

Boyle, G. J. (1986)

6

Australian Clinical Psychologist,

Vol. 18(2), 21-27.

21.

The Australian
Clinical Psychologist

November 1986

CONCUSSING THE BRAIN WITH ELECTROCONVULSIVE
SHOCK THERAPY (ECT): AN APPROPRIATE TREATMENT
FOR DEPRESSION AND SUICIDAL IDEATION ?

Dr. Gregory J. Boyle, Department of Education, University of Melbourne,
Parkville, Victoria, 3052.

ABSTRACT

While the use of ECT has declined in recent years, nevertheless, it is still used in psychiatry for the treatment of depression and/or suicidal ideation. Proponents of ECT argue that it is "quick, clean and efficient," bringing an otherwise chronically depressed/suicidal individual back to normal or even outgoing psychosocial functioning in a relatively brief period of time. Unfortunately, the extant evidence suggests that ECT "works" by inducing an acute organic brain syndrome with accompanying memory and cognitive deficits. As patients are often given repeated treatments, it is apparent that ECT is a symptomatic procedure which probably adds to the individual's pre-existing psychological difficulties. The present paper summarises some of the literature pertaining to the adverse effects of ECT.

In recent years, the use of Electroconvulsive Shock Therapy (ECT) has declined somewhat in the treatment of depressed and suicidal patients (Kramer, 1985). This decline has been partly a response to public outcries against the procedure, particularly by former mental hospital patients, informed citizens, and even neurologists and psychiatrists (cf. Breggin, 1979; Friedberg, 1976, 1977). Psychiatric nurses (who run the risk of being denied registration if they refuse to participate in the administration of ECT) have also criticised ECT as inhumane and potentially intellectually damaging (e.g. Ross, 1981; Whyte, 1982; Packham, 1984). As these various authors (who are intimately acquainted with the "grass roots" application of ECT) have pointed out, the continued use of ECT remains highly controversial. If the procedures used were entirely safe and effective such controversy would not persist.

According to Ross (1981, p.20), some psychiatric patients receive literally hundreds of treatments with concomitant brain damage. Confusion, memory loss, headache and nausea generally follow each treatment (p.21). In psychiatric hospitals, patients are often treated involuntarily (p.22). ECT is clearly not able to prevent relapses of depression and suicidal ideation, as it is not uncommon for patients to receive repeated treatments at regular intervals (Whyte, 1982, p.42). According to him (p.43), "Psychiatry has relatively little to offer in terms of treatment once ECT has been used." Packham (1984, p.19) reported that ECT is often administered by junior psychiatrists and that most consultants who prescribe ECT do not administer it themselves. Over two-thirds of psychiatrists who use ECT typically employ bilateral rather than unilateral procedures (p.19). From a Royal College of Psychiatrists' report in The Lancet, Packham (p.20) reiterated that, "ECT was often given in large open dormitory wards with rows of patients lying on unscreened or only partially screened beds, with the treatment and anaesthetic machines being trundled from bed to bed...Many patients waiting for treatment could either see or hear the treatment being given to others." The resulting fear of ECT among psychiatric patients (cf. Jenike, 1983) is quite understandable. Packham (p.20) also

Indicated that many of the ECT machines were obsolete and that forty percent of clinics did not have access to proper maintenance of their ECT equipment.

Breggin (1979, 1981) has thoroughly reviewed the scientific literature up to the end of the 1970's in relation to ECT and its effects on the brain. He has concluded that ECT is a brain-disabling procedure which induces a severe acute organic brain syndrome, with concomitant loss of memory and cerebral damage to the brain. He has argued on the basis of the empirical evidence that ECT should be abolished and that it is not effective in treating depression and suicidal ideation. An editorial by Morris (1981, p.515) commented on ECT that, "...it is good to have it superseded by better treatments." In a controlled double-blind study of the effectiveness of real ECT versus simulated ECT in treating depression, Johnstone et al. (1980, p.1317) concluded that, "No differences were found between the two groups at one-month and six-month follow-up." Under these circumstances, reports supporting the efficacy of ECT cannot be accepted at face value.

One of the most frequently cited side-effects of ECT is both anterograde and retrograde amnesia (sometimes extending back two or three years prior to treatment with ECT, resulting in a significant loss of personal self-identity). Among the recently published studies indicating adverse effects on memory are those by Freeman et al. (1980), Shellenberger et al. (1981), Squire (1981), Squire et al. (1981), Price (1982a), Lerer et al. (1983), Pettinati and Rosenberg (1983), Rosenberg and Pettinati (1984). It has been suggested that unilateral placement of the electrodes over the non-dominant hemisphere (usually the right hemisphere) results in less memory loss and confusion than does bilateral ECT (e.g., Jenike, 1983). However, as Breggin (1979) has shown, unilateral placement of the electrodes on the right hemisphere generally produces significant memory and intellectual impairment in non-verbal, visuo-spatial functioning. It has also been suggested that acute memory impairment following ECT is mimicked by using a brief pulse electrical stimulus rather than a sinusoidal galvanic current (which is so frequently employed) to induce the convulsive grand mal seizure (Daniel et al. 1983; Daniel & Crovitz, 1983). Moreover, the claim that modified ECT (with anaesthetic, muscle paralysis and forced oxygenation) is safer than unmodified ECT (given "straight") is not supported from reviews of the literature (e.g., Breggin, 1979, 1981) which suggest that seizure thresholds are increased with concomitant need to apply stronger electrical stimuli to induce the convulsion (cf. Wehner et al. 1980). As it is known that the electrical current causes the brain dysfunction and cerebral damage (e.g., Jenike, 1983, p.36), it is apparent that modified ECT may indeed produce greater brain damage than does unmodified ECT generally.

Apart from memory dysfunction following ECT, another major difficulty is the interference with normal brain functioning (as evidenced by abnormal EEG recordings) and the associated cognitive impairment which may persist, more or less, indefinitely in some cases (e.g., Wehner, 1980; Calloway et al., 1981; Friedberg, 1981; Calloway & Dolan, 1982; Price, 1982b; Pettinati & Bonner, 1984; Tewfik, 1984; Wise, 1984; Daniel, 1985). Reports of the use of multiple ECT (known as MEECT) - i.e. REST - regressive electroshock therapy, which induces a state of virtually complete neurological collapse (cf. Abrams, 1974), have been criticised even by some of the most ardent advocates of ECT (e.g., Kalinowsky, 1981). In cases where MEECT is used, prolonged seizures of up to one hour's duration have been recorded (Abrams, p. 81; Wehner et al., 1980).

Tewfik (1984, p.97) stated that, "As both repeated concussion and repeated naturally occurring major and minor epilepsy are known to result in brain damage there is every reason to minimise the use of such treatment." Tefwik (p.97) further contended that, "...post-concussional states may result in long-lasting disability with symptoms of insomnia, anxiety and depression which may well be more obvious than the loss of concentration and intellectual deficit." Hence ECT may actually increase depression in the long run, rather than alleviating it! The apparent diminution of depressive and/or suicidal ideation pursuant to ECT is almost certainly symptomatic of an induced acute organic brain syndrome (cf. Breggin, 1979; Summers et al., 1979). Post-ECT behaviour such as apathy or euphoria is not essentially or necessarily indicative of therapeutic success, but probably of a profound disabling of normal brain function, typically recognised as such in non-ECT cases of concussion and brain trauma. The inadequacy of ECT in eliminating suicidal ideation (in the absence of major depression) has been commented on by Frankel (1984, p.384), who stated that, "The suicidal threats and concerns of patients with personality disorders are not likely to respond to ECT." Given that Frankel is an advocate of ECT, this conclusion cannot be taken lightly. As Breggin (1979) pointed out, the notion that ECT actually reduces the incidence of suicide has not been proven. The fact that many psychiatric institutions and most psychiatrists find it totally unnecessary to employ ECT at all is clear enough indication of its effectiveness in this regard. There are even documented cases where it appears likely that the administration of ECT with its psychologically debilitating after-effects has itself been responsible for contributing to actual suicides (cf. Friedberg, 1976).

Apart from disabling the brain, numerous studies have suggested that ECT is also associated with other serious and potentially fatal side-effects, including cardiovascular complications (Jones & Knight, 1981; Gerrig & Shields, 1982; Jones, 1983; Major, 1984; Raskin, 1984; Peterson, 1985), status epilepticus (Wehner, 1981; Peters, et al., 1984), simultaneous bilateral hip damage (Ebong, 1982), tardive dyskinesia (Flaherty et al., 1984), adrenal haemorrhagic necrosis (Donald & Freeman, 1982), acute pulmonary oedema (Buisseret, 1982), ruptured spleen (Ernest, 1980), ruptured bladder (Irving & Drayson, 1984), and dental fractures/tooth loss (Pollard & O'Leary, 1981; Faber, 1983). While there is a literature of experimentally induced brain damage in animals caused by ECT (see Breggin, 1979 for a review), recent animal studies (e.g., Lerer, 1984; Lerer et al., 1984) have corroborated the adverse effects of ECT on the brain.

In conclusion, there is considerable empirical evidence that ECT induces significant and to some extent lasting brain impairment. The studies cited above are but a few which suggest that ECT is potentially a harmful procedure, as indeed are most naturally occurring episodes of brain trauma resulting in concussion, unconsciousness and grand mal epileptic seizures. Accordingly, the continued use of ECT in psychiatry must be questioned very seriously. While memory and cognitive deficits are frequent consequences of ECT, even more pervasive and increases in anxiety, fear and depression may result from its use despite claims to the contrary (e.g., Jenike, 1983) that ECT actually alleviates such symptoms. The reality apparently is that ECT is used only by a small minority of psychiatrists who either are unable or unwilling to recognise that the acute organic brain syndrome induced therein is indeed the mechanism of action in ECT.

REFERENCES

Abrams, R. (1974), Multiple ECT: What have we learned? in M. Fink, S. Key, J. McLaugh, & T.A. Williams (eds.), Psychobiology of convulsive therapy, Winston, Washington, D.C.

Breggin, P.R. (1979), Electroshock: Its Brain-Disabling Effects, Springer, New York.

Breggin, P.R. (1981), Disabling the brain with electroshock, in M. Dongler & E.D. Wittkower (eds.), Divergent Views in Psychiatry, Harper and Row, Hagerstown.

Buisseret, P. (1982), Acute pulmonary oedema following grand mal epilepsy and as a complication of electric shock therapy, British Journal of Diseases of the Chest, 76, 194-195.

Calloway, S.P. & Dolan, R.J. (1982), ECT and cerebral damage, British Journal of Psychiatry, 140, 103.

Calloway, S.P., Dolan, R.J., Jacoby, R.J. & Levy, R. (1981), ECT and cerebral atrophy: A computed tomographic study, Acta Psychiatrica Scandinavica, 64, 442-445.

Daniel, W.F. (1985), ECT-induced hyperactive delirium and brain laterality, American Journal of Psychiatry, 142, 521-522.

Daniel, W.F. & Crovitz, H.F. (1983), Acute memory impairment following electroconvulsive therapy: Effects of electrical stimulus waveform and number of treatments, Acta Psychiatrica Scandinavica, 67, 1-7.

Daniel, W.F., Weiner, R.D. & Crovitz, H.F. (1983), Autobiographical amnesia with ECT: An analysis of the roles of stimulus wave form, electrode placement, stimulus energy, and seizure length, Biological Psychiatry, 18, 121-126.

Donald, I.P. & Freeman, C.P. (1982), Adrenal haemorrhagic necrosis following electroconvulsive therapy, The Lancet, 2 (July 31), 277.

Shong, W.W. (1982), Simultaneous bilateral hip injury: Two cases due to trauma, and one following electroshock therapy, East African Medical Journal, 59, 564-568.

Innest, D. (1980), Ruptured spleen after electric convulsion therapy, British Medical Journal, 280, 763.

Shah, R. (1983), Dental fracture during ECT, American Journal of Psychiatry, 140, 1255-1256.

Shaherty, J.A., Naidu, J. & Dysken, M. (1984), ECT, emergent dyskinesia, and depression, American Journal of Psychiatry, 141, 808-809.

Frankel, F.H. (1984), The use of electroconvulsive therapy in suicidal patients, American Journal of Psychotherapy, 38, 384-391.

~~removed~~

Freeman, C.P.L., Weeks, D. & Kendell, R.E. (1980), ECT: II: Patients who complain, British Journal of Psychiatry, 137, 17-25.

Friedberg, J. (1976), Shock treatment is not good for your brain, Glide Publications, San Francisco.

Friedberg, J. (1977), Shock treatment, brain damage, and memory loss: A neurological perspective, American Journal of Psychiatry, 134, 1010-1014.

Friedberg, J. (1981), Neuropathological effects of ECT, American Journal of Psychiatry, 138, 1129.

Irving, A.D. & Drayson, A.M. (1984), Bladder rupture during ECT, British Journal of Psychiatry, 144, 670.

Gerring, J.P. & Shields, H.M. (1982), The identification and management of patients with a high risk for cardiac arrhythmias during modified ECT, Journal of Clinical Psychiatry, 43, 140-143.

Jenike, M.A. (1983), Electroconvulsive therapy: What are the facts?, Geriatrics, 38, 33-38.

Johnstone, E.C., Lawler, P., Stevens, M., Deakin, J.F.W., Frith, C.D., McPherson, K. & Crow, T.J. (1980), The Northwick Park electroconvulsive therapy trial, The Lancet, 2 (December 20/27), 1317-1320.

Jones, R.M. (1983), ECT for patients with hypertensive heart disease, American Journal of Psychiatry, 140, 139.

Jones, R.M. & Knight, P.R. (1981), Cardiovascular and hormonal responses to electroconvulsive therapy, Anaesthesia, 36, 795-799.

Kalinowsky, L.B. (1981), Is multiple-monitored ECT safer? American Journal of Psychiatry, 138, 701-702.

Kolb, B. & Wishaw, I.Q. (1985), Fundamentals of human neuropsychology, (2nd ed.), Freeman, New York, 500-501.

Kramer, B.A. (1985), Use of ECT in California, 1977-1983, American Journal of Psychiatry, 142, 1190-1192.

Lerer, B. (1984), Electroconvulsive shock and neurotransmitter receptors: Implications for mechanism of action and adverse effects of electroconvulsive therapy, Biological Psychiatry, 19, 361-383.

Lerer, B., Zabow, T., Egnal, N. & Belmaker, R.H. (1983), Effect of vasopressin on memory following electroconvulsive therapy, Biological Psychiatry, 18, 821-824.

Lerer, B., Stanley, M., McIntyre, I. & Altman, H. (1984), Electroconvulsive shock and brain muscarinic receptors: Relationship to anterograde amnesia, Life Sciences, 35, 2659-2664.

Major, L.F. (1984), Electroconvulsive therapy in the 1980's, Psychiatric Clinics of North America, 7, 611-623.

Packham, H. (1984), Electroconvulsive shock therapy: A review of the Royal College of Psychiatrists' Report on ECT, Nursing Mirror, 159, 19-23.

~~removed~~

~~removed~~

~~removed~~

- Peters, S.G., Hochos, D.N. & Peterson, G.C. (1984), Status epilepticus as a complication of concurrent electroconvulsive and theophylline therapy, Mayo Clinic Proceedings, 59, 568-570.
- Peterson, G.N. (1985), ECT risk in cardiac patients, Psychosomatics, 26, 531.
- Pettinati, H.M. & Bonner, K.M. (1984), Cognitive functioning in depressed geriatric patients with a history of ECT, American Journal of Psychiatry, 141, 49-52. ✓
- Pettinati, H.M. & Rosenberg, J. (1984), Memory self-ratings before and after electroconvulsive therapy: Depression- versus ECT induced, Biological Psychiatry, 19, 539-548.
- Pollard, B.J. & O'Leary, J. (1981), Guedel airway and tooth damage, Anaesthesia and Intensive Care, 9, 395.
- Price, T.R.P. (1982a), Short- and long-term cognitive effects of ECT: Part I --Effects on memory, Psychopharmacology Bulletin, 18, 81-91. ✓
- Price, T.R.P. (1982b), Short- and long-term cognitive effects of ECT: Part II --Effects on nonmemory associated cognitive functions, Psychopharmacology Bulletin, 18, 91-101. ✓
- Raskin, D.E. (1984), Cardiac irritability, tricyclic antidepressants, and electroconvulsive therapy, Journal of Clinical Psychopharmacology, 4, 237-238.
- Rosenberg, J. & Pettinati, H.M. (1984), Differential memory complaints after bilateral and unilateral ECT, American Journal of Psychiatry, 141, 1071-1074. ✓
- Ross, R. (1981), A shock to the system, Nursing Mirror, 152, 20-22.
- Shellenberger, W., Miller, M.J., Small, I.F., Milstein, V. & Stout, J.R. (1981), Follow-up study of memory deficits after ECT, Canadian Journal of Psychiatry, 27, 325-329.
- Squire, L.R. (1981), Two forms of human amnesia: An analysis of forgetting, Journal of Neuroscience, 1, 635-640.
- Squire, L.R., Wetzel, C.D. & Slater, P.C. (1979), Memory complaint after electroconvulsive therapy: Assessment with a new self-rating instrument, Biological Psychiatry, 14, 791-801.
- Squire, L.R., Slater, P.C. & Miller, P.L. (1981), Retrograde amnesia and bilateral electroconvulsive therapy, Archives of General Psychiatry, 38, 89-95.
- Summers, W.K., Robins, E. & Reich, T. (1979), The natural history of acute organic mental syndrome after bilateral electroconvulsive therapy, Biological Psychiatry, 14, 905-912. ✓
- Tewfik, G. (1984), ECT, Australian and New Zealand Journal of Psychiatry, 18, 97-98.
- Weiner, R.D. (1980), The persistence of electroconvulsive therapy-induced changes in the electroencephalogram, Journal of Nervous and Mental Diseases, 168, 224-228.

- Weiner, R.D. (1981), ECT-induced status epilepticus and further ECT: A case report, American Journal of Psychiatry, 138, 1237-1238.
- Weiner, R.D., Volow, M.R., Gianturco, D.T. & Cavenar, J.O. (1980), Seizures terminable and interminable with ECT, American Journal of Psychiatry, 137, 1416-1418.
- Whyte, L. (1982), Shock treatment, Nursing Mirror, 155, 42-43.
- Wise, M.G. (1984), ECT in pregnancy: A reply to Kalinowsky, American Journal of Psychiatry, 141, 1643. ✓
- Wortis, J. (1981), Editorial: Is ECT extinct?, Biological Psychiatry, 1, 517-518.

1975

1. Boyle, G. J. Report order in tachistoscopic recognition. Australian Journal of Psychology, 1975, 27, 269-272.
2. Boyle, G. J. Shortened Halstead Category Test. Australian Psychologist, 1975, 10, 81-84.

1977

3. Boyle, G. J. Validation of the three-factor optimal arousal model. Indian Journal of Psychology, 1977, 52, 92-94.

1979

4. Boyle, G. J. Behavioural management of hyperactive, learning disabled children. Australian Journal of Remedial Education, 1979, 11, 6-10.
5. Boyle, G. J. Control of hyperactive behaviour using a 'timeout' approach. Proceedings, 10th Annual Conference, Australian Association for Research in Education, 1979, 132-140.
Abstract in Australian Educational Researcher, 1979, 6, 33.
6. Boyle, G. J. Delimitation of state-trait curiosity in relation to state anxiety and learning task performance. Australian Journal of Education, 1979, 23, 70-82.
7. Boyle, G. J. Private practice in psychology. Bulletin of the Australian Psychological Society, 1979, 1, 25-26.

1983

8. Boyle, G. J. Critical review of state-trait curiosity test development. Motivation and Emotion, 1983, 7, 377-397.
9. Boyle, G. J. Effects on academic learning of manipulating emotional states and motivational dynamics. British Journal of Educational Psychology, 1983, 53, 347-357.
10. Boyle, G. J. Higher-order factor structure of Cattell's MAT and 8SQ. Multivariate Experimental Clinical Research, 1983, 6, 119-127.

1984

11. Boyle, G. J. A cross-cultural investigation of the effects of depressive mood on processing of high and low content structure text. Paper presented at the 19th Annual Conference, Australian Psychological Society, University of Western Australia, Perth, August 1984.
Abstract in Australian Psychologist, 1985, 20, 366. (also 1986, 21, 319).
12. Boyle, G. J. Effects of viewing a road trauma film on emotional and motivational factors. Accident Analysis and Prevention, 1984, 16, 383-386.
13. Boyle, G. J. Reliability and validity of Izard's Differential Emotions Scale. Personality and Individual Differences, 1984, 5, 747-750.
14. Boyle, G. J. & Cattell, R. B. Proof of situational sensitivity of mood states and dynamic traits--ergs and sentiments--to disturbing stimuli. Personality and Individual Differences, 1984, 5, 541-548.

1985

15. Boyle, G. J. A reanalysis of the higher-order factor structure of the Motivation Analysis Test and the Eight State Questionnaire. Personality and Individual Differences, 1985, 6, 367-374.
16. Boyle, G. J. A reconsideration of the Cooper/Kline critique of the factor structure of the Motivation Analysis Test. Multivariate Experimental Clinical Research, 1985, 7, 89-94.
17. Boyle, G. J. Review of Cattell's structured personality-learning theory: A wholistic multivariate research approach. Australian Journal of Psychology, 1985, 37, 109-110.
18. Boyle, G. J. Self-report measures of depression: Some psychometric considerations. British Journal of Clinical Psychology, 1985, 24, 45-59.
19. Boyle, G. J. The influence of a foreign language spoken at home on higher-order reading skills in an Australian context. Bulletin of the Australian College of Education, 1985, 11, 245-248.
20. Boyle, G. J. The paramenstruum and negative moods in normal young women. Personality and Individual Differences, 1985, 6, 649-652.
21. Boyle, G. J. (with G. J. Mooney). Treatment of aquaphobia using a self-efficacy approach. Paper presented at the first joint conference of the Australian and New Zealand Psychological Societies, University of Canterbury, Christchurch, New Zealand, August 1985. Abstract in Australian Psychologist, 1986, 21, 148-149.
22. Boyle, G. J., Stanley, G. V. & Start, K. B. Canonical/redundancy analyses of the Sixteen Personality Factor Questionnaire, the Motivation Analysis Test, and the Eight State Questionnaire. Multivariate Experimental Clinical Research, 1985, 7, 113-132.

1986

23. Boyle, G. J. Analysis of typological factors across the Eight State Questionnaire and the Differential Emotions Scale. Psychological Reports, 1986, 59, 503-510.
24. Boyle, G. J. Canonical-redundancy analysis of change scores for the DES-IV and 8SQ multivariate mood-state scales. Paper presented at the 21st Annual Conference of the Australian Psychological Society, James Cook University of North Queensland, Townsville, August 1986. Abstract in Australian Psychologist, 1987, 22, 81.
25. Boyle, G. J. Clinical neuropsychological assessment: Abbreviating the Halstead Category Test of brain dysfunction. Journal of Clinical Psychology, 1986, 42, 615-625.
26. Boyle, G. J. Concussing the brain with electroconvulsive shock therapy (ECT): An appropriate treatment for depression and suicidal ideation? Australian Clinical Psychologist, 1986, 18, 21-27.
27. Boyle, G. J. Depressed mood effects on processing of high- and low-content structure text in American and Australian college women. Journal of Structural Learning, 1986, 9, 77-82.

28. Boyle, G. J. Estimation of measurement redundancy across the Eight State Questionnaire and the Differential Emotions Scale. New Zealand Journal of Psychology, 1986, 15, 54-61.
 29. Boyle, G. J. Higher-order factors in the Differential Emotions Scale (DES-III). Personality and Individual Differences, 1986, 7, 305-310.
 30. Boyle, G. J. Intermodality superfactors in the Sixteen Personality Factor Questionnaire, Eight State Battery and Objective Motivation Analysis Test. Personality and Individual Differences, 1986, 7, 583-586.
 31. Boyle, G. J. Prediction of academic achievement from intrapersonal psychological variables. Paper presented at the Annual Conference of the Australian Association for Research in Education, Ormond College, University of Melbourne, November 1986. Abstract in Australian Educational Researcher, 1986, 14, 41.
 32. Boyle, G. J. Prediction of cognitive learning performance from multivariate state-change scores. Australian Educational and Developmental Psychologist, 1986, 3, 17-21.
 33. Boyle, G. J. Review of Cattell's human motivation and the dynamic calculus. New Zealand Journal of Psychology, 1986, 15, 82-84.
 34. Boyle, G. J. & Stanley, G. V. Application of factor analysis in psychological research: Improvement of simple structure by computer-assisted graphic oblique transformation: A brief note. Multivariate Experimental Clinical Research, 1986, 8, 175-182.
- 1987
35. Boyle, G. J. A conjoint dR-factoring of the 8SQ/DES-IV multivariate mood-state scales. Australian Journal of Psychology, 1987, 39, 79-87.
 36. Boyle, G. J. A cross-validation of the factor structure of the Profile of Mood States: Were the factors correctly identified in the first instance? Psychological Reports, 1987, 60, 343-354.
 37. Boyle, G. J. Central clinical states: An examination of the Profile of Mood States and the Eight State Questionnaire. Submitted for publication, 1987.
 38. Boyle, G. J. Content similarities and differences in Cattell's Sixteen Personality Factor Questionnaire, Eight State Questionnaire, and Motivation Analysis Test. Psychological Reports, 1987, 60, 179-186.
 39. Boyle, G. J. Contribution of Cattellian psychometrics to the elucidation of human intellectual structure. Submitted for publication, 1987.
 40. Boyle, G. J. Electroconvulsive Shock Treatment: Does it induce brain damage and memory loss? Paper to be presented at the 22nd Annual Conference of the Australian Psychological Society, Australian National University, Canberra, August 1987.
 41. Boyle, G. J. Elucidation of motivation structure by dynamic calculus. (Ch. 21). In J. R. Nesselrode & R. B. Cattell (Eds.), Handbook of multivariate experimental psychology. Revised Second Edition, New York: Plenum, 1987. (in press).

42. Boyle, G. J. Evidence of typological mood states from change-score (dR)-factoring of the Clinical Analysis Questionnaire. Psychologische Beiträge, in press.
43. Boyle, G. J. Is Electroconvulsive Shock Therapy (ECT) an appropriate treatment for depression and suicidal ideation? Submitted for publication, 1987.
44. Boyle, G. J. Neuropsychological factors and the Halstead Category Test of brain dysfunction. Paper to be presented at the 22nd Annual Conference of the Australian Psychological Society, Australian National University, Canberra, August 1987.
45. Boyle, G. J. Psychopathological depression superfactors in the Clinical Analysis Questionnaire. Personality and Individual Differences, 1987, in press.
46. Boyle, G. J. Review of Breggin's electroshock: Its brain-disabling effects. New Zealand Journal of Psychology, 1987, in press.
47. Boyle, G. J. Review of Cattell and Johnson's functional psychological testing: Principles and instruments. Submitted for publication, 1987.
48. Boyle, G. J. Review of standards for educational and psychological testing. Australian Journal of Psychology, 1987, 39, in press.
49. Boyle, G. J. Secondary mood-type factors in the Differential Emotions Scale (DES-IV). Multivariate Experimental Clinical Research, 1987, in press.
50. Boyle, G. J. ^{Commentary:} Role of intrapersonal psychological variables in academic school learning. Journal of School Psychology, 1987, in press.
51. Boyle, G. J. Typological mood-state factors measured in the Eight State Questionnaire. Personality and Individual Differences, 1987, 8, 137-140.
52. Boyle, G. J. Quantitative and qualitative intersections between the Eight State Questionnaire and the Profile of Mood States. Educational and Psychological Measurement, 1987, 47, 437-443.
53. Boyle, G. J. Use of change scores in redundancy analyses of multivariate psychological inventories. Personality and Individual Differences, 1987, in press.
54. Boyle, G. J. What does the neuropsychological Category Test measure? Submitted for publication, 1987.
55. Boyle, G. J. & Cattell, R. B. A first survey of the similarity of personality and motivation prediction of 'in situ' and experimentally controlled learning, by structured learning theory. Australian Psychologist, 1987, 22, 189-196.
56. Boyle, G. J. & Cattell, R. B. The behaviour under stimulation of unintegrated and integrated components in the Motivation Analysis Test: Evidence of their state-trait nature. Journal of Psychological Researches, 1987, in press.

Books in Preparation:

57. Boyle, G. J. & Langley, C. D. Elementary statistical methods. Pergamon Press.
58. Boyle, G. J. Personality and motivation research: Appraisal of Cattell's multivariate psychometric model. Australian Council for Educational Research.

THESES

- Boyle, G. J. The Halstead Category Test: The clinical neuropsychological assessment of brain-damaged patients. Honours Thesis, University of Melbourne, 1972.
- Boyle, G. J. Delimitation of state and trait curiosity in relation to state anxiety and performance on a learning task. Masters Thesis, University of Melbourne, 1977.
- Boyle, G. J. Effects of depressive mood and the premenstrual factor on processing of high and low content structure text in American and Australian college women. Ph.D. Dissertation, University of Delaware, 1983. Dissertation Abstracts International, 1984, 45(2), 661-B. Order No. DA8412699.
- Boyle, G. J. Effects on academic learning of manipulating mood states and motivational dynamics in relation to ability and personality factors. Ph.D. Dissertation, University of Melbourne, 1984. Dissertation Abstracts International, 1986, 46(9), 3252B-3253B. Order No. DA8525651.