Validating a Test of Functional Performance With Psychiatric Patients

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Key Words: activities of daily living • test, by title, psychosocial (BaFPE) • tests, psychosocial • test standards

The primary purpose of the study was to contribute to the validation of a recently developed test of functional abilities, the Bay area Functional Performance Evaluation (BaFPE). On the premise that aspects of intelligence influence functional performance, three subscales of the Wechsler Adult Intelligence Scale (WAIS) were administered, in conjunction with the BaFPE task-oriented assessment (TOA), to a sample of 60 psychiatric inpatients with diagnosed depression or schizophrenia. The three subscales (picture completion, block design, and digit symbol) correlated significantly with the TOA, thus supporting its validity.

A second goal was to determine what variables were predictors of functional performance. Age and history of electroconvulsive treatments were negatively associated with the TOA, and level of education was positively associated with it. Variables not associated with the TOA were diagnosis, gender, amount of medication, type of medication, number of admissions, and total time spent in a hospital in the past 2 years. Research and clinical implications are discussed.

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Psychiatric samples are available are memory for oral and written instructions, organization of time and materials, attention span, evidence of thought or mood disorder, ability to abstract, task completion, number of errors, motivation, frustration tolerance, and self-confidence (Bloomer & Williams, 1979).

The SIS component of the BaFPE, which has been standardized separately from the TOA, was not used in this study. It requires subjects to participate in group processes over a period of time, and such a requirement cannot be met on inpatient units where the length of stay fluctuates greatly.

There are substantial differences between the first and second versions of the TOA (Bloomer & Williams, 1984). Even though the five tasks still assess the same general areas of human functioning, several of the administration procedures have been modified. The bank deposit slip exercise that appeared in the first version, for instance, has become a more comprehensive money management task in the second format. Features such as grocery shopping and banking simulations have been added. Changes were also implemented in the house floor plan task which requires the subject to draw a well-structured plan, similar to a blueprint. To improve the evaluation of memory function and to eliminate cultural biases found in the 1979 instructions, the revised edition of the floor plan task contains more details to be memorized, and the list of rooms has been modified. The scoring procedure has also undergone changes: The time use, memory, and qualitative indicators have become more specific in the second format.

The validation process used in the present study includes two steps. First, since functional abilities and aspects of intellectual performance should be associated, the new version of the BaFPE TOA was correlated with three subtests of the Wechsler Adult Intelligence Scale (WAIS) to test whether or not such an association exists. The three WAIS subtests chosen were digit symbol, block design, and picture completion. According to Allison, Blatt, and Zimet (1968), the digit symbol measures the ability to plan simple tasks; the block design assesses the visual-motor organization and analytical skills, and the picture completion taps the capacity to concentrate on an externalized form. Second, the BaFPE subscale totals were then correlated with each other to test whether or not they were conceptually distinct.

The TOA scores were also studied in relation to variables expected to be related to functional performance. Based on the relevant literature, it was predicted that subjects who had received ECT would have impaired perceptual skills (Breggin, 1979) and therefore would score lower on the TOA. Lower TOA scores were also expected for subjects receiving high doses of neuroleptics because it has been reported that these subjects show perceptual dysfunctions (Gruzelier & Hammond, 1980; Hartley & Couper-Smith, 1978). Moreover, negative side-effects can be expected from psychotropic drugs (Brown, Lewis, Brown, Horn, & Bowes, 1982, West, Hernandez, & Appel, 1982).

BaFPE TOA scores were expected to be inversely related to chronicity, which was measured by the number of admissions and the total time spent in a hospital within the last 2 years. A decrease in performance was also hypothesized with an increase in age. Finally, subjects with a higher educational level were expected to score higher on the TOA, since level of education should correlate with intellectual abilities and ultimately with functional performance.

Although there is no functional deficit specific to schizophrenia or depression (Caudrey, Kirk, Thomas, & Ng, 1980; Miller, 1975), the functional profiles as shown in performance on the subscales of the BaFPE TOA were expected to differ for patients with depression and schizophrenia. Specifically, based on the nature of psychosis, lower scores on the organization subscale were predicted for schizophrenic patients.

**Method**

**Subjects**

The sample consisted of 60 psychiatric inpatients who were tested over a period of 8 months. The wards to which they had been admitted constitute the major referral center of the Annapolis Valley in rural Nova Scotia. All consecutive admissions were assessed with the BaFPE TOA and then screened with the Feighner diagnostic criteria (Feighner et al., 1972), only those subjects fitting the profile for depression or schizophrenia were included in the sample. The Feighner criteria also had to agree with the diagnosis given by the attending psychiatrist for the subject to be included in the study. Subjects who presented any of the following features were excluded from the study: double diagnosis, history of alcoholism or drug abuse, mental retardation, and lack of information pertaining to the subject's psychiatric history over the last 2 years. Consequently, only 60 of the approximately 160 patients assessed qualified for the study, the most common reason for exclusion being alcoholism.

**Procedure**

The TOA of the BaFPE and the three subscales of the WAIS were administered to the subjects as soon after admission as their condition allowed, in all cases between the 1st and the 10th day of their stay in the hospital. The examiner remained blind to diagnosis throughout the interviews and testing procedures, which took approximately 1 hour for each subject. The evaluation process was always presented in the
same sequence: the interview, the subscales of the WAIS, and the TOA. In each case, the examiner had one initial contact with the subject on the ward before testing. At that time, the subjects were told that the purpose of the evaluation was to assess and eventually help monitor their functional status. The administration of the TOA and other instruments was part of the regular assessment procedure and was used for those purposes.

The scores were obtained according to the standard procedures for both the WAIS (Wechsler, 1955) and the BaFPE (Bloomer & Williams, 1984). The procedure in the unpublished 1984 edition differs only slightly, i.e., in minor changes in wording, from that in the published 1987 edition (Williams & Bloomer, 1987). The BaFPE scoring system is a matrix containing elements derived in the following way: First, a score for each aspect of each task is recorded (the memory score for the money management task, for example). These items are added across all tasks to form a subscore (the five memory scores from the different tasks constitute the memory subscore). These subscores are then regrouped under a more general heading (the cognitive components subscore, in the case of memory function). As explained earlier, three component scores (cognitive, affective, and performance) are used to make up the TOA total score. Each component encompasses either four or five subscores: The cognition component includes five subscores, and the affective and performance components each are made up of four subscores. Therefore, the cognition total for each subject is based on 25 items (five items each for five tasks) and the performance and affective components are made up of 20 items (four items each for five tasks). The fourth component, qualitative signs, provides information on unusual distortions but is not part of the TOA total. It should be noted that the efficiency subscore was derived from norms we created. The 1984 edition stipulates that the efficiency subscore of the TOA be calculated using the preestablished norms; since those norms were not yet available, norms were generated from the 60-subject sample for the purpose of this study and then used as a basis for calculating the efficiency subscore.

Demographic and medical variables, including age, sex, type and amount of medication, number of electroconvulsive treatments, education, and time in hospital were obtained from medical records.

Results

Demographic and Medical Data
The subjects ranged in age from 21 to 75 years; 26 were male and 34 were female. Their level of education varied from Grade 3 to postdoctoral studies, with a mean of 9.9 years of schooling. In terms of diagnosis, 31 subjects had a diagnosed condition of schizophrenia and 29 of depression. All subjects were receiving medication; 33 were receiving antipsychotics, and 27 were receiving antidepressives. Nineteen of the subjects had undergone ECT within the 2 years preceding the testing. Among the subjects who had received ECT, the number of treatments had varied from 2 to 18 with a mean of 8.0 sessions; the mean time since the last ECT was 20.5 days, with a standard deviation of 67.5 and a skewness of 3.9. Twenty-four of the subjects had been admitted once over the last 2 years; the remainder had been admitted from two to six times in that same period.

Validity of the BaFPE
In testing the strength of the relationship between the BaFPE TOA scores and the normative scores of the WAIS subtests, we found that the correlation of the TOA total with picture completion was \( r = .58, p < .001 \); with block design, \( r = .67, p < .001 \); and with digit symbol, \( r = .60, p < .001 \). These correlations were within the expected range.

It was anticipated that the three component scores of the TOA would correlate significantly with each other since all are aspects of functional performance. Correlations among the cognitive, performance, and affective components are shown in Table 1. Considering the fact that the component scores are supposed to assess different components of performance, it is surprising that the correlations were found to be so high.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Cognitive</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>( r = .76 ), ( p &lt; .001 )</td>
<td>( r = .75 ), ( p &lt; .001 )</td>
</tr>
<tr>
<td>Performance</td>
<td>( r = .79 ), ( p &lt; .001 )</td>
<td>( r = .79 ), ( p &lt; .001 )</td>
</tr>
</tbody>
</table>

Correlates of Functional Performance
To test the hypothesis that subjects receiving ECT would score lower on measures of functional performance, we analyzed the association of prior ECT with functional performance as assessed by the BaFPE TOA and also with components of intelligence as assessed by the subtests of the WAIS. In a first step, we tested the association of sex with ECT and diagnosis with ECT. Subjects were coded as having either received or not received ECT in the last 2 years. The corrected chi-square for sex with ECT was \( \chi^2 = 2.55, p > .05 \), and for diagnosis with ECT was \( \chi^2 = 1.66, p > .05 \). Therefore, in this sample, ECT had not been administered significantly more often to one gender.
than another or significantly more often to those with a current diagnosis of depression than to those with a current diagnosis of schizophrenia. Thus any differences found between those receiving and not receiving ECT cannot be a result of a confounding with diagnosis or sex.

We then compared the performance of those who had received ECT with the performance of those who had not received ECT on the following scores: for the WAIS, the block design, digit symbol, and picture completion scores; for the BaFPE TOA, the memory, organization, cognition, attention span, qualitative signs, block design, and total scores. These analyses were performed to assess specifically those aspects of performance and intelligence where differences were expected between the two groups. The results for the WAIS block design were thought to be of special significance since this subtest is considered a measure of concept formation and visual-motor integration (Allison, Blatt, & Zimet, 1968). As predicted, the non-ECT group scored significantly higher on the WAIS and BaFPE block designs (see Table 2).

The non-ECT group also performed significantly better on all other measures except organization, attention span, and qualitative signs. Those tests which showed significant differences were the BaFPE memory, cognition, block design, and TOA total scores and the WAIS digit symbol, picture completion, and block design scores (see Table 2).

It was hypothesized that subjects receiving higher doses of neuroleptics would show a poorer functional performance than those receiving lower doses. The amount of medication was calculated in terms of percentage of average dosage using the guidelines published in the *Compendium of Pharmaceuticals and Specialties* (Canadian Pharmaceutical Association, 1983). The correlation between the percentage of average medication and the BaFPE TOA was $r = .05$, $p > .05$. No significant relationship existed between the amount of medication in terms of percentage of average dosage and the BaFPE TOA total.

Since the above analysis was for the total sample, combining information across diagnostic groups and across drug types, thus possibly obscuring a relationship between amount of medication and functional performance for one of those groups, the same procedure was repeated for selected groups: schizophrenic subjects, depressive subjects, subjects receiving antipsychotic medication, and subjects receiving antidepressive medication. No significant association between percentage of average medication and the BaFPE TOA total score was found for any of the selected groups.

In order to differentiate between subjects receiving a traditional treatment and those being given doses beyond the usual therapeutic range, the total sample was then dichotomized into those receiving more than 100% of the maximum recommended dosage ($n = 11$) and those receiving less than 100% ($n = 49$) as defined by the *Compendium of Pharmaceuticals and Specialties* (Canadian Pharmaceutical Association, 1983). A $t$ test on these two groups showed that there was no difference in functional performance between the two, $t = .02$, $p > .05$. Thus, the hypothesis that subjects receiving higher doses of neuroleptics would score lower on the TOA was not confirmed; this is true even for the group receiving more than 100% of maximum dosage, when compared with all others.

It was also expected that subjects receiving high doses of medication would be those who had been frequently readmitted or who had spent considerable time in a hospital. Nevertheless such an association was not found. The Pearson correlation coefficient for amount of medication and number of admissions was $r = -.06$, $p > .05$ and for the amount of medication and time spent in hospital, $r = -.08$, $p > .05$.

### Table 2
Comparison of ECT ($n = 19$) Versus Non-ECT Patients ($n = 41$) on BaFPE TOA and WAIS Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>$t$</th>
<th>$p$ (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOA VARIABLES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total non-ECT ECT</td>
<td>185.02</td>
<td>32.11</td>
<td>2.89</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Memory non-ECT ECT</td>
<td>15.15</td>
<td>3.01</td>
<td>2.91</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Organization non-ECT ECT</td>
<td>16.83</td>
<td>3.51</td>
<td>-0.79</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Attention span non-ECT ECT</td>
<td>17.24</td>
<td>3.48</td>
<td>-0.88</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Cognitive total non-ECT ECT</td>
<td>79.58</td>
<td>16.16</td>
<td>2.47</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Qualitative signs non-ECT ECT</td>
<td>4.74</td>
<td>4.63</td>
<td>-1.43</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Block design non-ECT ECT</td>
<td>24.34</td>
<td>10.78</td>
<td>2.61</td>
<td>&lt;.01</td>
</tr>
<tr>
<td><strong>WAIS VARIABLES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digit symbol non-ECT ECT</td>
<td>31.02</td>
<td>17.84</td>
<td>3.19</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Picture completion non-ECT ECT</td>
<td>9.49</td>
<td>4.18</td>
<td>2.82</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Block design non-ECT ECT</td>
<td>24.34</td>
<td>10.78</td>
<td>2.61</td>
<td>&lt;.01</td>
</tr>
</tbody>
</table>

Note: ECT = Electroconvulsive therapy.
Table 3
Intercorrelations of BaFPE TOA Total Scores and Predictor Variables

<table>
<thead>
<tr>
<th></th>
<th>TOA Total</th>
<th>Number of Admissions</th>
<th>Medication</th>
<th>Education</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time in hospital</td>
<td>$r = -.04$</td>
<td>$r = .32$</td>
<td>$r = -.08$</td>
<td>$r = .15$</td>
<td>$r = -.01$</td>
</tr>
<tr>
<td></td>
<td>$p &gt; .05$</td>
<td>$p &lt; .01$</td>
<td>$p &gt; .05$</td>
<td>$p &gt; 05$</td>
<td>$p &gt; 05$</td>
</tr>
<tr>
<td>Age</td>
<td>$r = -.38$</td>
<td>$r = .09$</td>
<td>$r = -.22$</td>
<td>$r = .24$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p &lt; .001$</td>
<td>$p &gt; .05$</td>
<td>$p &lt; .05$</td>
<td>$p &lt; 05$</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>$r = .30$</td>
<td>$r = -.10$</td>
<td>$r = .10$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p &lt; .01$</td>
<td>$p &gt; .05$</td>
<td>$p &gt; 05$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>$r = .05$</td>
<td>$r = -.07$</td>
<td>$r = .05$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p &gt; .05$</td>
<td>$p &gt; .05$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of admissions</td>
<td>$r = -.21$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p &gt; .05$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of medication was not found to correlate with the BaFPE TOA score either; a t test comparing TOA scores for those receiving the two types of medication, antipsychotic and antidepressive, yielded $t = .15, p > .05$.

It was expected that there would be an inverse relationship between chronicity and functional performance. The correlation between the TOA and the number of admissions over the last 2 years was $r = -.21, p > .05$, and the correlation between the TOA and the total time spent in hospital over the last 2 years was $r = -.04, p > .05$. Thus it was concluded that chronicity was not related to functional performance in this sample.

As hypothesized, age was significantly related to performance on the BaFPE TOA: $r = -.378, p < .001$, and there was a relationship between the BaFPE TOA total and education: $r = .30, p < .01$. Younger people performed better than older people, and more highly educated people performed better than less educated people.

We had expected not to find a difference in overall functional performance between schizophrenic and depressive subjects. A t test was computed on the BaFPE total scores for the two groups yielding $t = .99, p > .05$; as expected, the two groups do not show a significant difference in global performance. We had no hypothesis concerning differences in TOA scores between the two genders, and we found no differences ($t = 1.37, p > .05$).

Multiple regression was then used to analyze the association between the BaFPE TOA total score and age, education, medication (percentage of average medication), number of admissions, time spent in a hospital, and ECT coded as a dummy variable (presence or absence). Prior to performing the analysis, Pearson correlation coefficients were calculated to establish the correlations of the different variables. The results are presented in Table 3.

The multiple regression analysis yielded the following results: Age and ECT were the strongest predictors with respective $F$ values to enter the equation of 9.67, $p < .005$ and 6.14, $p < .001$ (see Table 4). The two variables together account for 23% of the variance in BaFPE TOA scores. No other variables were significantly related to the TOA scores once age had been entered.

### Functional Profiles for Depressives and Schizophrenics

Because of the nature of psychosis, it was hypothesized that functional profiles as shown on the TOA subscores of the BaFPE would differ for schizophrenic and depressive subjects; in particular, differences were predicted on the BaFPE subscore of organization where schizophrenic subjects were expected to score lower. We tested this hypothesis by comparing the two diagnostic groups on all the subscales of the TOA. The two groups differed on only two subscales: frustration tolerance, where the schizophrenic subjects scored significantly better than depressed subjects, $t = 2.29, p < .05$, and qualitative task specific observations, $t = 3.38, p < .001$, where the schizophrenic subjects showed a more distorted performance than depressed subjects. Therefore, the functional profiles differed for the diagnostic categories but not in the way initially hypothesized.

Table 4
Summary Table for Multiple Regression Analysis: Predictors of the BaFPE TOA Total Score

<table>
<thead>
<tr>
<th></th>
<th>$F$ to Enter</th>
<th>$p$</th>
<th>$R^2$</th>
<th>Multiple $R$</th>
<th>Simple $r$</th>
<th>Overall $F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>9.67</td>
<td>&lt;.005</td>
<td>.14</td>
<td>.38</td>
<td>- .38</td>
<td>9.67</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>ECT</td>
<td>6.14</td>
<td>&lt;.025</td>
<td>.23</td>
<td>.48</td>
<td>- .35</td>
<td>8.34</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
Discussion

The positive relationship between the BaFPE TOA and three subtests of the WAIS are evidence for the validity of the BaFPE, but the correlations are not so high as to suggest that the two tests assess the same dimensions of human functioning. The BaFPE requires intellectual skills but is not limited to those skills alone. It seems to assess performance in broader terms because it focuses on competence pertaining to daily living tasks.

The validity of the BaFPE TOA subscales, however, can be questioned. The cognitive, performance, and affective components correlated highly with one another, suggesting a lack of differentiation between what was being measured by the separate scales. The scales were constructed to evaluate specific aspects of functioning but seem to overlap; in particular, the cognitive performance score should not be so strongly correlated with the affective impression score since those two dimensions are conceptually relatively independent of each other. The labels (cognitive components ratings, performance component ratings, and affective components ratings) appear to be misleading because the scores are not pure measures of the facets of functional performance they are said to represent. Consequently, one should rely on the BaFPE TOA total score and not on the subscores when interpreting patients' functional profiles. References to the headings of the subscales (cognitive, affective, performance) should be avoided. This fact, however, does not affect conclusions about the BaFPE total score, which has been validated twice: in its first version with the Global Assessment Scale and the Functional Life Scale by Bloomer and Williams (1979), and in its second version, in the present study, with the WAIS.

Although there was a clear difference found between the ECT and non-ECT groups in functional performance, the design of the present study does not allow the elimination of the effects of possible confounding variables. One explanation for the relatively poor performance of the ECT group might be that they had suffered brain damage as a result of ECT. Another possible explanation is that the pretreatment level of functioning of the ECT group was worse than that of the non-ECT group. ECT is sometimes used as a treatment of last resort for severely ill patients. In any case, the results are strong enough to justify further research, especially since the practical implications of the possible interpretations are very different.

The lack of relationship between chronicity and the BaFPE TOA suggests that chronicity, at least as measured by number of admissions and total time spent in a hospital, has little to do with functional performance. History of psychiatric admissions is not necessarily linked to ability to cope with activities of daily living. Nor, according to our results, is this ability associated with the current level of medication.

Since older subjects scored lower on the BaFPE, we suggest that age-related norms be established for normal and inpatient populations. Educational level should also be included in norms to be established, since there is a significant negative relationship between age and education, and a significant positive relationship between educational level and TOA scores. Brockett (1985) has suggested that norms for cultural affiliations also be established.

Of the 23 subscores included in the BaFPE TOA score sheet, only 2 differed significantly between schizophrenic and depressed subjects: tolerance to frustration and the number of qualitative signs from the task-specific observations. Since the subjects with schizophrenia, by definition, exhibit more of those unusual responses, this discrepancy was to be expected. Their better performance on the frustration tolerance score could be partly explained by lack of anxiety (Allison, Blatt, & Zimer, 1968). Consequently, in this study, the hypothesis that schizophrenic subjects score lower on organization has to be dismissed.

The issue of diagnosis often influences the delivery of occupational therapy services, because expected functional deficits have been attached to specific medical labels. Since the profiles found in this study between the two diagnostic categories were so similar, we conclude that diagnosis should not be a factor for discrimination in the delivery of occupational therapy services.

This study was an initial step in analyzing the components of functional performance, and the factors related to them, as assessed in occupational therapy in mental health. While the study has shown that the BaFPE correlates highly with some of the WAIS subscores, no studies have been completed correlating functional performance as assessed by the BaFPE with scales assessing activities of daily living. Since occupational therapy's primary purpose is the evaluation and treatment of functional deficits through meaningful activity, such research would be of great value.

Acknowledgments

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References


