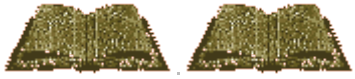
ANIL AGGRAWAL'S
Internet Journal of Forensic Medicine and Toxicology
The world's first online journal devoted entirely to forensic medicine and toxicology · Published 1 January and 1 July

VOL. 2, NO. 2
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Technical Books Section



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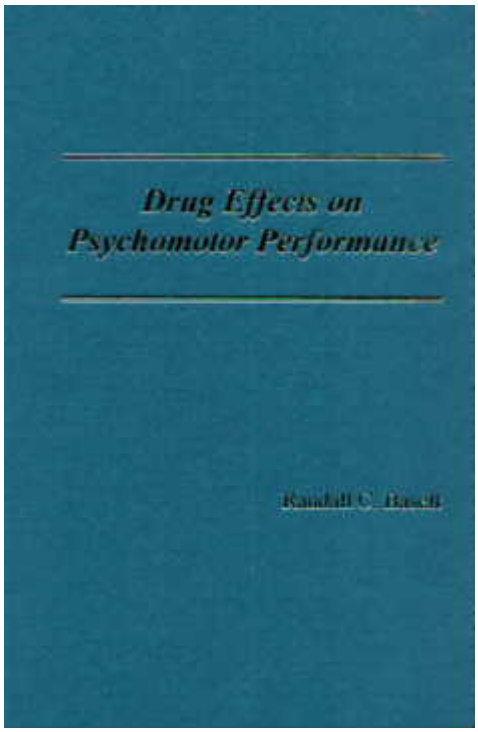
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HOW DRUGS AFFECT YOUR PERFORMANCE

Drug effects on Psychomotor Performance, 1st Edition *by* Randall C. Baselt. Hard Bound, 7" x 10" Biomedical Publications, P.O. Box 8299, Foster City, California 94404. Publication Date 2001; viii + 475 pages: ISBN 0-9626523-4-2: Library of Congress Control No. 00-133235: Hardback edition, 2001: Price $109.00

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Randall C. Baselt, the author

Dr. Randall C. Baselt is an analytical toxicologist with 35 years experience in forensic, clinical and industrial toxicology. He is the author of numerous scientific publications on the analysis of toxic substances in biological specimens and the interpretation of analytical findings. Books to his credit include Disposition of Toxic Drugs and Chemicals in Man, Introduction to Forensic Toxicology, Courtroom Toxicology (7 volumes), Biological Monitoring Methods for Industrial Chemicals and Analytical Procedures for Therapeutic Drug Monitoring and Emergency Toxicology. He has provided consultant services to the National Institute on Drug Abuse, the Centers for Disease Control, the U.S. Navy and the U.S. Food and Drug Administration. Dr. Baselt is certified by the American Board of Toxicology, the American Board of Clinical Chemistry and the American Board of Forensic Toxicology. He also holds California Department of Health Services licenses as Clinical Chemist, Clinical Laboratory Toxicologist and Clinical Toxicologist Technologist. He is a member of 10 professional societies and has been president of the California Association of Toxicologists; current positions include editor of the Journal of Analytical Toxicology and editorial board member of the Journal of Forensic Sciences. He has provided expert testimony on numerous occasions in civil and criminal trials in municipal, superior, federal and military courts and in congressional hearings.

How do antihistaminics affect your patients' psychomotor performance? Or sedatives? Or amphetamines? Intrigued? Well, fish out any book on pharmacology, and it will tell you all about it. But will it? I tried it with several well-known pharmacological texts, but the information given in the book under review always surpassed every other book both in quantity and quality of information.

Welcome to a new and authentic book, which is dedicated to the explanation of the psychomotor effects of drugs? So if these are what you are looking for, this book is for you. This book deals with a total of 145 drugs ranging from Alprazolam to Zopiclone, arranged in a dictionary style. This style has been resorted to for easy accessibility, and has been used successfully by another book we shall be discussing later (American Drug Index, 45th Edition).

Each drug is discussed under five sections: pharmacology, laboratory studies, driving studies, epidemiology and conclusions. Before any of these sections start, the drug is categorized under four headings, namely therapeutic category, Pharmacologic category, active metabolite(s) and blood half life. For instance, on page 253, where the drug *Methyldopa* is described, we find the following four lines at the top of the page:

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Therapeutic category: Antihypertensive
Pharmacologic category: false neurotransmitter (CNS depressant)
Active metabolite(s): none
Blood half life: 4-14 hr

This kind of information immediately puts the drug in the right perspective in the reader's mind. To my mind this kind of information is very valuable because it immediately helps you relate even an unknown drug to the drugs you already know. I only vaguely knew about the drug *Venlafaxine*, but once I turned to this drug (on page 444), immediately I was greeted with the following information:

Table 1: List of drugs/Substances/Poisons dealt with in this book (Cont'd in table 2)

		49. Gabapentin
1. Alprazolam	25. Clemastine	50. Gamma-hydroxybutyrate
2. Amitriptyline	26. Clobazam	51. Haloperidol
3. Amobarbital	27. Clomipramine	52. Heroin
4. Amoxapine	28. Clonazepam	53. Hydromorphone
5. Amphetamine	29. Clonidine	54. Hydroxyzine
6. Astemizole	30. Clorazepate	55. Imipramine
7. Atenolol	31. Clozapine	56. Kavain
8. Atropine	32. Cocaine	57. Ketamine
9. Bromazepam	33. Codeine	58. Lamotrigine
10. Brompheniramine	34. Cyclizine	59. Lidocaine
11. Bupivacaine	35. Desipramine	60. Lithium
12. Buprenorphine	36. Diazepam	61. Loprazolam
13. Bupropion	37. Diphenhydramine	62. Loratadine
14. Buspirone	38. Dothiepin	63. Lorazepam
15. Butorphanol	39. Doxepin	64. Lormetazepam
16. Caffeine	40. Ephedrine	65. Lysergic Acid Diethylamide
17. Carbamazepine	41. Fenfluramine	66. Maprotiline
18. Carisoprodol	42. Fentanyl	67. Medazepam
19. Cetirizine	43. Fexofenadine	68. Melatonin
20. Chlordiazepoxide	44. Flunitrazepam	69. Meperidine
21. Chlorpheniramine	45. Fluoxetine	70. Mepivacaine
22. Chlorpromazine	46. Fluphenazine	71. Meprobamate
23. Cimetidine	47. Flurazepam	72. Methadone
24. Citalopram	48. Fluvoxamine	

Therapeutic category: Antidepressant
Pharmacologic category: selective serotonin reuptake inhibitor

Active metabolite(s): O-desmethylvenlafaxine
Blood half life: 3-7 hr (venlafaxine); 12 hr (O-desmethylvenlafaxine)

And lo, immediately I knew what type of drug I was going to read about.

Under the heading "*Pharmacology*", we see major therapeutic indications of that drug, primary manifestations of drug usage (e.g. sedation or stimulation), common commercial forms of the drug (such as tablets or and injectable solution), usual routes of administration, normal adult dosage range, blood concentrations produced by therapeutic doses, major adverse effects and warnings published by the drug manufacturer regarding possible impairment of psychomotor skills or interaction with other psychoactive drugs.

The section "*Laboratory Studies*" appeared to me as the soul of this whole book. In this section, which incidentally happens to be the most detailed too, published investigations have been listed in chronological order (with references). Each study description provides the number of subjects, their ages and sex (where indicated in the original sources), whether they were healthy volunteers or patients with a particular medical history, drug dose, route, timing and frequency of administration.

What I found most interesting were the amazing variety of different psychomotor tests that were employed by different researchers. Furthermore, the same psychomotor test was not necessarily similarly named by different groups of researchers. The author has - for the sake of uniformity - given the same name to the same psychomotor test, even if this test was named differently by the original researchers. This is indeed a commendable task. Not only that, the author has made a comprehensive A-Z listing of all these tests under a different section (called *Glossary*). Various psychomotor tests ranging from *Arithmetic* to *Word List Recall* are represented here along with their brief descriptions (A total of 82 tests are described!). This was indeed necessary, as otherwise one could easily get confused by the variety of psychomotor tests that are used.

Take for instance *Alprazolam*. Under the laboratory studies, one of the laboratory study mentions that the drug was given to 9 healthy men and then these persons were tested for sedation self rating, word list recall, CFF, discriminant reaction time and the Buschke task. The results of these tests are also given. But I never knew what was the Buschke task in the first place. No problem. I went to the glossary section, and found the test listed. I discovered that Buschke task is a specialized version of the word list recall test, in which the investigator reads a series of 10-20 words to the subject, who then tries to recall as many as possible. The investigator will then repeat the words that the subject has forgotten and the subject is asked once again to recall the entire list. The process is repeated up to 10-12 times.

What about CFF? Since I was there, I decided to check this test too, although I vaguely knew what it was. What I discovered was this: CFF stands for *Critical Flicker Fusion*. The subject is asked to view one or more lights on a computer screen or electronic apparatus and to indicate whether the light appears to be flickering or continuous. The rate of flicker is constantly increased or decreased, and the frequency of the subject's discriminative threshold is recorded.

Table 2: List of drugs/Substances/Poisons dealt with in this book (Cont'd from table 1)

73. Methamphetamine	97. Oxazepam	121. Scopolamine
74. Methaqualone	98. Oxprenolol	122. Secobarbital
75. Methocarbamol	99. Oxycodone	123. Selegiline
76. Methohexital	100. Paroxetine	124. Sertraline

77. Methyldopa
78. Methylenedioxy methamphetamine
79. Methylphenidate
80. Metoprolol
81. Mianserin
82. Midazolam
83. Mirtazapine
84. Moclobemide
85. Modafinil
86. Morphine
87. Nadolol
88. Nalbuphine
89. Nefazodone
90. Nicotine
91. Nifedipine
92. Nitrazepam
93. Nitrous Oxide
94. Nortriptyline
95. Olanzapine
96. Ondansetron
101. Pemoline
102. Pentazocine
103. Pentobarbital
104. Phencyclidine
105. Phenobarbital
106. Phentermine
107. Phenytoin
108. Prazepam
109. Prochlorperazine
110. Promethazine
111. Propofol
112. Propoxyphene
113. Propranolol
114. Protriptyline
115. Pseudoephedrine
116. Psilocybin
117. Quazepam
118. Ranitidine
119. Remoxipride
120. Risperidone
125. Sibutramine
126. Sulpiride
127. Temazepam
128. Terfenadine
129. Tetrahydro cannabinol
130. Theophylline
131. Thiopental
132. Thioridazine
133. Tramadol
134. Trazodone
135. Triazolam
136. Trihexyphenidyl
137. Triprolidine
138. Valproic Acid
139. Venlafaxine
140. Verapamil
141. Vigabatrin
142. Zaleplon
143. Zolmitriptan
144. Zolpidem
145. Zopiclone

I found these psychomotor test sheer pleasure to read *suo moto* too. While scanning this section, I came across such juicy terms as *Gibson Spiral maze, Letter cancellation, Mirror drawing, Seashore rhythm, Tower of London* and *Tower of Toronto*. What is *Seashore rhythm*? Well, in this test, auditory rhythms are presented as pairs and the subject must decide whether the rhythms within the pair are identical or different. *Tower of Toronto* is a puzzle consisting of 4 disks of different colors initially stacked on the first of 3 pegs. The subject must reassemble the discs on the third peg in the same order as quickly as possible, moving only one disc at a time and never putting a darker-colored disc on top of a lighter one.

What is important is that all these 82 tests represent some particular psychomotor function. It is also important to appreciate that various researchers have preferred to use different psychomotor tests when testing different drugs. I would have been particularly happy, if the author had cared to cross-index every psychomotor test with the drugs that affected them. For instance if I am reading about a psychomotor test, say, *Symbol Copying*, I can only know what it is. I would have been far more interested in knowing, which drugs affect this test, or at least with which drugs, researchers have cared to employ this test. I hope the author would take care to include this kind of cross-reference in the future editions. This is also about the only major criticism of this otherwise extremely fascinating book.

This section has one more interesting feature - interactions between two drugs. It is nice to know how a psychomotor test is affected when a person takes, say, marijuana, but what happens when he takes marijuana along with, say, alcohol, or with amphetamines, or with cocaine? This is dealt with under sub-headings within this section. For instance in the section on Laboratory studies under the title *Diazepam*, we see three subheadings - Alcohol, Amitriptyline and Theophylline (page 133). In

the relevant section on *Tetrahydrocannabinol*, we find four subheadings - Alcohol, Amphetamine, Cocaine and Propranolol. Interactions of each of these drugs with tetrahydrocannabinol is described. Readers might be intrigued with our original question: the interaction between tetrahydrocannabinol and cocaine? Well, here you go. You get to read the details on page 410. A group of 12 healthy men smoked marijuana cigarettes containing 0, 13 or 27 mg THC over 5 minutes, followed 8 minutes later by intravenous injection of 0, 16 or 32 mg cocaine. They were tested over the next 15 minutes using these psychomotor tests: reaction time (visual), choice reaction time (visual), DSS, word list recall, repeated acquisition, number recognition and sedation self-rating. Studies like this are cross-referenced (this particular study is referenced as: *R.W. Foltin, M.W.Fishman, P.A. Pippen and T.H. Kelly. Behavioral effects of cocaine alone and in combination with ethanol or marijuana in humans. Drug Alc. Depend. 32:93-106, 1993*). I was curious if the author had cared to include this study under the heading *cocaine*, and sure enough I found the same information on page 117. Very systematic indeed!

Who would find this book of most use? Well, I am a forensic pathologist and a clinical forensic physician, and I am going to use the book very frequently. I believe most people of my discipline are going to love this book. I also think that the book should be useful to all pharmacologists, especially psychopharmacologists, who are planning to explore deeper into the psychomotor effects of drugs. Toxicologists, clinical toxicologists, and forensic toxicologists would find this book very valuable. Clinicians who do not want to compromise the motor and sensory skills of their patients with their prescriptions, would do well to consult the book before prescribing any drug to them. Safety officials who are concerned with the role of drugs in workplace or traffic accidents would find the book very useful too. Finally students appearing in the postgraduate exams of pharmacology, psychiatry, physiology and forensic medicine would find sterling material in this book to write in their exams and quote in viva.

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