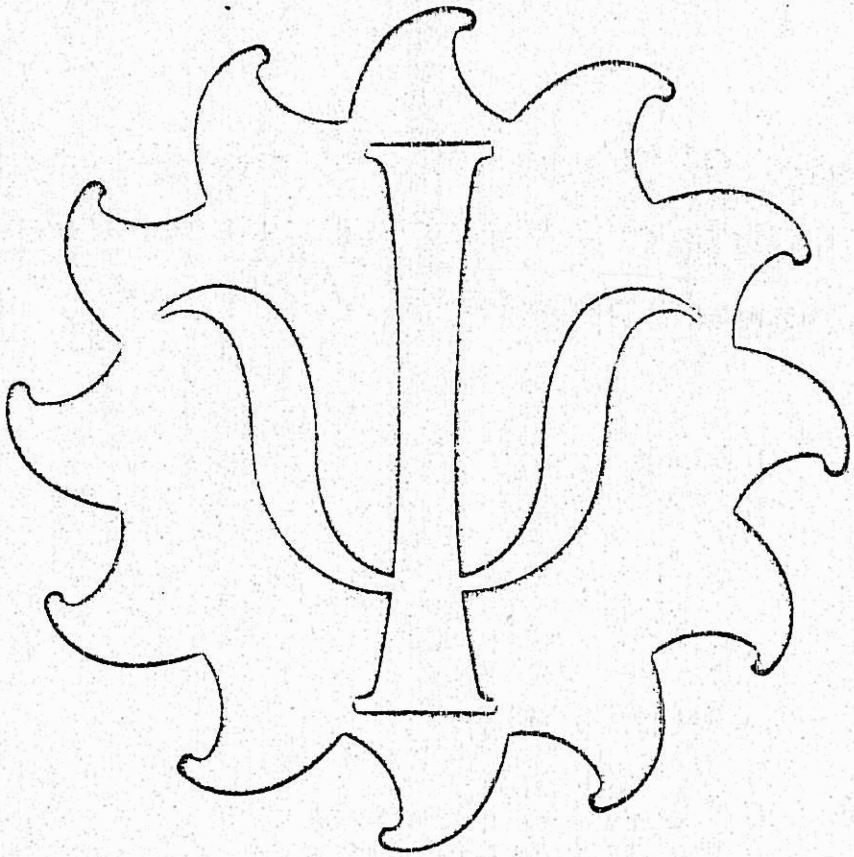
A Reprint from
REVISTA INTERAMERICANA DE PSICOLOGÍA
December 1967
INTERAMERICAN JOURNAL OF PSYCHOLOGY

ECT
Brain Damage



RELATIONSHIP OF ETHNIC BACKGROUND, RELIGION, DIAGNOSIS, MEMORY, AND OTHER VARIABLES TO PRESENCE OF SHOCK "THERAPY" HISTORY FOR A SAMPLE OF HOSPITALIZED MENTAL PATIENTS: PRELIMINARY INVESTIGATION OF THE LASTING EFFECTS OF SHOCK TREATMENT ON BEHAVIOR

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VOL. 1 NO. 4 DICIEMBRE, 1967
INTERAMERICAN JOURNAL OF PSYCHOLOGY

RELATIONSHIP OF ETHNIC BACKGROUND, RELIGION, DIAGNOSIS, MEMORY, AND OTHER VARIABLES TO PRESENCE OF SHOCK "THERAPY" HISTORY FOR A SAMPLE OF HOSPITALIZED MENTAL PATIENTS: PRELIMINARY INVESTIGATION OF THE LASTING EFFECTS OF SHOCK TREATMENT ON BEHAVIOR[1]

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Although a recent review of shock treatment or ECT[2] in the United States from 1937 to 1956 led the author to conclude "the era of shock therapy is fast coming to a close" (Riddell, 1963), such an end has yet to arrive. Nor is the field of mental health free of its past influence. Morgan (1966) felt ECT leads to permanent neurological and psychological damage with resultant behavior change that is potentially detectable by established psychological measures. Mednick (1955), Flynn, MacLean, and Kim (1961), among many others (Geller, 1965), have progressed toward validating and identifying this neurological damage, much of which centers on the limbic system. Since this latter area is associated with memory function, behavior checks and observations have typically dealt with immediate memory impairment following ECT. However, Morgan (1966) suggests that the *permanent* effects of ECT be investigated with populations having at least one year between them and their last ECT. Despite the evidence for permanent brain damage as a result of ECT, permanent behavioral consequences have yet to be adequately explored, although generally they are categorically denied by ECT practitioners.

This preliminary study is a first step towards such an investigation.

SAMPLE AND PROCEDURE

In July of 1966, the active files of patients currently admitted to Hawaii State Hospital were examined for the following criteria: males between the ages of 20–50 who were not diagnosed as brain damaged (nor lobotomized) *nor had had ECT within the last year.* In addition, the records on prior ECT history had to have been available. A total of 127 patients fit this description.

Of these, 83 had a history of at least one shock treatment (group median was 20 treatments) and 44 had no previous history of ECT. Both groups were examined by variables of age, number of treatments, marital status, education,

ethnic background, religion, diagnosis, evidence of severe depression and/or suicide attempts, and employment prior to admission. (See tables 1, 2, 3, 4, 5, 6, 7, 8, 9.)

TABLE 1

Age of sample

	Frequency distribution of sample by age			
	20–29	30–39	40–50	Mean-Age
Past history of ECT	19	38	26	35.3*
No history of ECT	24	16	4	29.8*
Total	43	54	30	33.3

* Chi square = 9.74, median test significantly different at $P<.01$.

TABLE 2

Number of treatments

Frequency distribution of sample by number of treatments			
No. of treatments	No. of patients	No. of treatments	No. of patients
0	44	100–125	6
1– 9	16	126–150	1
10–19	25	151–175	1
20–29	8	175–199	0
30–39	5	200–225	2
40–49	5	226–250	0
50–59	5	251–275	0
60–69	3	276–299	1
70–79	3	$\overline{X}$ for full sample = 27, N = 127	
80–89	0	$\overline{X}$ for ECT sample = 42, N = 83	
90–99	1	Median for full sample = 11	
		Median for ECT sample = 20	

TABLE 3

Marital status of sample

Group	No. Never Married	% Never Married	
No ECT	37	84	No significant difference
ECT	74	89	
Full Sample	111	87	

TABLE 4

Education of sample

Group	X Years	
No ECT	11.0	No significant difference
ECT	10.8	
Full Sample	10.9	

TABLE 5

Ethnic distribution of the sample

1. By number of patients:

Group	Japanese	Caucasian*	Hawaiian & Pt. Haw'n.	Filipino	Chinese	Korean
No ECT	12	9	10	7	4	2
ECT	43	13	9	9	7	2
Full Sample	55	22	19	16	11	4

* Including Portuguese and Puerto Rican.

2. By percent of sample:

Group	Jap.	Cauc.	Hawaiian & Pt. Haw'n.	Filipino	Chinese	Korean	Σ
No ECT	27†	20	23	16	9	5	100
ECT	52†	16	11	11	8	2	100
Full Sample	43	17	15	13	9	3	100

† According to Chi square analysis: the Japanese sample was significantly more often in the ECT group (Chi square = 6.1, $P<.02$). There were no other significant differences by ECT group.

Of the 127 patient sample, 35 had been interviewed on a wide variety of behavioral measures for an ongoing research venture at Hawaii State Hospital (Katz, Gudeman, and Sanborn, 1966). It was decided to investigate patients tested on these measures to take advantage of the substantial amount of additional data that will therefore eventually be available on these *Ss*. (These data have, at this time, not yet become available.) Of the tested sub-sample of 35, admitted from 10/65 to 6/66, by July of 1966 the number of patients without a history of ECT had dropped from 13 to 4 (a drop due both to discharge

TABLE 6

Religious distribution of the sample

1. By number of patients:

Group	Catholic	No Religion	Prot.	Buddhist	Mormon	Other*
No ECT	18	7	10	7	1	1
ECT	23	24	18	15	2	1
Full Sample	41	31	28	22	3	2

*Confucianist, Taoist, Ina religions.

2. By percent of sample:

Group	Catholic	No Religion	Prot.	Buddhist	Mormon	Other	Σ
No ECT	41†	16†	23	16	2	2	100
ECT	28†	29†	22	18	2	1	100
Fully Sample	32	25	22	17	2	2	100

† According to Chi square analysis: Catholics were significantly more often in the No ECT group than those without religion (Chi square = 5.3, P<.05). There were no other statistically significant differences.

TABLE 7

Diagnostic distribution of the sample

1. By number of patients:

Group	Schizophrenic Paranoid	Catatonic	Heberphrenic	Other*	Σ	Non-schiz.†
No ECT	16	3	3	14	36	8
ECT	32	20	4	23	79	4
Full Sample	48	23	7	37	115	12

2. By percent of sample:

Group	Schizophrenic‡ Paranoid	Catatonic	Hebephrenic	Other	Σ	Non-schiz.‡	ΣΣ
No ECT	36	7†	7	32	82	18	100
ECT	39	24†	5	28	96	4	100
Full Sample	38	18	6	29	91	9	100

* Chi square = 9.74, median test significantly different at P<.01.

‡ According to Chi square analysis: Catatonic schizophrenics were significantly more often in the ECT group than any other diagnostic category of schizophrenia (Chi square = 3.45, P<.06) and, as a whole, schizophrenics were significantly more often in the ECT group than non-schizophrenics (Chi square = 4.55, P<.05).

(Interactions of diagnosis, religion, and ethnic origin showed no significant clustering.)

TABLE 8

Patients whose records include severe depression and/or suicidal attempts

Group	Number of patients	Percent of their group	
No ECT	17	39%	(Not a significant
ECT	44	53%	difference;
	—	——	Chi square = 1.9)
Full Sample	61	48%	

TABLE 9

Patients listing employment prior to admission

Group	Number of patients	Percent of their group
No ECT	29	66%*
ECT	35	42%
	—	—
Full Sample	64	50%

* According to Chi square analysis, significantly more patients who had listed employment prior to admission were in the No ECT (Chi square = 5.88, P<.02).

and to newly innovated exposure to ECT). The four patients without a history of ECT were matched as closely as possible on education and age with four members of the ECT group having a number of treatments within the modal range of their group (10–18 treatments). It was hoped that matching for education and age would help control their influence on the cognitive measures to be made. (Mean sub-group ages were 29 and 30; mean education levels were 10.1 years and 10.6 years; the latter figure is that of the ECT sub-group.) The four members of the ECT sub-group averaged a history of 13 shock treatments and a range of 10 to 18 treatments.

Using the Peabody Vocabulary Test (PPVT), IQ was tested on the 8 *Ss* on July 26 and retested on July 28, two days later. Tests used were PPVT Form B and Retest Form A. A mean IQ of 83 for the No ECT sub-group and 74 for the ECT sub-group (medians were just the opposite at 74 and 82 respectively). Thus the two sub-groups seemed relatively close in average IQ performance. On July 26, following the IQ test, the Digit Span Test of the Wechsler Adult Intelligence Scale was administered to the four pairs of patients. The same test was readministered on July 28 following the alternate form of the IQ test.

RESULTS

a) Results of the analysis of records for the full sample

1. Members of the ECT group averaged 5½ years older (a statistically significant difference) despite the restricted age range of the full sample (ages 20–50). Shock treatment may actually be a fading phenomenon.
2. Of the full sample, the median number of shock treatments was 11; for only those patients receiving ECT, the median dosage was 20 treatments (range was 1 to 293).
3. Of the full sample, 87% were not and had never been married. This percentage did not differ significantly between ECT and No ECT groups.
4. Of the full sample, the average education was 10.9 years. This average did not differ significantly between ECT and No ECT groups.
5. Of the full sample, the largest ethnic minority was the Japanese at 43%. Percentage-wise, twice as many Japanese were in the ECT group as those in the No ECT group. This was the only statistically significant finding along ethnic lines. It is tempting to speculate that some connection exists between this finding and the significant hospital-specific belligerence of the Japanese patients discussed in the paper by Katz *et al* (1966).
6. The religious categories of Catholic, Protestant, Buddhist, and No Religion account for 96% of the sample. Significantly more Catholics fail to be in the ECT group than those patients of the No Religion group.
7. Schizophrenics, 91% of the full sample, were significantly more often found in the ECT group than non-schizophrenics. Within schizophrenic diagnostic categories, there were three times more catatonics shocked than any other brand (paranoid, hebephrenic, etc.).
8. Of the full sample, only one patient was diagnosed as a depressive. Therefore, the records of all 127 patients were checked for evidence of severe depression and/or attempted suicide (these being among the few remaining reasons for ECT typically verbalized by psychiatrists still using it: Geller, 1965). While 48% of the patients in the full sample had such histories, their membership in the ECT versus No ECT group was significantly different.
9. Two-thirds (66%) of the No ECT group were able to list employment prior to hospitalization whereas less than half (52%) of the ECT group had done so. This difference was statistically significant.

Summary of the analysis of the sample:

Of hospitalized non-brain damaged males aged 20–50, those most likely to have avoided ECT at Hawaii State Hospital were:

1. Non-schizophrenic
2. Catholic
3. Under 30
4. Employed prior to admission

Of the same group, those most likely to have already received ECT at Hawaii

State Hospital were:

1. Schizophrenic (particularly catatonics)
2. No Religion
3. Over 35
4. Unemployed prior to admission
5. Japanese

The following factors were not significantly related to either presence or absence of ECT:

1. Martial status
2. Education
3. Severe depression and/or attempted suicide

b) Results of the miniature experiment on Digit Span memory, tested and retested, for the 4 ECT-No ECT matched pairs of *Ss*.

There was a net gain in favor of those patients without a history of ECT and a smaller net loss for those with a past history of ECT. (See Table 10.)

TABLE 10

Miniature memory experiment results: Digit Span scores, tested and retested, for the four matched pairs of Ss: No ECT and ECT sub-groups

A. Gain in second testing	*No ECT*	*ECT*	
Pair A	−1	−2	
B	+1	0	
C	+3	+4	
D	0	−3	
Mean Gain	+0.75	−0.25	
B. Scores on day 1 testing	*No ECT*	*ECT*	
Pair A	10	10	
B	10	9	
C	9	6	
D	8	10	
Mean Score	9.25	8.75	Difference = 0.50
C. Scores on day 2 testing	*No ECT*	*ECT*	
Pair A	9	8	
B	11	9	
C	12	10	
D	8	7	
Mean Score	10.00	8.50	Difference = 1.50

The discrepancy between the mean scores of the No ECT and ECT groups was three times as large on day 2 as it was on day 1 and in favor of the No ECT group. These data suggest that memory of day 1 testing may not have been as helpful to ECT groups *Ss* two days later to overcome on their initial learning disadvantage and catch up to the No ECT group.

DISCUSSION: WHERE TO FROM HERE?

The data suggest further experiments with larger samples, better controlled, should be done with learning and relearning over varying time periods. It seems a possibility that patients who have experienced ECT would do more poorly at this than those who have not.

Other measures that seem fruitful for research on the permanent effects of ECT are those used by deMille (1962) to differentiate matched subgroups of 50 lobotomized schizophrenics from 50 non-lobotomized schizophrenics (*Ss* were matched for age, education, duration of illness, sex, race, diagnosis, veteran status, hospital, and tranquilizer). de Mille found the following to be most sensitive to lobotomy-generated intellectual deficit:

a. Numerical Operations Test (Guliford-Zimmerman Aptitude Survey, Part III, Form A—8 minutes)
b. Ship Destination Test (Christenson & Guliford, 15 minutes)
c. Letter Series (adaptation of Thurstone's PMA Reasoning subtest, 12 minutes)
d. Social Situations (consequences of actions, Guilford & Merrifred, EPO 3A, 10 minutes)
e. Digit Span (on the Wechsler-Bellevue, Form I)
f. Similarities(on the Wechsler-Bellevue, Form I)
g. Verbal, Performance, and Full Scale IQ (on Wechsler-Bellevue, Form I)

In a study of the permanent ECT effects on intellect and memory, these measures should be made at intervals of say 1 day, 1 week, 1 month and 1 year. The same sample should be tested on the measures used by Katz *et al* (1966) to more fully investigate the personality changes associated with a given number of ECT.

deMille found lobotomies did wipe out some schizophrenic behavior but while the patient was less characteristically psychotic, it was achieved "at a cost of impairment of a number of factor-defined intellectual abilities" (p. 171) and with a 20% probability of epilepsy following the lobotomy.

Like lobotomy, ECT damage must be investigated and treated in its own right as an important mental impairment. To do this we must better define the consequences of X treatments on behavior as well as develop reliably sensitive measures for this behavior change. With enough data, it may some day be possible to deal therapeutically with ECT damaged patients, perhaps with some

radically new approach to psychotherapy or direct re-education and modification of behavior. Optimistically, Morgan (1966) has suggested that "neurosurgery and neurological psychiatry may one day be able to restore the damaged sections of the limbic system and undo the pathological effects of the once well-intentioned electro-convulsive therapy."

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[1] This paper would not have been possible without the careful, continuous and conscientious data collection and discussion provided by Alberta Ing, Barbara Lam, and Mark Ames, WICHE students affiliating with Hawaii State Hospital for the summer of 1966 under Dr. Robert Hunt. Drs. Howard Gudeman and Kenneth Sanborn also were especially helpful in making data available and discussing its meaning.

[2] The "T" in ECT is more often used to signify "therapy" than "treatment." That this electric form of limbic lobotomy is therapeutic is an assumption this author will not take for granted by giving it semantic validity.

ABSTRACT

127 male hospitalized mental patients, aged 20 to 50, were compared on the basis of prior shock treatment experience. None were brain damaged, lobotomized, or had had shock within a year (since lasting effects of shock were the focus of interest). The data suggest *Ss* were significantly less likely to have had a shock treatment history if they were nonschizophrenic, Catholic, under 30 years, and employed prior to hospital admission; *Ss* were significantly more likely to have had shock if they were diagnosed schizophrenics (particu-

arly catatonics), without religion, over 35, unemployed prior to hospital admission, and of Japanese ethnic background (Filipino, Hawaiian, Chinese, Korean, U.S. Caucasian ethnic groups showed no significant differences). Marital status, educational level, history of severe depression or suicide attempts were not significantly related to presence or absence of shock. A miniature experiment on Digit Span memory, tested and retested, showed for 4 matched pairs of Ss drawn from the sample, greater mean gains for Ss without shock history. Seemingly fruitful measures and procedures for further research are discussed.

RESUMEN

127 pacientes mentales hospitalizados del sexo masculino, de 20 a 50 años de edad, fueron comparados sobre la base de una experiencia anterior del tratamiento de shock. Ninguno de ellos tenía el cerebro dañado o había tenido tratamiento de shock por un año (dado que el efecto duradero del shock era el foco de interés). Los datos indican que la probabilidad de haber tenido tratamiento de shock era menor si los sujetos no fueran esquizofrénicos, católicos, con menos de 30 años y empleados antes de haber sido admitidos en el hospital; la probabilidad era mayor si los sujetos hubiensen sido diagnosticados esquizofrénicos (particularmente catatónicos), sin religión, con más de 35 años, sin empleo antes de haber sido admitido en el hospital y de antecedente étnico japones (los grupos étnicos filipino, hawaiano, chino, coreano y blanco estadounidense no mostraron ninguna diferencia). El estado civil, nivel de educación, historia de severa depresión o atentado de suicidio no estaban significativamente relacionados con la presencia o ausencia de shock. Otras medidas y procedimientos para futuras investigaciones son discutidas.

RESUMO

127 homens hospitalizados, entre 20 e 50 anos de idade, foram comparados na base da sua experiência anterior ao tratamento de choque. Nenhum dêles tinha sofrido lobotomia, nem havia recebido tratamento de choque por um ano (já que os efeitos do choque eram o ponto focal do estudo). Os dados sugerem que a probabilidade era menor dos Sujeitos haverem tido uma história de tratamento de choque se êles fôssem não-esquizofrênicos católicos, com menos de 30 anos de idade, e empregados anteriormente a sua admissão ao hospital; a probabilidade era maior dos Sujeitos terem recebido choque se êles tivessem sido diagnosticados esquizofrênicos (especialmente catatônicos) sem religião, com mais de 35 anos de idade, desempregados antes da sua admissão ao hospital, e com background étnico japonês (diferenças significativas não foram encontradas para os seguintes grupos étnicos: filipinos, havaianos, chinêses, coreanos, ameri-

canos brancos). Estado civil, nível de instrução, história de depressão severa ou tentativas de suicídio não mostraram ser significativamente relacionados à presença ou ausência de tratamento de choque. Medidas e procedimentos aparentemente adequados para futuras pesquisas são discutidos.