were included across scales, arguing for use of the full 91 clinical item set.

Discriminant validity was demonstrated in a sample of healthy elderly versus demented patients for all scales except Mania. The NBAP failed to distinguish between two severity levels of dementia, determined through median split by the cognitive assessment scores (Nelson et al., 1989). This may be due to the cognitive measure used to determine dementia severity (i.e., Mini-Mental State Exam [MMSE]), which measures only gross cognitive functioning. The Clinical Dementia Rating Scale also was administered to the dementia sample. It is not reported whether the NBAP differentiated between dementia groups resulting from a median split on this more behavioral measure.

Further study with patients who had cerebrovascular accidents as compared to matched controls (Nelson et al., 1993) found discriminant validity across scales, with the exception of Inappropriateness and Mania. In addition, differences between groups were found for the “before” items, in contrast to the prior study with demented patients. That is, the Depression and Indifference “before” scales were significantly higher in the stroke patients and the Mania scale was significantly lower (Nelson et al., 1993). Thus, the contributions of premorbid emotional factors should be considered and may vary across clinical groups.

The NBAP has been used with a variety of populations in addition to dementia and stroke patients, such as persons with Down’s syndrome (Nelson, Lott, Touchette, Satz, & D’Elia, 1995), or a healthy geriatric sample (Uchiyama, Mitrushina, Satz, & Schall, 1996). Most recently, the NBAP has been utilized with traumatic brain injury populations (Groom, Shaw, O’Connor, Howard, & Pickens, 1998; Nelson, Drebing, Satz, & Uchiyama, 1998).

Groom et al. (1998) utilized the “now” items of the NBAP in a large-scale study of family functioning in traumatically brain-injured adults. They found that the NBAP effectively discriminated between TBI patients and controls. Internal consistency for each of the five scales ranged from .79 for Inappropriateness to .85 for Depression and for the entire NBAP, the alpha value was quite high (.92). Factor analysis with individual items supported the five factors of the NBAP. At the scale level, factor analysis indicated that both the depression and mania scales are unique, constituting their own scales, and appear sensitive to mood. The remaining three scales load on a large, common factor that may be sensitive to general neurobehavioral functioning, unrelated to mood states. The Inappropriateness and Depression scales were found to have the greatest percentage of item endorsement. The Mania scale continues to be problematic, in that it has failed to discriminate between patients and controls and has the lowest mean inter-item correlation of the five scales.

Groom et al. (1998) found that the neurobehavioral impairment, as measured by the NBAP, was significantly related to family dysfunction. Inappropriateness and Depression appeared to be more predictive of family functioning than the other scales.

Additionally, Groom et al. (1998) found that only the Inappropriateness scale was positively correlated with injury severity, with the other four scales and measures of family functioning unrelated to injury severity. The authors state that this finding “serves to challenge the assumption that more severe injuries necessarily have the greatest adverse impact on the patient and his or her family” (pp. 706–707).

The validity of collateral reports using the NBAP was addressed by Mello and
Drebing (1998), using a sample of Alzheimer’s patients and family raters. They found that nonspousal caregivers were more accurate, as compared to staff ratings, on the NBAP Indifference, Pragnosia, and Mania scales; however, spousal caregivers were more accurate on the Depression scale. Mello and Drebing hypothesize that a spouse may be better able to accurately identify subtle behavioral changes, such as seen in depression, but that emotional distance allows nonspouses to accurately perceive more overt behavioral changes. Thus, using multiple raters of the same behavior was suggested.

Satz et al. (1996) address the NBAP’s susceptibility to rater bias through the use of dissemblers of varied training levels and newly created validity scales. When comparing dissemblers with two traumatic brain injury samples, various combinations of validity scales effectively discriminated the groups.

Published research to date has utilized only the other-rated form of the NBAP. A self-report form also has been developed, using the same items with appropriate rephrasing. The present study compares the other-rated and the self-rated forms of the NBAP in a TBI population, as part of a larger investigation.

METHOD

Closed head trauma patients of a neurosurgical group were identified by record review and invited by mail to participate in a larger follow-up study. Twenty-eight (16 female) patients and their identified relatives/close friends completed the NBAP. None of the patients were in active litigation related to their injuries. Time since injury ranged from 7 to 27 months ($M = 17.7$ months, $SD = 6.9$). Age ranged from 18 to 77 years ($M = 36.8$, $SD = 15.8$). Average education level was 12.9 years ($SD = 1.7$). Cause of injury was predominantly motor vehicle accident (43%) or fall (43%). Severity of injury varied, but was predominantly mild (minutes loss of consciousness: $0–3$, $n = 18$; $3–60$, $n = 8$; $> 60$, $n = 2$). Eighty-two percent of the participants did not receive rehabilitation services after their acute medical attention; both of the more severely injured (LOC > 60 minutes) patients had participated in rehabilitation, as did 3 of the other participants.

RESULTS

When comparing “before” and “now” ratings by the patients (see Table 1), the Inappropriateness, Pragnosia, and Depression scales are significantly different. Patients indi-

| TABLE 1 |
| Means ($M$) and Standard Deviations ($SD$) for Self-Report |

<table>
<thead>
<tr>
<th>Item Set</th>
<th>Before</th>
<th></th>
<th>Now</th>
<th></th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>($SD$)</td>
<td>$M$</td>
<td>($SD$)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indifference</td>
<td>2.3</td>
<td>2.7</td>
<td>2.8</td>
<td>2.9</td>
<td>27</td>
<td>-1.17</td>
<td>.250</td>
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<tr>
<td>Inappropriateness</td>
<td>1.3</td>
<td>1.3</td>
<td>1.6</td>
<td>1.5</td>
<td>27</td>
<td>-2.30</td>
<td>.030</td>
</tr>
<tr>
<td>Pragnosia</td>
<td>1.3</td>
<td>1.5</td>
<td>2.0</td>
<td>2.1</td>
<td>27</td>
<td>-2.29</td>
<td>.030</td>
</tr>
<tr>
<td>Depression</td>
<td>1.4</td>
<td>1.7</td>
<td>3.0</td>
<td>2.9</td>
<td>27</td>
<td>-3.87</td>
<td>.001</td>
</tr>
<tr>
<td>Mania</td>
<td>6.4</td>
<td>4.3</td>
<td>6.5</td>
<td>4.5</td>
<td>27</td>
<td>-5.19</td>
<td>.854</td>
</tr>
</tbody>
</table>
cated greater degrees of inappropriate behavior, depression, and deficits in pragnosia now, as compared to before the injury.

“Before” and “now” ratings according to the relatives/close friends (see Table 2) reflect significant differences on the Inappropriateness and Depression scales. In both cases, more items were endorsed for now, as compared to before the injury.

Tables 3 and 4 reflect responses from the 28 patient/relative pairs. No significant differences were found between the patients’ self-reports and their significant others’ responses in any area for “before” the injury. Self and relative report pairs for “now” were significantly different on the Indifference and Pragnosia scales, with patients endorsing more symptoms.

There were no differences among injury severity levels for any of the NBAP scales for either “before” or “now.”

**DISCUSSION**

Both patients and their relatives or close friends reported increased levels of inappropriateness and depression following a traumatic brain injury. These results are not surprising, as personality changes and depressed mood often are sequelae of TBI; however, it is important to note that these patients were not actively seeking clinical treatment, nor were they involved in active litigation, and the injuries were predominantly mild.

No premorbid rating differences between patients and relatives were found. These results contrast with the Leathem et al. (1998) study, using the PCRS, which found patients tended to endorse more problems for “before” as compared to their informants’ ratings. The current results also contrast with those of Nelson et al. (1998) in their clinical traumatic brain injury sample. They found that relatives tended to endorse fewer “before” items, as compared to controls, suggesting a bias to present their relatives’ premorbid status in a positive light. It should be noted that their clinical TBI sample included patients who had been referred for follow-up assessment or for treatment of TBI-related symptoms. Approximately half of the sample was involved in litigation. Thus, there may have been an incentive for raters to depict their relatives as impaired—either for financial reasons or to support their receiving clinical services. Interestingly, Nelson et al.’s clinical sample reported higher levels of impairment than their TBI research sample, which was comprised of moderately to severely injured patients and assessed 6 months postinjury (vs. 24 months in the clinical sample). None of the research sample was involved in litigation.

**TABLE 2**

<table>
<thead>
<tr>
<th>Item Set</th>
<th>Before</th>
<th>Now</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indifference</td>
<td>1.4</td>
<td>2.4</td>
<td>27</td>
<td>−1.44</td>
<td>.161</td>
</tr>
<tr>
<td>Inappropriateness</td>
<td>1.2</td>
<td>1.3</td>
<td>27</td>
<td>−2.50</td>
<td>.019</td>
</tr>
<tr>
<td>Pragnosia</td>
<td>1.1</td>
<td>1.6</td>
<td>27</td>
<td>−1.00</td>
<td>.326</td>
</tr>
<tr>
<td>Depression</td>
<td>1.7</td>
<td>2.3</td>
<td>27</td>
<td>−2.19</td>
<td>.037</td>
</tr>
<tr>
<td>Mania</td>
<td>5.0</td>
<td>4.4</td>
<td>27</td>
<td>−1.39</td>
<td>.177</td>
</tr>
</tbody>
</table>
That none of the current sample was involved in litigation at the time of participation is somewhat unusual for a brain injury population. It is possible that a self-selection bias was present, such that those involved in litigation may not have wanted to “compromise” their cases in any way by participating in this project. It also may be that continuing recovery may have kept them optimistic. Perhaps after a greater amount of time postinjury, when the chronicity of deficits is apparent, there may have been more interest in litigation. Additionally, only 12 patients were involved in motor vehicle accidents, the source of most litigation claims; it is not known how many of these may have been single-vehicle accidents. The remainder of the patients suffered their injuries from falls or recreational vehicle accidents, events less likely to result in litigation.

The majority of patients in this sample also suffered no or little loss of consciousness. This may also not be representative of other “mild” brain traumas; however, all the patients in this study had been deemed sufficiently injured to warrant referral to and evaluation by the neurosurgical group from which participants were drawn. Still, generalizability to other mild brain injury populations may be limited.

The possibility of rater bias also should be considered. The lack of active litigation, and small percentage (18%) who were or had been in rehabilitation may have lessened the likelihood of bias. It also is possible that the patients themselves and their relatives/friends equally distorted the preinjury picture.

Patients in the current study, but not their relatives, reported greater levels of pragnosia after the injury. In contrast to reports by Prigatano et al. (1990), these findings suggest that some patients may have more insight into their behavioral deficits, as com-

### TABLE 3
Means ($M$) and Standard Deviations ($SD$) for Response Pairs by Group (Before Item Set)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Self</th>
<th>Other</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$(SD)$</td>
<td>$M$</td>
<td>$(SD)$</td>
<td></td>
</tr>
<tr>
<td>Indifference</td>
<td>2.3</td>
<td>2.7</td>
<td>1.4</td>
<td>2.4</td>
<td>27</td>
</tr>
<tr>
<td>Inappropriateness</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
<td>1.3</td>
<td>27</td>
</tr>
<tr>
<td>Pragnosia</td>
<td>1.3</td>
<td>1.5</td>
<td>1.1</td>
<td>1.6</td>
<td>27</td>
</tr>
<tr>
<td>Depression</td>
<td>1.4</td>
<td>1.7</td>
<td>1.7</td>
<td>2.3</td>
<td>27</td>
</tr>
<tr>
<td>Mania</td>
<td>6.4</td>
<td>4.3</td>
<td>5.0</td>
<td>4.4</td>
<td>27</td>
</tr>
</tbody>
</table>

### TABLE 4
Means ($M$) and Standard Deviations ($SD$) for Response Pairs by Group (Now Item Set)

<table>
<thead>
<tr>
<th>Scale</th>
<th>Self</th>
<th>Other</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$(SD)$</td>
<td>$M$</td>
<td>$(SD)$</td>
<td></td>
</tr>
<tr>
<td>Indifference</td>
<td>2.8</td>
<td>2.9</td>
<td>1.7</td>
<td>2.5</td>
<td>27</td>
</tr>
<tr>
<td>Inappropriateness</td>
<td>1.6</td>
<td>1.5</td>
<td>1.6</td>
<td>1.5</td>
<td>27</td>
</tr>
<tr>
<td>Pragnosia</td>
<td>2.0</td>
<td>2.1</td>
<td>1.3</td>
<td>1.8</td>
<td>27</td>
</tr>
<tr>
<td>Depression</td>
<td>3.0</td>
<td>2.9</td>
<td>2.6</td>
<td>2.8</td>
<td>27</td>
</tr>
<tr>
<td>Mania</td>
<td>6.5</td>
<td>4.5</td>
<td>5.8</td>
<td>5.2</td>
<td>27</td>
</tr>
</tbody>
</table>
pared to the reports of their relatives. That the majority of the patients in the current study had only mild injuries, as compared to the more severely impaired patients studied by Prigatano, may have allowed for better introspection. The patients themselves may be noticing more subtle changes from their premorbid state, changes that are less noticeable to others.

That there are no significant differences between the patient and relative reports of indifference before the injury, yet patients appear to report significantly more symptoms after the injury may be explained by a trend for the patients to endorse more indifference symptoms before the injury, which continued after the injury, then reaching statistically significant levels.

Therefore, it certainly is not clear who makes the best informant. The occurrence of anosognosia and denial of deficits in more severe brain trauma warrants the inclusion of reports by others. Future research is needed to examine the use of both the self- and other-rated forms of the NBAP in a moderate to severe brain trauma population, which would provide an index of the degree of anosognosia present. Contrasting the two forms (self- and other-rated), may be a potentially more sensitive measure of anosognosia, than either report in isolation.

Including ratings by a clinician, as well, would add an additional dimension to the assessment. Prigatano and Klonoff (1998) report initial work on a clinician rating scale, which attempts to differentiate between impaired self-awareness and denial of deficit, both of which may present as anosognosia. Unfortunately, their investigation finds that clinicians differed in the behavior referents used to make these distinctions. Thus, bias may be present from all perspectives. For more mild injuries, however, the present study suggests that self-report may be preferable to other-report, where patients may be more sensitive to subtle changes.

It appears that the NBAP provides useful information in traumatic brain injury populations. This tool has the unique feature of allowing for direct comparison of premorbid and current reports of functioning and one can utilize both the self-report and relative-report forms, allowing for exploration of possible bias. Obtaining information from multiple raters (self, relative, friend, treatment staff) is likely to give the most rounded and least biased picture. Further research with the NBAP, particularly the self-rated form, is needed to continue to explore the utility of the instrument in a traumatic brain injury population.

REFERENCES


