

ECT: Brain Damage



Cognitive Functioning and Degree of Psychosis in Schizophrenics given many Electroconvulsive Treatments

By DONALD I. TEMPLER, CAROL F. RUFF and GLORIA ARMSTRONG

PROBLEM

Goldman, Gomer, and Templer (2) found that the Bender-Gestalt and Benton Visual Retention Test performances of male chronic schizophrenic in-patients with a history of 50 or more electroconvulsive treatments (ECT) were significantly inferior to those of control patients matched for age, level of education, and race. However, the authors maintained that it cannot be inferred with certainty that ECT causes permanent brain damage since it is possible that schizophrenic patients more likely to receive ECT are those whose psychosis is more severe. It has been reported that patients with the so-called functional psychiatric disorders tend to do poorly on tests of organicity (5).

The purposes of the present research were (i) to replicate the findings of Goldman *et al.*; (ii) to compare ECT and control patients on the Wechsler Adult Intelligence Scale (WAIS); and (iii) to compare the degree of psychosis of ECT and control patients.

METHOD

Subjects were 14 male and 30 female schizophrenics in Western State Hospital, Hopkinsville, Kentucky. Of these patients 22 had a history of from 40 to 269 ECT with a median number of 58.5. All ECT was administered earlier than seven years ago. The 22 control patients were matched for age, sex, race, and level of education. Table I indicates the extent of the between-groups matching.

All 44 patients were administered the WAIS, the Bender-Gestalt, and the Benton (Form C, Administration A). Ten of the ECT patients and 18 of the control patients were able to complete the Minnesota Multiphasic Personality Inventory (MMPI). The Pascal and Suttell (3) method of scoring for deviations on the Bender-

TABLE I

Extent of between-group matching and mean Bender-Gestalt, Benton, and WAIS scores for ECT and control groups

	ECT group		Control group	
	Mean	S.D.	Mean	S.D.
Age	43.86	10.99	42.23	8.61
Years of education	9.86	3.47	9.82	3.08
Bender error score	124.17	87.32	56.82	46.17
Benton error score	18.48	5.28	14.82	5.60
Benton no. correct	1.29	1.76	2.18	2.08
WAIS verbal IQ	68.50	16.86	79.72	14.67
WAIS performance IQ	65.68	17.67	75.59	14.64
WAIS full scale IQ	65.73	16.87	76.77	14.65

Gestalt was employed. Two scoring systems were used for the Benton: (i) the number of correct reproductions or 'number correct scores', and (ii) 'error scores' consisting of a detailed analysis of specific errors in each figure of each card (1). The interscorer reliability coefficients between the two scorers were .99 ($p < .01$) for the Bender-Gestalt error scores, .97 ($p < .01$) for the Benton error scores, and .95 ($p < .01$) for the Benton number correct scores.

The MMPI was administered so that the scores of ECT and control patients could be compared both on the Schizophrenia (Sc) Scale and on a special Sc-O Scale developed by Watson (4) to differentiate organics from schizophrenics. The unweighted long form of the Sc-O Scale was employed.

Additional procedures for comparing the degree of psychosis of ECT and control patients entailed the blind rating of two experienced clinical psychologists. These psychologists were requested to sort the 44 sets of answers on the Verbal section of the WAIS into the 22 most psychotic and the 22 least psychotic. The two

psychologists were given the following instructions:

'Place the 44 sets of WAIS answers into two categories, with those of the 22 most psychotic patients in one category and those of the 22 least psychotic patients in the other. Consider looseness of associations, peculiar ideation, idiosyncratic responses, and in general the abnormalities than can be subsumed under "schizophrenic thinking". Try to consider extent of thought disorder rather than number of correct answers or level of intelligence displayed. In like fashion, place the Bender-Gestalt reproductions into two categories of the 22 most psychotic and the 22 least psychotic.'

RESULTS

As indicated in Table I, the mean error score on the Bender-Gestalt was 124.27 for the ECT group and 56.82 for the control group ($t = 3.20, p < .01$). The mean Benton error score was 18.48 for the ECT group and 14.82 for the control group ($t = 2.20, p < .05$), and the mean Benton number correct score was 1.29 for the ECT group and 2.18 for the control group ($t = 1.67, p < .05$). On the WAIS, the ECT and control group respective means were 68.50 and 79.72 for Verbal IQ ($t = 2.46, p < .01$), 65.68 and 75.59 for Performance IQ ($t = 2.02, p < .05$), and 65.73 and 76.77 for Full Scale IQ ($t = 2.32, p < .05$).

For the ECT group, the product-moment correlation coefficient between number of ECT received and Bender-Gestalt error score was .07 (n.s.); between number of ECT and Benton error score, .34 ($p < .10$); between number of ECT and Benton number correct score, .37 ($p < .05$); between number of ECT and Verbal IQ, .10 (n.s.); between number of ECT and Performance IQ, .34 ($p < .10$); between number of ECT and Full Scale IQ, .26 (n.s.).

The mean MMPI Sc Scale score was 40.90 for the 10 ECT patients who completed the MMPI and 36.50 for the 18 control patients who completed the MMPI ($t = .93$, n.s.). In nine instances both the ECT patients and their control patients completed the MMPI. The mean Sc Scale score for these nine ECT patients was 41.78; the mean of the corresponding nine control patients was 35.89 ($t = 1.07$, n.s.). On the MMPI Sc-O Scale (upon which a higher

score indicates a greater probability of organicity and a lesser one of schizophrenia), the 10 ECT patients obtained a mean score of 38.00 and the 18 control patients obtained a mean score of 42.11 ($t = 1.51$, n.s.). For the nine cases in which the ECT patients and their controls both completed the MMPI, the mean Sc-O Scale scores were 38.22 and 45.44 respectively ($t = 2.19, p < .05$).

One of the clinical psychologist raters classified 15 of the ECT patients' WAIS protocols and seven of the control patients' protocols into the '22 most psychotic' category ($\chi^2 = 5.08, p < .02$). The other clinical psychologist classified 16 ECT patients' protocols and 6 control protocols into the '22 most psychotic' category ($\chi^2 = 9.08, p < .01$).

One of the clinical psychologists classified 14 ECT patients' and 8 of the control patients' Bender-Gestalt reproductions into the '22 most psychotic' category ($\chi^2 = 3.27, p < .10$). The other psychologist classified 15 ECT patients' Bender-Gestalt reproductions and 7 control patients' reproductions into the '22 most psychotic' category ($\chi^2 = 5.80, p < .02$).

CONCLUSIONS AND DISCUSSION

The Goldman *et al.* findings of ECT patients' inferior Benton and Bender-Gestalt performances were replicated in the present study. The ECT patients' performance was also found to be inferior on the WAIS. However, the ECT patients were found to be more psychotic on all eight indices of psychoses—both of the MMPI Sc Scale score comparisons, both of the Sc-O Scale comparisons, both sets of clinical judgements upon the WAIS, and both sets of clinical judgements upon the Bender-Gestalt. The level of significance is beyond the .05 level in three of these comparisons. Furthermore, for the 10 ECT patients who completed the MMPI, the correlation coefficient between number of ECT received and Sc Scale score is .77 ($p < .01$).

However, the greater degree of psychosis of the ECT patients does not rule out organicity. It is conceivable that they could be both organically damaged and more psychotic. In order to equate both groups for degree of psychosis, the 10 ECT patients who completed the MMPI were matched for MMPI Sc Scale

score as closely as possible with 10 control patients. The mean absolute difference between these ECT and control patients on the Sc Scale is 1.9 points. The mean Sc Scale scores for the ECT and control patients were almost identical, 40.90 and 40.80 respectively. The respective mean difference for these MMPI matched ECT and control patients is 76.9 and 35.9 ($t = 2.28$, $p < .05$) for Bender-Gestalt error score; 15.9 and 14.0 ($t = 1.01$, n.s.) for Benton error score; 2.10 and 2.00 ($t = 1.00$, n.s.) for Benton number correct score; 77.1 and 82.1 ($t = .14$, n.s.) for Verbal IQ; 78.3 and 79.8 ($t = .24$, n.s.) for Performance IQ; and 76.1 and 80.1 ($t = .78$, n.s.) for Full Scale IQ.

It is apparent that the Benton and WAIS performances of ECT and control patients are very similar when degree of psychosis is controlled for. However, even with the two groups so matched for psychopathology, the ECT patients' Bender-Gestalt performance was significantly inferior to that of the control group. It is not certain why such significance was obtained upon a test of perceptual-motor functioning but not upon tests of memory and general intelli-

gence. However, with the 22 ECT patients and their 22 control patients, the greatest level of significance was obtained with the Bender-Gestalt. Such a finding was also reported in the Goldman *et al.* study. The ECT patients' inferior Bender-Gestalt performance does suggest that ECT causes permanent brain damage.

ACKNOWLEDGMENT

Appreciation is extended to Cyril and Violet Franks for their judgements of the psychoticism of WAIS answers and Bender-Gestalt reproductions.

REFERENCES

1. BENTON, A. L. (1969). *The Benton Visual Retention Test: Clinical and Experimental Applications*. New York: Psychological Corporation.
2. GOLDMAN, H., GOMER, F. E., and TEMPLER, D. I. (1972). 'Long-term effects of electroconvulsive therapy upon memory and perceptual-motor performance.' *J. clin. Psychol.*, 28, 32-4.
3. PASCAL, G. R., and SUTTELL, B. J. (1951). *The Bender-Gestalt Test*. New York: Paul B. Hoeber.
4. WATSON, C. G. (1971). 'An MMPI scale to separate brain-damaged from schizophrenic men.' *J. consult. clin. Psychol.*, 36, 121-5.
5. YATES, A. J. (1954). 'The validity of some psychological tests of brain damage.' *Psychol. Bull.*, 51, 350-70.

Donald I. Templer, Ph.D.,* Chief Psychologist,

Carol F. Ruff, M.A., Chief Psychologist,

Gloria Armstrong, M.A., Psychologist,

Western State Hospital, Hopkinsville, Kentucky 42246, U.S.A.

(Received 29 August 1972)

*Present address: Pleasant Grove Hospital, Louisville, Kentucky 40023