

**Controlled Study on
Time Reproduction of
Depressive Patients**

Toshinori Kitamura, Rajinder Kumar



Medical and Scientific Publishers
Basel · München · Paris · London · New York · Tokyo · Sydney

Printed in Switzerland

Controlled Study on Time Reproduction of Depressive Patients

Toshinori Kitamura^a, Rajinder Kumar^b

^aDepartment of Psychiatry, and ^bSub-Department of Ethology, Medical School, University of Birmingham, UK

Abstract. 23 depressive inpatients and the same number of matched nonpsychiatric controls were examined three times: following admission, and 14 and 28 days thereafter. Hamilton's Rating Scale for Depression and the Time Reproduction Test were administered. Time reproduction was found not to be different between patients and normal controls and within patients. Nor was a significant correlation found with any clinical symptoms.

Time reproduction [4], one of the aspects of time perception, is an ability to imitate a given rhythm. Usually, a regular beating sound, as of a metronome, is given to the subject for a short time, then after it is discontinued the subject is required to imitate the rhythm by tapping as exactly as possible. This may, therefore, reflect personal tempo.

When one suffers from depressive illness, not only psychological but also physiological functions are depressed. The latter appear as constipation, insomnia, reduced salivation and sexual dysfunction. Psychomotor tasks, for example number counting [5], are also inhibited, particularly when subjects are retarded.

Since time reproduction is a psychomotor task, it can be anticipated that time reproduction in depressive subjects will be slowed down, as has been shown by two previous investigations [3, 4].

Nevertheless, these two investigations had certain methodological drawbacks; *Mezey and Cohen* [4] did not employ control groups and *Lehman's* [3] samples were not followed up. Neither of them applied explicit diagnostic criteria for depressive illness. Furthermore, correlations between time reproduction and each depressive symptom were not scrutinized.

We therefore compared patients who had been selected using the Catego [6] as diagnos-

tic criteria with matched controls. These subjects were examined over a 4-week treatment period by adopting *Hamilton's* [1] rating scale for depression as well as the Time Reproduction Test (TRT).

Material and Methods

The full details of the methods used have been discussed elsewhere [2]. Briefly, the methods were as follows:

23 depressive patients newly admitted to All Saints Hospital, Birmingham, UK (13 males and 10 females, aged between 20 and 66; mean 42.2) were examined on three occasions: on admission, and 14 and 28 days thereafter. They were diagnosed by the Present State Examination (PSE) and its subsequent Catego computer system [6] and divided into three diagnostic groups, namely endogenous depression ($n = 14$; Catego main classes D+, D?, R+, and R?), depressive or anxiety neurosis ($n = 5$; A+, A?, N+, and N?) and schizophrenia or paranoid state with depressive symptoms ($n = 4$; S+, S?, P+, P?, O+, and O?). No significant differences in the mean ages were found between the three groups.

The medication for the patients was started before the experiment. However, within one individual the treatment regimen was rarely changed.

On each interview, Hamilton's Rating Scale for Depression (HRS) [1] was completed and the TRT administered.

In the TRT [4], a regular metronome beat, approximately 40 beats per minute, was presented for a short time and the subject was requested, when the beat was stopped, to try his best to imitate the exact rhythm by tapping the table in front of him. The length of time spent for 10 taps was measured by the author with a stopwatch and the tapping rate was calculated by the following formula: $r = pq/600$, where p is the actual rhythm of the metronome beat (beats per minute) and q is the time (in seconds) spent by the subject for 10 taps. Although the metronome beat was around 40/min, it occasionally showed slight deviation. The exact beat frequency of the metronome was measured on every occasion and was applied in the calculation of r . The formula was designed to indicate the relative tempo of the subject's tapping with the value of 1.0 when the tapping was exactly the same as that of the metronome. A high r value means slow tapping whereas a low r means rapid tapping. The beat frequency of the original design of *Mezey and Cohen* [4] was 20/min. This was halved in the present study since our preliminary trial indicated that beats as slow as 20/min might be too boring.

The same number of nonpsychiatric volunteers matched for age, sex and race were examined in the same way. They were found to have never been mentally ill by applying the PSE and investigating their past history.

Table I. Mean TRT scores (\pm SD) of the patients and the controls on the three occasions

Interview	Patients	Controls	P
1st	0.96 \pm 0.22 (0.54–1.38)	0.91 \pm 0.16 (0.69–1.23)	NS
2nd	1.05 \pm 0.26 (0.69–1.61)	0.95 \pm 0.12 (0.77–1.30)	NS
3rd	1.03 \pm 0.24 (0.73–1.69)	0.94 \pm 0.19 (0.69–1.53)	NS

Figures in parentheses indicate range of TRT values. P value of two tailed Wilcoxon matched pairs signed-rank test. NS = Not significant.

Written informed consent was obtained from every subject prior to the examination. The Local Ethical Committee approved this study.

Results

As is shown in the table I, no significant difference emerged within and between the patients as a whole and the normal controls. Subcategorization of the patients into males and females, and into the three diagnostic groups failed to reveal a significant difference (Mann-Whitney U test). The TRT was not correlated with the patient's age.

Neither the total score nor any single symptom (including 'psychomotor retardation') of the HRS was correlated with the TRT.

17 of 23 patients showed more than 50% reduction of the total HRS score over the 4-week period whereas the remaining 6 patients did not. No significant difference of TRT emerged between the two groups.

Discussion

The findings of the present study, despite our expectation, did not show any difference between or within the patients, or between the patients and the normal controls. This negative finding may well be due to too short an examination time (about 10 s) to uncover a subtle abnormality if it exists.

The examination time was about 30 s in *Mezey and Cohen's* [4] study, whereas it was about 15 s in *Lehman's* [3]. The range of the TRT values was between 0.54 and 1.69 for the patients and between 0.69 and 1.53 for the controls (table I). Therefore, the negative nature of the present results cannot be attrib-

uted only to the short examination time. Although it would have been desirable to prolong the examination time, for example, to 3 min, most of the subjects found the tapping so tiring that it had to be restricted to a relatively short time.

Another expectation was that the TRT score would be increased (slowing down of the tapping) when the subject was retarded. This was because retarded patients were reported to take longer to do a psychomotor task like number counting [5].

The TRT of the 'retarded' cases in the present study was not significantly different from that of the other patients. However, since subjects who did not manage to complete a PSE interview were excluded, patients selected in this study cannot have been 'severely' retarded.

Possible effects of medication on TRT cannot be ruled out by the present findings since the medication was started before the study. Nevertheless, the possibility seems low because the TRT did not manifest any significant changes within the 4-week period, whereas more than 70% of the patients were improved by the same medication for each of them. This assumption remains to be verified by comparing drug-free patients and those on drug.

Acknowledgements

The authors wish to thank Prof. *H. Hosaki*, Keio Gijuku University, and Sir *William H. Trethowan*, University of Birmingham, for their supervision and encouragement. The PSE data were kindly processed by Prof. *J.K. Wing*, MRC Social Psychiatry Unit, Institute of Psychiatry, London, to whom the authors are grateful. R.K. was financially supported by a research grant of the West Midlands Regional Health Authority.

References

- 1 Hamilton, M.A.: Rating scale for depression. *J. Neurol. Neurosurg. Psychiat.* 23: 56-62 (1960).
- 2 Kitamura, T.; Kumar, R.: Time passes slowly for patients with depressive state. *Acta psychiat. scand.* 65: 415-520 (1982).
- 3 Lehman, H.E.: Time and psychopathology. *Ann. N. Y. Acad. Sci.* 138: 798-821 (1967).
- 4 Mezey, A.G.; Cohen, S.I.: The effect of depressive illness on time judgement and time experience. *J. Neurol. Neurosurg. Psychiat.* 24: 269-270 (1961).
- 5 Szabadi, E.; Bradshaw, C.M.; Besson, J.A.O.: Elongation of pause-time in speech: a simple objective measure of motor retardation in depression. *Br. J. Psychiat.* 129: 592-597 (1976).
- 6 Wing, J.K.; Copper, J.E.; Sartorius, N.: The measurement and classification of psychiatric symptoms. An introduction manual for the PSE and Catego program (Cambridge University Press, London 1974).

T. Kitamura, MD, MRCPsych, PhD,
Department of Neuropsychiatry,
School of Medicine,
Keio Gijuku University, 35, Shinanomachi,
Shinjuku-ku, Tokyo (Japan)