

References

- Aberman, J. E. & Salamone, J. D. (1999). Nucleus accumbens dopamine depletions make rats more sensitive to high ratio requirements but do not impair primary food reinforcement. *Neuroscience* **92**: 545-552.
- Adams, C. D. (1982). Variations in the sensitivity of instrumental responding to reinforcer devaluation. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **34**: 77-98.
- Adams, C. D. & Dickinson, A. (1981). Instrumental responding following reinforcer devaluation. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **33**: 109-121.
- Ainslie, G. (1975). Specious reward: a behavioral theory of impulsiveness and impulse control. *Psychological Bulletin* **82**: 463-496.
- Alderson, H. L., Robbins, T. W. & Everitt, B. J. (in press-a). The effects of excitotoxic lesions of the basolateral amygdala on the acquisition of heroin-seeking behaviour in rats [DOI 10.1007/s002130000527]. *Psychopharmacology*.
- Alderson, H. L., Robbins, T. W. & Everitt, B. J. (in press-b). Heroin self-administration under a second-order schedule of reinforcement: acquisition and maintenance of heroin-seeking behaviour in rats [DOI 10.1007/s002130000429]. *Psychopharmacology*.
- Aldridge, J. W., Berridge, K. C., Herman, M. & Zimmer, L. (1993). Neuronal coding of serial order: syntax of grooming in the neostriatum. *Psychological Science* **4**: 391-395.
- Alexander, G. E. & Crutcher, M. D. (1990). Functional architecture of basal ganglia circuits: neural substrates of parallel processing. *Trends in Neurosciences* **13**: 266-271.
- Alexander, G. E., Crutcher, M. D. & DeLong, M. R. (1990). Basal ganglia-thalamocortical circuits - parallel substrates for motor, oculomotor, prefrontal and limbic functions. *Progress in Brain Research* **85**: 119-146.
- Alexander, G. E., DeLong, M. R. & Strick, P. L. (1986). Parallel organization of functionally segregated circuits linking basal ganglia and cortex. *Annual Review of Neuroscience* **9**: 357-381.
- Allport, A. (1987). Selection for action: Some behavioral and neurophysiological considerations of attention and action. In *Perspectives on Perception and Action* (Heuer, H. & Sanders, A. F., eds.), pp. 395-419. Lawrence Erlbaum Associates, Hillsdale, New Jersey.
- Al-Ruwaitea, A. S., Al-Zahrani, S. S., Ho, M. Y., Bradshaw, C. M. & Szabadi, E. (1997a). Effect of central 5-hydroxytryptamine depletion on performance in the "time-left" procedure: further evidence for a role of the 5-hydroxytryptaminergic pathways in behavioural "switching". *Psychopharmacology* **134**: 179-186.
- Al-Ruwaitea, A. S. A., Al-Zahrani, S. S. A., Ho, M. Y., Bradshaw, C. M. & Szabadi, E. (1997b). 5-Hydroxytryptamine and interval timing. In *Time and Behaviour: Psychological and Neurobehavioural Analyses* (Bradshaw, C. M. & Szabadi, E., eds.), pp. 517-570. Elsevier, Amsterdam.
- Altman, J., Everitt, B. J., Glautier, S., Markou, A., Nutt, D., Oretti, R., Phillips, G. D. & Robbins, T. W. (1996). The biological, social and clinical bases of drug addiction: commentary and debate. *Psychopharmacology* **125**: 285-345.
- Al-Zahrani, S. S., Ho, M. Y., Velazquez Martinez, D. N., Lopez Cabrera, M., Bradshaw, C. M. & Szabadi, E. (1996). Effect of destruction of the 5-hydroxytryptaminergic pathways on behavioural timing and "switching" in a free-operant psychophysical procedure. *Psychopharmacology* **127**: 346-352.
- Al-Zahrani, S. S. A., Ho, M. Y., Al-Ruwaitea, A. S. A., Bradshaw, C. M. & Szabadi, E. (1997). Effect of destruction of the 5-hydroxytryptaminergic pathways on temporal memory: Quantitative analysis with a delayed interval bisection task. *Psychopharmacology* **129**: 48-55.
- Amaral, D. G., Price, J. L., Pitkänen, A. & Carmichael, S. T. (1992). Anatomical organization of the primate amygdaloid complex. In *The amygdala: neurobiological aspects of emotion, memory, and mental dysfunction* (Aggleton, J. P., ed.), pp. 1-66. Wiley-Liss, New York.
- Anand, B. K. & Brobeck, J. R. (1951). Hypothalamic control of food intake. *Yale Journal of Biology and Medicine* **24**: 123-140.
- APA (1994). *Diagnostic and Statistical Manual of Mental Disorders, version IV (DSM-IV)*, American Psychiatric Association, Washington DC.
- Aristotle (350 BC / 1925). *Nicomachean Ethics [translated by W.D. Ross]*, Clarendon Press, Oxford.

- Arroyo, M., Markou, A., Robbins, T. W. & Everitt, B. J. (1998). Acquisition, maintenance and reinstatement of intravenous cocaine self-administration under a second-order schedule of reinforcement in rats: effects of conditioned cues and continuous access to cocaine. *Psychopharmacology* **140**: 331-344.
- Åsberg, M., Träskman, L. & Thorén, P. (1976). 5-HIAA in the cerebrospinal fluid: a biochemical suicide predictor. *Archives of General Psychiatry* **33**: 1193-1197.
- Autor, S. M. (1969). The strength of conditioned reinforcers as a function of frequency and probability of reinforcement. In *Conditioned reinforcement* (Hendry, D. P., ed.), pp. 127-162. The Dorsey Press, Homewood, Illinois.
- Awh, E. & Gehring, W. J. (1999). The anterior cingulate cortex lends a hand in response selection. *Nature Neuroscience* **2**: 853-854.
- Baars, B. J. (1988). *A cognitive theory of consciousness*, Cambridge University Press, Cambridge.
- Baer, L., Rauch, S. L., Ballantine, H. T., Jr., Martuza, R., Cosgrove, R., Cassem, E., Giriunas, I., Manzo, P. A., Dimino, C. & Jenike, M. A. (1995). Cingulotomy for intractable obsessive-compulsive disorder. Prospective long-term follow-up of 18 patients. *Archives of General Psychiatry* **52**: 384-392.
- Baeyens, F., Eelen, P., van den Berg, H. & Crombez, G. (1990). Flavor-flavor and color-flavor conditioning in humans. *Learning & Motivation* **21**: 434-455.
- Bakshi, V. P. & Kelley, A. E. (1991). Dopaminergic regulation of feeding behavior. 1: Differential effects of haloperidol microinfusion into 3 striatal subregions. *Psychobiology* **19**: 223-232.
- Balleine, B. (1992). Instrumental performance following a shift in primary motivation depends on incentive learning. *Journal of Experimental Psychology: Animal Behavior Processes* **18**: 236-250.
- Balleine, B. (1994). Asymmetrical interactions between thirst and hunger in Pavlovian-instrumental transfer. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **47**: 211-231.
- Balleine, B., Ball, J. & Dickinson, A. (1994). Benzodiazepine-induced outcome revaluation and the motivational control of instrumental action in rats. *Behavioral Neuroscience* **108**: 573-589.
- Balleine, B., Davies, A. & Dickinson, A. (1995a). Cholecystokinin attenuates incentive learning in rats. *Behavioral Neuroscience* **109**: 312-319.
- Balleine, B. & Dickinson, A. (1991). Instrumental performance following reinforcer devaluation depends upon incentive learning. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **43**: 279-296.
- Balleine, B. & Dickinson, A. (1992). Signalling and incentive processes in instrumental reinforcer devaluation. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **45**: 285-301.
- Balleine, B. & Dickinson, A. (1994). Role of cholecystokinin in the motivational control of instrumental action in rats. *Behavioral Neuroscience* **108**: 590-605.
- Balleine, B. & Killcross, S. (1994). Effects of ibotenic acid lesions of the nucleus accumbens on instrumental action. *Behavioural Brain Research* **65**: 181-193.
- Balleine, B. W. & Dickinson, A. (1998a). Goal-directed instrumental action: contingency and incentive learning and their cortical substrates. *Neuropharmacology* **37**: 407-419.
- Balleine, B. W. & Dickinson, A. (1998b). The role of incentive learning in instrumental outcome revaluation by sensory-specific satiety. *Animal Learning & Behavior* **26**: 46-59.
- Balleine, B. W. & Dickinson, A. (2000). The effect of lesions of the insular cortex on instrumental conditioning: evidence for a role in incentive memory. *Journal of Neuroscience* **20**: 8954-8964.
- Balleine, B. W., Garner, C., Gonzalez, F. & Dickinson, A. (1995b). Motivational control of heterogeneous instrumental chains. *Journal of Experimental Psychology: Animal Behavior Processes* **21**: 203-217.
- Barratt, E. S. & Patton, J. H. (1983). Impulsivity: cognitive, behavioral and psychophysiological correlates. In *Biological bases of sensation seeking, impulsivity, and anxiety* (Zuckerman, M., ed.), pp. 77-116. Lawrence Erlbaum Associates, Hillsdale, New Jersey.
- Barto, A. G. (1995). Adaptive critics and the basal ganglia. In *Models of Information Processing in the Basal Ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 215-232. MIT Press, Cambridge, Massachusetts.

- Bassareo, V. & Di Chiara, G. (1999). Differential responsiveness of dopamine transmission to food-stimuli in nucleus accumbens shell/core compartments. *Neuroscience* **89**: 637-641.
- Baum, W. M. (1974). On two types of deviation from the matching law: Bias and undermatching. *Journal of the Experimental Analysis of Behavior* **22**: 231-242.
- Baum, W. M. (1979). Matching, undermatching, and overmatching in studies of choice. *Journal of the Experimental Analysis of Behavior* **32**: 269-281.
- Baum, W. M. & Rachlin, H. C. (1969). Choice as time allocation. *Journal of the Experimental Analysis of Behavior* **12**: 861-874.
- Bautista, L. M., Alonso, J. C. & Alonso, J. A. (1992). A 20-year study of wintering common crane fluctuations using time series analysis. *Journal of Wildlife Management* **56**: 563-572.
- Baxter, D. J. & Zamble, E. (1982). Reinforcer and response specificity in appetitive transfer of control. *Animal Learning & Behavior* **10**: 201-210.
- Baxter, M. G., Parker, A., Lindner, C. C. C., Izquierdo, A. D. & Murray, E. A. (2000). Control of response selection by reinforcer value requires interaction of amygdala and orbital prefrontal cortex. *Journal of Neuroscience* **20**: 4311-4319.
- Bechara, A., Damasio, H. & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral Cortex* **10**: 295-307.
- Bechara, A., Damasio, H., Damasio, A. R. & Lee, G. P. (1999). Different contributions of the human amygdala and ventromedial prefrontal cortex to decision-making. *Journal of Neuroscience* **19**: 5473-5481.
- Bechara, A., Damasio, H., Tranel, D. & Anderson, S. W. (1998). Dissociation of working memory from decision making within the human prefrontal cortex. *Journal of Neuroscience* **18**: 428-437.
- Bechara, A., Damasio, H., Tranel, D. & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science* **275**: 1293-1295.
- Bechara, A., Tranel, D., Damasio, H. & Damasio, A. R. (1996). Failure to respond autonomically to anticipated future outcomes following damage to prefrontal cortex. *Cerebral Cortex* **6**: 215-225.
- Belke, T. W. (1998). Qualitatively different reinforcers and parameters of Herrnstein's (1970) response-strength equation. *Animal Learning & Behavior* **26**: 235-242.
- Bench, C. J., Friston, K. J., Brown, R. G., Scott, L. C., Frackowiak, R. S. & Dolan, R. J. (1992). The anatomy of melancholia - focal abnormalities of cerebral blood flow in major depression. *Psychological Medicine* **22**: 607-615.
- Bench, C. J., Frith, C. D., Grasby, P. M., Friston, K. J., Paulesu, E., Frackowiak, R. S. & Dolan, R. J. (1993). Investigations of the functional anatomy of attention using the Stroop test. *Neuropsychologia* **31**: 907-922.
- Berendse, H. W., Galisdegraaf, Y. & Groenewegen, H. J. (1992). Topographical organization and relationship with ventral striatal compartments of prefrontal corticostriatal projections in the rat. *Journal of Comparative Neurology* **316**: 314-347.
- Berns, G. S., Cohen, J. D. & Mintun, M. A. (1997). Brain regions responsive to novelty in the absence of awareness. *Science* **276**: 1272-1275.
- Bernstein, P. S., Scheffers, M. K. & Coles, M. G. H. (1995). Where did I go wrong - a psychophysiological analysis of error-detection. *Journal of Experimental Psychology: Human Perception and Performance* **21**: 1312-1322.
- Berridge, K. C. (1991). Modulation of taste affect by hunger, caloric satiety, and sensory-specific satiety in the rat. *Appetite* **16**: 103-120.
- Berridge, K. C. (1996). Food reward: Brain substrates of wanting and liking. *Neuroscience and Biobehavioral Reviews* **20**: 1-25.
- Berridge, K. C., Flynn, F. W., Schulkin, J. & Grill, H. J. (1984). Sodium depletion enhances salt palatability in rats. *Behavioral Neuroscience* **98**: 652-660.
- Berridge, K. C., Grill, H. J. & Norgren, R. (1981). Relation of consummatory responses and preabsorptive insulin release to palatability and learned taste aversions. *Journal of Comparative and Physiological Psychology* **95**: 363-382.
- Berridge, K. C. & Robinson, T. E. (1998). What is the role of dopamine in reward: hedonic impact, reward learning, or incentive salience? *Brain Research Reviews* **28**: 309-369.
- Bickel, W. K., Odum, A. L. & Madden, G. J. (1999). Impulsivity and cigarette smoking: delay discounting in current, never, and ex-smokers. *Psychopharmacology* **146**: 447-454.

- Bizot, J., Le Bihan, C., Puech, A. J., Hamon, M. & Thiébot, M. (1999). Serotonin and tolerance to delay of reward in rats. *Psychopharmacology* **146**: 400-412.
- Bizot, J. C. & Thiébot, M. H. (1996). Impulsivity as a confounding factor in certain animal tests of cognitive function. *Cognitive Brain Research* **3**: 243-250.
- Blackburn, J. R., Phillips, A. G. & Fibiger, H. C. (1987). Dopamine and preparatory behavior. 1. Effects of pimozide. *Behavioral Neuroscience* **101**: 352-360.
- Blundell, J. E., Strupp, B. J. & Latham, C. J. (1977). Pharmacological manipulation of hoarding: further analysis of amphetamine isomers and pimozide. *Physiological Psychology* **5**: 462-468.
- Blundell, P. J. & Killcross, A. S. (2000a). The basolateral amygdala (BLA) mediates the sensory properties of reinforcers in appetitive conditioning. *European Journal of Neuroscience* **12 (supplement 11)**: 78.
- Blundell, P. J. & Killcross, A. S. (2000b). Effects of excitotoxic lesions of the basolateral nucleus of the amygdala on associative learning in rats. *Journal of Psychopharmacology* **14 (3) (supplement)**: A48.
- Bolles, R. C. & Fanselow, M. S. (1980). A perceptual-defensive-recuperative model of fear and pain. *Behavioral Brain Sciences* **3**: 291-323.
- Bolles, R. C., Holtz, R., Dunn, T. & Hill, W. (1980). Comparison of stimulus learning and response learning in a punishment situation. *Learning & Motivation* **11**: 78-96.
- Botvinick, M., Nystrom, L. E., Fissell, K., Carter, C. S. & Cohen, J. D. (1999). Conflict monitoring versus selection-for-action in anterior cingulate cortex. *Nature* **402**: 179-181.
- Box, G. E. P. (1954). Some theorems on quadratic forms applied in the study of analysis of variance problems: I. Effect of inequality of variance in the one-way classification. *Annals of Mathematical Statistics* **25**: 290-302.
- Box, G. E. P. & Jenkins, G. M. (1970). *Time series analysis: forecasting and control*, Holden-Day, San Francisco.
- Bradley, C. (1937). The behavior of children receiving Benzedrine. *American Journal of Psychiatry* **94**: 577-585.
- Bradley, D. R. & Russell, R. L. (1998). Some cautions regarding statistical power in split-plot designs. *Behavior Research Methods, Instruments and Computers* **30**: 462-477.
- Bradshaw, C. M. & Szabadi, E. (1992). Choice between delayed reinforcers in a discrete-trials schedule - the effect of deprivation level. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **44B**: 1-16.
- Branch, M. N. (1975). Effects of chlorpromazine and d-amphetamine on observing responses during a fixed-interval schedule. *Psychopharmacologia* **42**: 87-93.
- Breiter, H. C., Rauch, S. L., Kwong, K. K., Baker, J. R., Weisskoff, R. M., Kennedy, D. N., Kendrick, A. D., Davis, T. L., Jiang, A. P., Cohen, M. S., Stern, C. E., Belliveau, J. W., Baer, L., Osullivan, R. L., Savage, C. R., Jenike, M. A. & Rosen, B. R. (1996). Functional magnetic resonance imaging of symptom provocation in obsessive-compulsive disorder. *Archives of General Psychiatry* **53**: 595-606.
- Broca, P. (1878). Anatomie comparée des circonvolutions cérébrales. Le grand lobe limbique et la scissure limbique dans la série des mammifères. *Revue Anthropologique (Paris)* **1**: 456-498.
- Brog, J. S., Salyapongse, A., Deutch, A. Y. & Zahm, D. S. (1993). The patterns of afferent innervation of the core and shell in the "accumbens" part of the rat ventral striatum: immunohistochemical detection of retrogradely transported fluoro-gold. *Journal of Comparative Neurology* **338**: 255-278.
- Brogden, W. J. (1939). Sensory pre-conditioning. *Journal of Experimental Psychology* **25**: 323-332.
- Brown, G. L. & Linnoila, M. (1990). CSF serotonin metabolite (5HIAA) studies in depression, impulsivity and violence. *Journal of Clinical Psychiatry* **51 (supplement 4)**: 31-41.
- Brown, K. S. (1999). Oops... sorry. Researchers know the brain somehow spots mistakes. *New Scientist* **13 February 1999**: 38-41.
- Brown, P. L. & Jenkins, H. M. (1968). Auto-shaping of the pigeon's keypeck. *Journal of the Experimental Analysis of Behavior* **11**: 1-8.
- Brown, V. J. & Bowman, E. M. (1995). Discriminative cues indicating reward magnitude continue to determine reaction time of rats following lesions of the nucleus accumbens. *European Journal of Neuroscience* **7**: 2479-2485.
- Browne, M. P. (1976). The role of primary reinforcement and overt movements in auto-shaping in the pigeon. *Animal Learning & Behavior* **4**: 287-292.

- Buchanan, S. L. & Powell, D. A. (1982a). Cingulate cortex: its role in Pavlovian conditioning. *Journal of Comparative and Physiological Psychology* **96**: 755-774.
- Buchanan, S. L. & Powell, D. A. (1982b). Cingulate damage attenuates conditioned bradycardia. *Neuroscience Letters* **29**: 261-268.
- Burns, L. H., Everitt, B. J. & Robbins, T. W. (1999). Effects of excitotoxic lesions of the basolateral amygdala on conditional discrimination learning with primary and conditioned reinforcement. *Behavioural Brain Research* **100**: 123-133.
- Burns, L. H., Robbins, T. W. & Everitt, B. J. (1993). Differential effects of excitotoxic lesions of the basolateral amygdala, ventral subiculum and medial prefrontal cortex on responding with conditioned reinforcement and locomotor activity potentiated by intra-accumbens infusions of D-amphetamine. *Behavioural Brain Research* **55**: 167-183.
- Busatto, G. F., Zamignani, D. R., Buchpiguel, C. A., Garrido, G. E. J., Glabus, M. F., Rocha, E. T., Maia, A. F., Rosario-Campos, M. C., Castro, C. C., Furie, S. S., Gutierrez, M. A., McGuire, P. K. & Miguel, E. C. (2000). A voxel-based investigation of regional cerebral blood flow abnormalities in obsessive-compulsive disorder using single photon emission computed tomography (SPECT). *Psychiatry Research - Neuroimaging* **99**: 15-27.
- Bush, G., Frazier, J. A., Rauch, S. L., Seidman, L. J., Whalen, P. J., Jenike, M. A., Rosen, B. R. & Biederman, J. (1999). Anterior cingulate cortex dysfunction in attention-deficit/hyperactivity disorder revealed by fMRI and the Counting Stroop. *Biological Psychiatry* **45**: 1542-1552.
- Bush, G., Luu, P. & Posner, M. I. (2000). Cognitive and emotional influences in anterior cingulate cortex. *Trends in Cognitive Sciences* **4**: 215-222.
- Bush, G., Whalen, P. J., Rosen, B. R., Jenike, M. A., McInerney, S. C. & Rauch, S. L. (1998). The counting Stroop: an interference task specialized for functional neuroimaging - validation study with functional MRI. *Human Brain Mapping* **6**: 270-282.
- Bussey, T. J. (1996). Functions of the cingulate cortex in learning and memory in the rat. Unpublished PhD thesis, University of Cambridge.
- Bussey, T. J., Everitt, B. J. & Robbins, T. W. (1997a). Dissociable effects of cingulate and medial frontal cortex lesions on stimulus-reward learning using a novel Pavlovian autoshaping procedure for the rat: implications for the neurobiology of emotion. *Behavioral Neuroscience* **111**: 908-919.
- Bussey, T. J., Muir, J. L., Everitt, B. J. & Robbins, T. W. (1996). Dissociable effects of anterior and posterior cingulate cortex lesions on the acquisition of a conditional visual discrimination: facilitation of early learning vs. impairment of late learning. *Behavioural Brain Research* **82**: 45-56.
- Bussey, T. J., Muir, J. L., Everitt, B. J. & Robbins, T. W. (1997b). Triple dissociation of anterior cingulate, posterior cingulate, and medial frontal cortices on visual discrimination tasks using a touchscreen testing procedure for the rat. *Behavioral Neuroscience* **111**: 920-936.
- Butcher, L. L. (1995). Cholinergic neurons and networks. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 1003-1015. Academic Press, London.
- Cador, M., Bjijou, Y. & Stinus, L. (1995). Evidence of a complete independence of the neurobiological substrates for the induction and expression of behavioral sensitization to amphetamine. *Neuroscience* **65**: 385-395.
- Cador, M., Robbins, T. W. & Everitt, B. J. (1989). Involvement of the amygdala in stimulus-reward associations: interaction with the ventral striatum. *Neuroscience* **30**: 77-86.
- Cador, M., Taylor, J. R. & Robbins, T. W. (1991). Potentiation of the effects of reward-related stimuli by dopaminergic-dependent mechanisms in the nucleus accumbens. *Psychopharmacology* **104**: 377-385.
- Calabresi, P., Maj, R., Pisani, A., Mercuri, N. B. & Bernardi, G. (1992). Long-term synaptic depression in the striatum: physiological and pharmacological characterization. *Journal of Neuroscience* **12**: 4224-4233.
- Canon, J. G. (1979). A comparison of clozapine, chlorpromazine, and thioridazine upon DRL performance in the squirrel monkey. *Psychopharmacology* **64**: 55-60.
- Cardinal, R. N., Parkinson, J. A., Robbins, T. W., Dickinson, A. & Everitt, B. J. (2000a). Effects of lesions of the nucleus accumbens core and shell on response-specific Pavlovian-instrumental transfer. *Journal of Psychopharmacology* **14(3) (supplement)**: A68.
- Cardinal, R. N., Robbins, T. W. & Everitt, B. J. (2000b). The effects of d-amphetamine, chlordiazepoxide, alpha-flupenthixol and behavioural manipulations on choice of signalled and unsignalled delayed reinforcement in rats. *Psychopharmacology* **152**: 362-375.

- Carey, M. P., Diewald, L. M., Esposito, F. J., Pellicano, M. P., Carnevale, U. A. G., Sergeant, J. A., Papa, M. & Sadile, A. G. (1998). Differential distribution, affinity and plasticity of dopamine D-1 and D-2 receptors in the target sites of the mesolimbic system in an animal model of ADHD. *Behavioural Brain Research* **94**: 173-185.
- Carey, R. J. & Kritkausky, R. P. (1972). Absence of a response-rate-dependent effect of d-amphetamine on a DRL schedule when reinforcement is signaled. *Psychonomic Science* **26**: 285-286.
- Carlson, N. R. (1991). *Physiology of Behaviour*. Fourth edition, Allyn & Bacon, London.
- Carmichael, S. T. & Price, J. L. (1994). Architectonic subdivision of the orbital and medial prefrontal cortex in the macaque monkey. *Journal of Comparative Neurology* **346**: 366-402.
- Carter, C. S., Botvinick, M. M. & Cohen, J. D. (1999). The contribution of the anterior cingulate cortex to executive processes in cognition. *Reviews in the Neurosciences* **10**: 49-57.
- Carter, C. S., Braver, T. S., Barch, D. M., Botvinick, M. M., Noll, D. & Cohen, J. D. (1998). Anterior cingulate cortex, error detection, and the online monitoring of performance. *Science* **280**: 747-749.
- Carter, C. S., Macdonald, A. M., Botvinick, M., Ross, L. L., Stenger, V. A., Noll, D. & Cohen, J. D. (2000). Parsing executive processes: Strategic vs. evaluative functions of the anterior cingulate cortex. *Proceedings of the National Academy of Sciences of the United States of America* **97**: 1944-1948.
- Carter, C. S., Mintun, M. & Cohen, J. D. (1995). Interference and facilitation effects during selective attention: An (H_2O)-O-15 PET study of Stroop task performance. *Neuroimage* **2**: 264-272.
- Catania, A. C. (1970). Reinforcement schedules and psychophysical judgment: A study of some temporal properties of behavior. In *The theory of reinforcement schedules* (Schoenfeld, W. N., ed.), pp. 1-42. Appleton-Century-Crofts, New York.
- Charrier, D. & Thiébot, M. H. (1996). Effects of psychotropic drugs on rat responding in an operant paradigm involving choice between delayed reinforcers. *Pharmacology, Biochemistry and Behavior* **54**: 149-157.
- Chase, V. M., Hertwig, R. & Gigerenzer, G. (1998). Visions of rationality. *Trends in Cognitive Sciences* **2**: 206-214.
- Chevalier, G. & Deniau, J. M. (1990). Disinhibition as a basic process in the expression of striatal functions. *Trends in Neurosciences* **13**: 277-280.
- Chiba, A. A., Bucci, D. J., Holland, P. C. & Gallagher, M. (1995). Basal forebrain cholinergic lesions disrupt increments but not decrements in conditioned stimulus processing. *Journal of Neuroscience* **15**: 7315-7322.
- Childress, A. R., Mozley, P. D., McElgin, W., Fitzgerald, J., Reivich, M. & O'Brien, C. P. (1999). Limbic activation during cue-induced cocaine craving. *American Journal of Psychiatry* **156**: 11-18.
- Choi, D. W. (1988). Glutamate neurotoxicity and diseases of the nervous system. *Neuron* **1**: 623-634.
- Choi, D. W. (1995). Calcium: still centre-stage in hypoxic-ischemic neuronal death. *Trends in Neurosciences* **18**: 58-60.
- Cohen, J. D., Botvinick, M. & Carter, C. S. (2000). Anterior cingulate and prefrontal cortex: who's in control? *Nature Neuroscience* **3**: 421-423.
- Cole, B. J. & Robbins, T. W. (1989). Effects of 6-hydroxydopamine lesions of the nucleus accumbens septi on performance of a 5-choice serial reaction time task in rats: implications for theories of selective attention and arousal. *Behavioural Brain Research* **33**: 165-179.
- Coles, M. G. H., Scheffers, M. K. & Holroyd, C. (1998). Berger's dream? The error-related negativity and modern cognitive psychophysiology. In *Quantitative and topological EEG and EMG analysis* (Witte, H., Zwiener, U., Schack, B. & Döring, A., eds.), pp. 96-102. Druckhaus Mayer Verlag, Jena-Erlangen, Germany.
- Colwill, R. M. & Motzkin, D. K. (1994). Encoding of the unconditioned stimulus in Pavlovian conditioning. *Animal Learning & Behavior* **22**: 384-394.
- Colwill, R. M. & Rescorla, R. A. (1985). Postconditioning devaluation of a reinforcer affects instrumental responding. *Journal of Experimental Psychology: Animal Behavior Processes* **11**: 120-132.
- Colwill, R. M. & Rescorla, R. A. (1988). Associations between the discriminative stimulus and the reinforcer in instrumental learning. *Journal of Experimental Psychology: Animal Behavior Processes* **14**: 155-164.
- Colwill, R. M. & Rescorla, R. A. (1990). Evidence for the hierarchical structure of instrumental learning. *Animal Learning & Behavior* **18**: 71-82.

- Cools, A. R. (1980). Role of the neostriatal dopaminergic activity in sequencing and selecting behavioural strategies: facilitation of processes involved in selecting the best strategy in a stressful situation. *Behavioural Brain Research* **1**: 361-378.
- Cools, A. R., van den Bos, R., Ploeger, G. & Ellenbroek, B. A. (1991). Gating function of noradrenaline in the ventral striatum: its role in behavioural responses to environmental and pharmacological challenges. In *The Mesolimbic Dopamine System: from Motivation to Action* (Willner, P. & Scheel-Kruger, J., eds.), pp. 139-171. John Wiley and Sons, Chichester.
- Corbit, L., Muir, J. & Balleine, B. W. (submitted). The role of the nucleus accumbens in instrumental conditioning: Evidence for functional dissociation between accumbens core and shell..
- Corbit, L. H. & Balleine, B. W. (2000a). The effects of lesions of the nucleus accumbens core and shell on tests of instrumental conditioning. *Society for Neuroscience Abstracts* **26**: 1741.
- Corbit, L. H. & Balleine, B. W. (2000b). The role of the hippocampus in instrumental conditioning. *Journal of Neuroscience* **20**: 4233-4239.
- Cousins, M. S., Atherton, A., Turner, L. & Salamone, J. D. (1996). Nucleus accumbens dopamine depletions alter relative response allocation in a T-maze cost/benefit task. *Behavioural Brain Research* **74**: 189-197.
- Cousins, M. S., Sokolowski, J. D. & Salamone, J. D. (1993). Different effects of nucleus accumbens and ventrolateral striatal dopamine depletions on instrumental response selection in the rat. *Pharmacology, Biochemistry and Behavior* **46**: 943-951.
- Coutureau, E., Dix, S. L. & Killcross, A. S. (2000). Involvement of the medial prefrontal cortex-basolateral amygdala pathway in fear-related behaviour in rats. *European Journal of Neuroscience* **12 (supplement 11)**: 156.
- Cromwell, H. C. & Berridge, K. C. (1996). Implementation of action sequences by a neostriatal site: A lesion mapping study of grooming syntax. *Journal of Neuroscience* **16**: 3444-3458.
- Damasio, A. R. (1994). *Descartes' Error*, Grosset/Putnam, New York.
- Damasio, A. R. (1996). The somatic marker hypothesis and the possible functions of the prefrontal cortex. *Philosophical Transactions of the Royal Society of London, Series B - Biological Sciences* **351**: 1413-1420.
- Damasio, A. R. & Damasio, H. (1993). Cortical systems underlying knowledge retrieval: evidence from human lesion studies. In *Exploring Brain Functions: Models in Neuroscience* (Poggio, T. A. & Glaser, D. A., eds.), pp. 233-249. John Wiley & Sons, Chichester.
- Davey, G. C., Oakley, D. A. & Cleland, G. G. (1981). Autoshaping in the rat: Effects of omission on the form of the response. *Journal of the Experimental Analysis of Behavior* **36**: 75-91.
- Davis, M. (1992). The role of the amygdala in conditioned fear. In *The amygdala: neurobiological aspects of emotion, memory, and mental dysfunction* (Aggleton, J. P., ed.), pp. 255-306. Wiley-Liss, New York.
- Davis, M. (1997). Neurobiology of fear responses: the role of the amygdala. *Journal of Neuropsychiatry and Clinical Neuroscience* **9**: 382-402.
- Davison, M. C. (1987). The analysis of concurrent-chain performance. In *Quantitative Analyses of Behavior: V. The Effect of Delay and of Intervening Events on Reinforcement Value* (Commons, M. L., Mazur, J. E., Nevin, J. A. & Rachlin, H., eds.), pp. 225-241. Lawrence Erlbaum, Hillsdale, New Jersey.
- Dawson, G. R. & Dickinson, A. (1990). Performance on ratio and interval schedules with matched reinforcement rates. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **42**: 225-239.
- de Borchgrave, R. (1995). On the involvement of the rat nucleus accumbens in instrumental performance. Unpublished PhD thesis, University of Oxford.
- de Villiers, A. S., Russell, V. A., Sagvolden, T., Searson, A., Jaffer, A. & Taljaard, J. J. (1995). Alpha 2-adrenoceptor mediated inhibition of [³H]dopamine release from nucleus accumbens slices and monoamine levels in a rat model for attention-deficit hyperactivity disorder. *Neurochemical Research* **20**: 427-433.
- de Villiers, P. A. & Herrnstein, R. J. (1976). Toward a law of response strength. *Psychological Bulletin* **83**: 1131-1153.
- Dehaene, S., Posner, M. I. & Tucker, D. M. (1994). Commentary: Localization of a neural system for error detection and compensation. *Psychological Science* **5**: 303-305.
- DeLong, M. R. & Georgopoulos, A. P. (1981). Motor functions of the basal ganglia. In *Handbook of Physiology, Section I, The Nervous System, Vol. 2, Part 2* (Brookhart, J. M., Moutcastle, V. B. & Brooks, V. B., eds.), pp. 1017-1061. American Physiological Society, Bethesda, Maryland.

- Deniau, J. M., Kitai, S. T., Donoghue, J. P. & Grofova, I. (1982). Neuronal interactions in the substantia nigra pars reticulata through axon collaterals of the projection neurons. An electrophysiological and morphological study. *Experimental Brain Research* **47**: 105-113.
- Derbyshire, S. W., Vogt, B. A. & Jones, A. K. (1998). Pain and Stroop interference tasks activate separate processing modules in anterior cingulate cortex. *Experimental Brain Research* **118**: 52-60.
- Devinsky, O., Morrell, M. J. & Vogt, B. A. (1995). Contributions of anterior cingulate cortex to behaviour. *Brain* **118**: 279-306.
- Di Chiara, G. (1998). A motivational learning hypothesis of the role of mesolimbic dopamine in compulsive drug use. *Journal of Psychopharmacology* **12**: 54-67.
- Dickinson, A. (1980). *Contemporary animal learning theory*, Cambridge University Press, Cambridge.
- Dickinson, A. (1985). Actions and habits - the development of behavioral autonomy. *Philosophical Transactions of the Royal Society of London, Series B - Biological Sciences* **308**: 67-78.
- Dickinson, A. (1986). Re-examination of the role of the instrumental contingency in the sodium-appetite irrelevant incentive effect. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **38**: 161-172.
- Dickinson, A. (1994). Instrumental conditioning. In *Animal Learning and Cognition* (Mackintosh, N. J., ed.), pp. 45-79. Academic Press, San Diego.
- Dickinson, A. & Balleine, B. (1994). Motivational control of goal-directed action. *Animal Learning & Behavior* **22**: 1-18.
- Dickinson, A., Balleine, B., Watt, A., Gonzalez, F. & Boakes, R. A. (1995). Motivational control after extended instrumental training. *Animal Learning & Behavior* **23**: 197-206.
- Dickinson, A. & Dawson, G. R. (1987a). The role of the instrumental contingency in the motivational control of performance. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **39**: 77-93.
- Dickinson, A. & Dawson, G. R. (1987b). Pavlovian processes in the motivational control of instrumental performance. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **39**: 201-213.
- Dickinson, A. & Dearing, M. F. (1979). Appetitive-aversive interactions and inhibitory processes. In *Mechanisms of learning and motivation* (Dickinson, A. & Boakes, R. A., eds.), pp. 203-231. Erlbaum, Hillsdale, New Jersey.
- Dickinson, A., Nicholas, D. J. & Adams, C. D. (1983). The effect of the instrumental training contingency on susceptibility to reinforcer devaluation. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **35**: 35-51.
- Dickinson, A., Smith, J. & Mirenowicz, J. (2000). Dissociation of Pavlovian and instrumental incentive learning under dopamine antagonists. *Behavioral Neuroscience* **114**: 468-483.
- Dickinson, A., Watt, A. & Griffiths, W. J. H. (1992). Free-operant acquisition with delayed reinforcement. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **45**: 241-258.
- Dietrich, A. & Allen, J. D. (1998). Functional dissociation of the prefrontal cortex and the hippocampus in timing behavior. *Behavioral Neuroscience* **112**: 1043-1047.
- Dix, S. L., Coutureau, E. & Killcross, A. S. (2000). The role of the nucleus accumbens in fear-related behaviours in rats. *European Journal of Neuroscience* **12 (supplement 11)**: 157.
- Doty, R. W. & Bosma, J. F. (1956). An electromyographic analysis of reflex deglutition. *Journal of Neurophysiology* **19**: 44-60.
- Drevets, W. C. (2000). PET imaging correlates of depression and mania. *Journal of Psychopharmacology* **14 (supplement)**: A1.
- Drevets, W. C., Price, J. L., Simpson, J. R., Todd, R. D., Reich, T., Vannier, M. & Raichle, M. E. (1997). Subgenual prefrontal cortex abnormalities in mood disorders. *Nature* **386**: 824-827.
- Dum, R. P. & Strick, P. L. (1993). Cingulate motor areas. In *Neurobiology of cingulate cortex and limbic thalamus: a comprehensive handbook* (Vogt, B. A. & Gabriel, M., eds.), pp. 415-441. Birkhäuser, Boston, Massachusetts.
- Dunn, R., Williams, B. & Royalty, P. (1987). Devaluation of stimuli contingent on choice: evidence for conditioned reinforcement. *Journal of the Experimental Analysis of Behavior* **48**: 117-131.
- Dunnett, S. B. & Iversen, S. D. (1982). Neurotoxic lesions of ventrolateral but not anteromedial neostriatum in rats impair differential reinforcement of low rates (DRL) performance. *Behavioural Brain Research* **6**: 213-226.

- Ernst, M., Zametkin, A. J., Matochik, J. A., Jons, P. H. & Cohen, R. M. (1998). DOPA decarboxylase activity in attention deficit hyperactivity disorder adults. A [fluorine-18]fluorodopa positron emission tomographic study. *Journal of Neuroscience* **18**: 5901-5907.
- Estes, W. K. (1943). Discriminative conditioning. I. A discriminative property of conditioned anticipation. *Journal of Experimental Psychology* **32**: 150-155.
- Estes, W. K. (1948). Discriminative conditioning. II. Effects of a Pavlovian conditioned stimulus upon a subsequently established operant response. *Journal of Experimental Psychology* **38**: 173-177.
- Evenden, J. L. (1998). Serotonergic and steroid influences on impulsive behaviour in rats. *Comprehensive Summaries of Uppsala Dissertations from the Faculty of Medicine* **764**.
- Evenden, J. L. (1999a). Impulsivity: a discussion of clinical and experimental findings. *Journal of Psychopharmacology* **13**: 180-192.
- Evenden, J. L. (1999b). Varieties of impulsivity. *Psychopharmacology* **146**: 348-361.
- Evenden, J. L. & Carli, M. (1985). The effects of 6-hydroxydopamine lesions of the nucleus accumbens and caudate nucleus of rats on feeding in a novel environment. *Behavioural Brain Research* **15**: 63-70.
- Evenden, J. L. & Meyerson, B. (1999). The behavior of spontaneously hypertensive and Wistar Kyoto rats under a paced fixed consecutive number schedule of reinforcement. *Pharmacology, Biochemistry and Behavior* **63**: 71-82.
- Evenden, J. L. & Ryan, C. N. (1996). The pharmacology of impulsive behaviour in rats: the effects of drugs on response choice with varying delays of reinforcement. *Psychopharmacology* **128**: 161-170.
- Evenden, J. L. & Ryan, C. N. (1999). The pharmacology of impulsive behaviour in rats VI: the effects of ethanol and selective serotonergic drugs on response choice with varying delays of reinforcement. *Psychopharmacology* **146**: 413-421.
- Everitt, B. J. (1990). Sexual motivation: a neural and behavioural analysis of the mechanisms underlying appetitive and copulatory responses of male rats. *Neuroscience and Biobehavioral Reviews* **14**: 217-232.
- Everitt, B. J., Cador, M. & Robbins, T. W. (1989). Interactions between the amygdala and ventral striatum in stimulus-reward associations: studies using a second-order schedule of sexual reinforcement. *Neuroscience* **30**: 63-75.
- Everitt, B. J., Cardinal, R. N., Hall, J., Parkinson, J. A. & Robbins, T. W. (2000a). Differential involvement of amygdala subsystems in appetitive conditioning and drug addiction. In *The amygdala: a functional analysis*, Second edition (Aggleton, J. P., ed.), pp. 353-390. Oxford University Press, New York.
- Everitt, B. J., Fray, P., Kostarczyk, E., Taylor, S. & Stacey, P. (1987). Studies of instrumental behavior with sexual reinforcement in male rats (*Rattus norvegicus*): I. Control by brief visual stimuli paired with a receptive female. *Journal of Comparative Psychology* **101**: 395-406.
- Everitt, B. J., Morris, K. A., O'Brien, A. & Robbins, T. W. (1991). The basolateral amygdala-ventral striatal system and conditioned place preference: further evidence of limbic-striatal interactions underlying reward-related processes. *Neuroscience* **42**: 1-18.
- Everitt, B. J., Parkinson, J. A., Lachenal, G., Halkerston, K. M., Rudarakanchana, N., Cardinal, R. N., Hall, J., Morrison, C. H., Dalley, J. W., Howes, S. R. & Robbins, T. W. (2000b). Effects of limbic corticostriatal lesions on autoshaping performance in rats. *Society for Neuroscience Abstracts* **26**: 979.
- Everitt, B. J., Parkinson, J. A., Olmstead, M. C., Arroyo, M., Robledo, P. & Robbins, T. W. (1999). Associative processes in addiction and reward - The role of amygdala-ventral striatal subsystems. *Annals of the New York Academy of Sciences* **877**: 412-438.
- Everitt, B. J. & Robbins, T. W. (1992). Amygdala-ventral striatal interactions and reward-related processes. In *The amygdala: neurobiological aspects of emotion, memory, and mental dysfunction* (Aggleton, J. P., ed.), pp. 401-430. Wiley-Liss, New York.
- Everitt, B. J. & Stacey, P. (1987). Studies of instrumental behavior with sexual reinforcement in male rats (*Rattus norvegicus*): II. Effects of preoptic area lesions, castration, and testosterone. *Journal of Comparative Psychology* **101**: 407-419.
- Eysenck, S. G. B. (1993). The I7: development of a measure of impulsivity and its relationship to the superfactors of personality. In *The impulsive client: theory, research and treatment* (McCown, W. G., Johnson, J. L. & Shure, M. B., eds.). American Psychological Association, Washington DC.
- Eysenck, S. G. B. & Eysenck, H. J. (1977). The place of impulsiveness in a dimensional system of personality description. *British Journal of Social and Clinical Psychology* **16**: 57-68.

- Falkenstein, M., Hohnsbein, J., Hoormann, J. & Blanke, L. (1990). Effects of errors in choice reaction tasks on the ERP under focused and divided attention. In *Psychophysiological brain research* (Brunia, C. H. M., Gaillard, A. W. K. & Kok, A., eds.), pp. 192-195. Tilburg University Press, Tilburg, The Netherlands.
- Falkenstein, M., Hoormann, J., Christ, S. & Hohnsbein, J. (2000). ERP components on reaction errors and their functional significance: a tutorial. *Biological Psychology* **51**: 87-107.
- Fallon, J. H. & Loughlin, S. E. (1995). Substantia nigra. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 215-237. Academic Press, London.
- Feldman, R. S., Meyer, J. S. & Quenzer, L. F. (1997). *Principles of neuropsychopharmacology*, Sinauer, Sunderland, Massachusetts.
- Fisk, G. D. & Wyss, J. M. (1997). Pressor and depressor sites are intermingled in the cingulate cortex of the rat. *Brain Research* **754**: 204-212.
- Fletcher, P. J., Korth, K. M., Sabijan, M. S. & DeSousa, N. J. (1998). Injections of d-amphetamine into the ventral pallidum increase locomotor activity and responding for conditioned reward: a comparison with injections into the nucleus accumbens. *Brain Research* **805**: 29-40.
- Floresco, S. B., Yang, C. R., Phillips, A. G. & Blaha, C. D. (1998). Basolateral amygdala stimulation evokes glutamate receptor-dependent dopamine efflux in the nucleus accumbens of the anaesthetized rat. *European Journal of Neuroscience* **10**: 1241-1251.
- Freeman, J. H., Jr., Cuppennell, C., Flannery, K. & Gabriel, M. (1996). Limbic thalamic, cingulate cortical and hippocampal neuronal correlates of discriminative approach learning in rabbits. *Behavioural Brain Research* **80**: 123-136.
- Frith, C. D., Friston, K., Liddle, P. F. & Frackowiak, R. S. (1991). Willed action and the prefrontal cortex in man: a study with PET. *Proceedings of the Royal Society of London, Series B - Biological Sciences* **244**: 241-246.
- Fudge, J. L. & Haber, S. N. (2000). The central nucleus of the amygdala projection to dopamine subpopulations in primates. *Neuroscience* **97**: 479-494.
- Fuster, J. M. (1995). *Memory in the cerebral cortex: an empirical approach to neural networks in the human and nonhuman primate*, MIT Press, Cambridge, Massachusetts.
- Gabriel, M. (1990). Functions of anterior and posterior cingulate cortex during avoidance learning in rabbits. *Progress in Brain Research* **85**: 467-482.
- Gabriel, M. (1993). Discriminative avoidance learning: a model system. In *Neurobiology of cingulate cortex and limbic thalamus: a comprehensive handbook* (Vogt, B. A. & Gabriel, M., eds.), pp. 478-523. Birkhauser, Boston, Massachusetts.
- Gabriel, M., Foster, K., Orona, E., Saltwick, S. & Stanton, M. (1980a). Neuronal activity of cingulate cortex, anteroventral thalamus, and hippocampal formation in discriminative conditioning: encoding and extraction of the significance of conditional stimuli. In *Progress in Psychobiology and Physiological Psychology* (Sprague, J. M. & Epstein, A. N., eds.), Vol. 9, pp. 125-231. Academic Press, New York.
- Gabriel, M., Kang, E., Poremba, A., Kubota, Y., Allen, M. T., Miller, D. P. & Steinmetz, J. E. (1996). Neural substrates of discriminative avoidance learning and classical eyeblink conditioning in rabbits: a double dissociation. *Behavioural Brain Research* **82**: 23-30.
- Gabriel, M., Kubota, Y., Sparenborg, S., Straube, K. & Vogt, B. A. (1991a). Effects of cingulate cortical lesions on avoidance learning and training-induced unit activity in rabbits. *Experimental Brain Research* **86**: 585-600.
- Gabriel, M., Lambert, R. W., Foster, K., Orona, E., Sparenborg, S. & Maiorca, R. R. (1983). Anterior thalamic lesions and neuronal activity in the cingulate and retrosplenial cortices during discriminative avoidance behavior in rabbits. *Behavioral Neuroscience* **97**: 675-696.
- Gabriel, M., Miller, J. D. & Saltwick, S. E. (1977). Unit activity in cingulate cortex and anteroventral thalamus of the rabbit during differential conditioning and reversal. *Journal of Comparative and Physiological Psychology* **91**: 423-433.
- Gabriel, M. & Orona, E. (1982). Parallel and serial processes of the prefrontal and cingulate cortical systems during behavioral learning. *Brain Research Bulletin* **8**: 781-785.
- Gabriel, M., Orona, E., Foster, K. & Lambert, R. W. (1980b). Cingulate cortical and anterior thalamic neuronal correlates of reversal learning in rabbits. *Journal of Comparative and Physiological Psychology* **94**: 1087-1100.
- Gabriel, M., Sparenborg, S. P. & Stolar, N. (1987). Hippocampal control of cingulate cortical and anterior thalamic information processing during learning in rabbits. *Experimental Brain Research* **67**: 131-152.
- Gabriel, M., Vogt, B. A., Kubota, Y., Poremba, A. & Kang, E. (1991b). Training-stage related neuronal plasticity in limbic thalamus and cingulate cortex during learning: a possible key to mnemonic retrieval. *Behavioural Brain Research* **46**: 175-185.

- Gaffan, D. (1992). Amnesia for complex naturalistic scenes and for objects following fornix transection in the rhesus monkey. *European Journal of Neuroscience* **4**: 381-388.
- Gaffan, D. & Harrison, S. (1989). Place memory and scene memory: effects of fornix transection in the monkey. *Experimental Brain Research* **74**: 202-212.
- Gallagher, M. & Holland, P. C. (1992). Understanding the function of the central nucleus: is simple conditioning enough? In *The amygdala: neurobiological aspects of emotion, memory, and mental dysfunction* (Aggleton, J. P., ed.), pp. 307-321. Wiley-Liss, New York.
- Gallagher, M. & Holland, P. C. (1994). The amygdala complex: multiple roles in associative learning and attention. *Proceedings of the National Academy of Sciences of the United States of America* **91**: 11771-11776.
- Gallagher, M., McMahan, R. W. & Schoenbaum, G. (1999). Orbitofrontal cortex and representation of incentive value in associative learning. *Journal of Neuroscience* **19**: 6610-6614.
- Gallistel, C. R. (1994). Space and time. In *Animal Learning and Cognition* (Mackintosh, N. J., ed.), pp. 221-253. Academic Press, San Diego.
- Garavan, H., Pankiewicz, J., Bloom, A., Cho, J. K., Sperry, L., Ross, T. J., Salmeron, B. J., Risinger, R., Kelley, D. & Stein, E. A. (2000). Cue-induced cocaine craving: Neuroanatomical specificity for drug users and drug stimuli. *American Journal of Psychiatry* **157**: 1789-1798.
- Garcia, J. (1989). Food for Tolman: Cognition and cathectis in concert. In *Aversion, avoidance and anxiety* (Archer, T. & Nilsson, L.-G., eds.), pp. 45-85. Erlbaum, Hillsdale, New Jersey.
- Garrud, P., Goodall, G. & Mackintosh, N. J. (1981). Overshadowing of a stimulus-reinforcer association by an instrumental response. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **33**: 123-135.
- Gawin, F. H. (1991). Cocaine addiction: psychology and neurophysiology. *Science* **251**: 1580-1586.
- Gehring, W. J., Coles, M. G. H., Meyer, D. E. & Donchin, E. (1990). The error-related negativity: an event-related brain potential accompanying errors. *Psychophysiology* **27 (supplement)**: S34.
- Gehring, W. J., Goss, B., Coles, M. G. H., Meyer, D. E. & Donchin, E. (1993). A neural system for error detection and compensation. *Psychological Science* **4**: 385-390.
- Gehring, W. J., Himle, J. & Nisenson, L. G. (2000). Action monitoring dysfunction in obsessive-compulsive disorder. *Psychological Science* **11**: 1-6.
- Gehring, W. J. & Knight, R. T. (2000). Prefrontal-cingulate interactions in action monitoring. *Nature Neuroscience* **3**: 516-520.
- Gelder, M., Gath, D., Mayou, R. & Cowen, P. (1995). *Oxford Textbook of Psychiatry*. Third edition, Oxford University Press, Oxford.
- Gemba, H., Sasaki, K. & Brooks, V. B. (1986). 'Error' potentials in limbic cortex (anterior cingulate area 24) of monkeys during motor learning. *Neuroscience Letters* **70**: 223-227.
- Gentry, G. D., Weiss, B. & Laties, V. G. (1983). The microanalysis of fixed-interval responding. *Journal of the Experimental Analysis of Behavior* **39**: 327-343.
- Gerfen, C. R. (1992a). The neostriatal mosaic: multiple levels of compartmental organization. *Trends in Neurosciences* **15**: 133-139.
- Gerfen, C. R. (1992b). The neostriatal mosaic: multiple levels of compartmental organization in the basal ganglia. *Annual Review of Neuroscience* **15**: 285-320.
- Gewirtz, J. C. & Davis, M. (1998). Application of Pavlovian higher-order conditioning to the analysis of the neural substrates of fear conditioning. *Neuropharmacology* **37**: 453-459.
- Gibbon & Church (1981). Time left: linear versus logarithmic subjective time. *Journal of Experimental Psychology: Animal Behavior Processes* **7**: 87-108.
- Gibbon, J., Malapani, C., Dale, C. L. & Gallistel, C. (1997). Toward a neurobiology of temporal cognition: advances and challenges. *Current Opinion in Neurobiology* **7**: 170-184.
- Gödel, K. (1931). Über formal unentscheidbare Sätze der Principia mathematica und verwandter Systeme I. *Monatshefte für Mathematik und Physik* **38**: 173-198.
- Goodale, M. A. & Milner, A. D. (1992). Separate visual pathways for perception and action. *Trends in Neurosciences* **15**: 20-25.
- Gottman, J. M. (1981). *Time-series analysis: a comprehensive introduction for social scientists*, Cambridge University Press, Cambridge.
- Grace, A. A. (1987). An electrophysiologist's eye view of the basal ganglia. *Behavioral and Brain Sciences* **10**: 214-215.

- Grace, R. C. (1996). Choice between fixed and variable delays to reinforcement in the adjusting-delay procedure and concurrent chains. *Journal of Experimental Psychology: Animal Behavior Processes* **22**: 362-383.
- Grice, G. R. (1948). The relation of secondary reinforcement to delayed reward in visual discrimination learning. *Journal of Experimental Psychology* **38**: 1-16.
- Grill, H. J. & Berridge, K. C. (1985). Taste reactivity as a measure of the neural control of palatability. *Progress in Psychobiology and Physiological Psychology* **11**: 1-61.
- Grindley, G. C. (1932). The formation of a simple habit in guinea pigs. *British Journal of Psychology* **23**: 127-147.
- Grossman, M., Crino, P., Reivich, M., Stern, M. B. & Hurtig, H. I. (1992). Attention and sentence processing deficits in Parkinson's disease: the role of anterior cingulate cortex. *Cerebral Cortex* **2**: 513-525.
- Grove, E. A., Domesick, V. B. & Nauta, W. J. (1986). Light microscopic evidence of striatal input to intrapallidal neurons of cholinergic cell group Ch4 in the rat: a study employing the anterograde tracer Phaseolus vulgaris leucoagglutinin (PHA-L). *Brain Research* **367**: 379-384.
- Guthrie, E. R. (1935). *The psychology of learning*, Harper, New York.
- Haber, S. N., Fudge, J. L. & McFarland, N. R. (2000). Striatonigrostriatal pathways in primates form an ascending spiral from the shell to the dorsolateral striatum. *Journal of Neuroscience* **20**: 2369-2382.
- Hall, F. S., Wilkinson, L. S., Humby, T., Inglis, W., Kendall, D. A., Marsden, C. A. & Robbins, T. W. (1998). Isolation rearing in rats: pre- and postsynaptic changes in striatal dopaminergic systems. *Pharmacology, Biochemistry and Behavior* **59**: 859-872.
- Hall, J. (1999). The roles of the amygdala and hippocampus in Pavlovian conditioning. Unpublished PhD thesis, University of Cambridge.
- Hall, J., Parkinson, J. A., Connor, T. M. F., Di Ciano, P., Dickinson, A. & Everitt, B. J. (1999). The role of amygdala-ventral striatal sub-systems in Pavlovian to instrumental transfer. *Society for Neuroscience Abstracts* **25**: 90.
- Halliday, G., Harding, A. & Paxinos, G. (1995). Serotonin and tachykinin systems. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 929-974. Academic Press, London.
- Han, J. S., Holland, P. C. & Gallagher, M. (1999). Disconnection of the amygdala central nucleus and substantia innominata/nucleus basalis disrupts increments in conditioned stimulus processing in rats. *Behavioral Neuroscience* **113**: 143-151.
- Han, J. S., McMahan, R. W., Holland, P. & Gallagher, M. (1997). The role of an amygdalo-nigrostriatal pathway in associative learning. *Journal of Neuroscience* **17**: 3913-3919.
- Hare, S. R. (1996). Low frequency climate variability and salmon production. Unpublished PhD thesis, University of Washington.
- Harlow, J. M. (1868). Recovery from the passage of an iron bar through the head. *Publications of the Massachusetts Medical Society* **2**: 327-347.
- Harmer, C. J. & Phillips, G. D. (1999). Enhanced dopamine efflux in the amygdala by a predictive, but not a non-predictive, stimulus: Facilitation by prior repeated D-amphetamine. *Neuroscience* **90**: 119-130.
- Harrison, A. A., Everitt, B. J. & Robbins, T. W. (1999). Central serotonin depletion impairs both the acquisition and performance of a symmetrically reinforced go/no-go conditional visual discrimination. *Behavioural Brain Research* **100**: 99-112.
- Hart, M., Poremba, A. & Gabriel, M. (1997). The nomadic engram: overtraining eliminates the impairment of discriminative avoidance behavior produced by limbic thalamic lesions. *Behavioural Brain Research* **82**: 169-177.
- Hatfield, T., Han, J. S., Conley, M., Gallagher, M. & Holland, P. (1996). Neurotoxic lesions of basolateral, but not central, amygdala interfere with Pavlovian second-order conditioning and reinforcer devaluation effects. *Journal of Neuroscience* **16**: 5256-5265.
- Hauber, W., Bohn, I. & Giertler, C. (2000). NMDA, but not dopamine D(2), receptors in the rat nucleus accumbens are involved in guidance of instrumental behavior by stimuli predicting reward magnitude. *Journal of Neuroscience* **20**: 6282-6288.
- Hearst, E. & Jenkins, H. M. (1974). *Sign tracking: the stimulus-reinforcer relation and directed action*, The Psychonomic Society, Austin, Texas.
- Heckerman, D. E., Horvitz, E. J. & Nathwani, B. N. (1992). Toward normative expert systems: Part I. The Pathfinder project. *Methods of Information in Medicine* **31**: 90-105.
- Heidbreder, C. A., Weiss, I. C., Domeney, A. M., Pryce, C., Homberg, J., Hedou, G., Feldon, J., Moran, M. C. & Nelson, P. (2000). Behavioral, neurochemical and endocrinological characterization of the early social isolation syndrome. *Neuroscience* **100**: 749-768.
- Heimer, L., Zahm, D. S. & Alheid, G. F. (1995). Basal ganglia. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 579-628. Academic Press, London.

- Henderson, R. W., Patterson, J. M. & Jackson, R. L. (1980). Acquisition and retention of control of instrumental behavior by a cue signaling airblast: how specific are conditioned anticipations? *Learning & Motivation* **11**: 407-426.
- Herrnstein, R. J. (1961). Relative and absolute strength of responses as a function of frequency of reinforcement. *Journal of the Experimental Analysis of Behavior* **4**: 267-272.
- Herrnstein, R. J. (1970). On the law of effect. *Journal of the Experimental Analysis of Behavior* **13**: 243-266.
- Hershberger, W. A. (1986). An approach through the looking glass. *Animal Learning & Behavior* **14**: 443-451.
- Hetherington, A. W. & Ranson, S. W. (1939). Experimental hypothalamohypophyseal obesity in the rat. *Proceedings of the Society for Experimental Biology and Medicine* **41**: 465-466.
- Heyman, G. M. (1996). Resolving the contradictions of addiction. *Behavioral and Brain Sciences* **19**: 561-610.
- Hill, R. T. (1970). Facilitation of conditioned reinforcement as a mechanism of psychomotor stimulation. In *International Symposium on Amphetamines and Related Compounds* (Costa, E. & Garattini, S., eds.), pp. 781-795. Raven Press, New York.
- Ho, M., Mobini, S., Chiang, T., Bradshaw, C. M. & Szabadi, E. (1999). Theory and method in the quantitative analysis of "impulsive choice" behaviour: implications for psychopharmacology. *Psychopharmacology* **146**: 362-372.
- Ho, M. Y., Al-Zahrani, S. S., Velazquez Martinez, D. N., Lopez Cabrera, M., Bradshaw, C. M. & Szabadi, E. (1995). The role of the ascending 5-hydroxytryptaminergic pathways in timing behaviour: further observations with the interval bisection task. *Psychopharmacology* **120**: 213-219.
- Ho, M. Y., Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1997). Choice between delayed reinforcers: Interaction between delay and deprivation level. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **50**: 193-202.
- Holland, P. C. (1981). Acquisition of representation-mediated conditioned food aversions. *Learning & Motivation* **12**: 1-18.
- Holland, P. C. (1990a). Event representation in Pavlovian conditioning: image and action. *Cognition* **37**: 105-131.
- Holland, P. C. (1990b). Forms of memory in Pavlovian conditioning. In *Brain organization and memory: cells, systems and circuits* (McGaugh, J. L., Weinberger, N. M. & Lynch, N. M., eds.), pp. 78-105. Oxford University Press, New York.
- Holland, P. C. (1997). Brain mechanisms for changes in processing of conditioned stimuli in Pavlovian conditioning: Implications for behavior theory. *Animal Learning & Behavior* **25**: 373-399.
- Holland, P. C. (1998). Amount of training affects associatively-activated event representation. *Neuropharmacology* **37**: 461-469.
- Holland, P. C. & Gallagher, M. (1993a). Amygdala central nucleus lesions disrupt increments, but not decrements, in conditioned stimulus processing. *Behavioral Neuroscience* **107**: 246-253.
- Holland, P. C. & Gallagher, M. (1993b). Effects of amygdala central nucleus lesions on blocking and unblocking. *Behavioral Neuroscience* **107**: 235-245.
- Holland, P. C. & Gallagher, M. (1999). Amygdala circuitry in attentional and representational processes. *Trends in Cognitive Sciences* **3**: 65-73.
- Holland, P. C., Han, J. S. & Gallagher, M. (2000). Lesions of the amygdala central nucleus alter performance on a selective attention task. *Journal of Neuroscience* **20**: 6701-6706.
- Holman, J. G. & Mackintosh, N. J. (1981). The control of appetitive instrumental responding does not depend on classical conditioning to the discriminative stimulus. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **33**: 21-31.
- Holroyd, C., Reichler, J. & Coles, M. G. H. (1999). Is the error-related negativity generated by a dopaminergic error signal for reinforcement learning? Hypothesis and model. *Journal of Cognitive Neuroscience* **11 (supplement)**: 45.
- Holroyd, C. B., Dien, J. & Coles, M. G. (1998). Error-related scalp potentials elicited by hand and foot movements: evidence for an output-independent error-processing system in humans. *Neuroscience Letters* **242**: 65-68.
- Holyoak, K. J. & Spellman, B. A. (1993). Thinking. *Annual Review of Psychology* **44**: 265-315.
- Houk, J. C., Adams, J. L. & Barto, A. G. (1995). A model of how the basal ganglia generate and use neural signals that predict reinforcement. In *Models of information processing in the basal ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 249-270. MIT Press, Cambridge, Massachusetts.
- Houk, J. C. & Wise, S. P. (1995). Distributed modular architectures linking basal ganglia, cerebellum, and cerebral cortex: their role in planning and controlling action. *Cerebral Cortex* **2**: 95-110.

- Howell, D. C. (1997). *Statistical Methods for Psychology*. Fourth edition, Wadsworth, Belmont, California.
- Howes, S. R., Dalley, J. W., Morrison, C. H., Robbins, T. W. & Everitt, B. J. (2000). Leftward shift in the acquisition of cocaine self-administration in isolation-reared rats: relationship to extracellular levels of dopamine, serotonin and glutamate in the nucleus accumbens and amygdala-striatal FOS expression. *Psychopharmacology* **151**: 55-63.
- Hsu, M. M. & Shyu, B. C. (1997). Electrophysiological study of the connection between medial thalamus and anterior cingulate cortex in the rat. *Neuroreport* **8**: 2701-2707.
- Hull, C. L. (1932). The goal gradient hypothesis and maze learning. *Psychological Review* **39**: 25-43.
- Hull, C. L. (1943). *Principles of behavior*, Appleton-Century-Crofts, New York.
- Huynh, H. & Feldt, L. S. (1970). Conditions under which mean square ratios in repeated measures designs have exact *F*-distributions. *Journal of the American Statistical Association* **65**: 1582-1589.
- Ito, M. (1985). Choice and amount of reinforcement in rats. *Learning & Motivation* **16**: 95-108.
- Ito, R., Dalley, J. W., Howes, S. R., Robbins, T. W. & Everitt, B. J. (2000). Dissociation in conditioned dopamine release in the nucleus accumbens core and shell in response to cocaine cues and during cocaine-seeking behavior in rats. *Journal of Neuroscience* **20**: 7489-7495.
- Jaspers, R., Schwarz, M., Sontag, K. H. & Cools, A. R. (1984). Caudate nucleus and programming behaviour in cats: role of dopamine in switching motor patterns. *Behavioral Brain Research* **14**: 17-28.
- Jenkins, H. M. & Moore, B. R. (1973). The form of the auto-shaped response with food or water reinforcers. *Journal of the Experimental Analysis of Behavior* **20**: 163-181.
- Jiménez-Castellanos, J. & Graybiel, A. M. (1989). Evidence that histochemically distinct zones of the primate substantia nigra pars compacta are related to patterned distributions of nigrostriatal projection neurons and striatonigral fibres. *Experimental Brain Research* **74**: 227-238.
- Jones, G. H., Hernandez, T. D., Kendall, D. A., Marsden, C. A. & Robbins, T. W. (1992). Dopaminergic and serotonergic function following isolation rearing in rats: study of behavioural responses and postmortem and in vivo neurochemistry. *Pharmacology, Biochemistry and Behavior* **43**: 17-35.
- Kacelnik, A. (1997). Normative and descriptive models of decision making: time discounting and risk sensitivity. In *Characterizing human psychological adaptations (Ciba Foundation Symposium 208)*, pp. 51-70. Wiley, Chichester.
- Kahneman, D., Slovic, P. & Tversky, A., Eds. (1982). *Judgement Under Uncertainty: Heuristics and Biases*. New York: Cambridge University Press.
- Kalivas, P. W., Pierce, R. C., Cornish, J. & Sorg, B. A. (1998). A role for sensitization in craving and relapse in cocaine addiction. *Journal of Psychopharmacology* **12**: 49-53.
- Kamin, L. J. (1968). 'Attention-like' processes in classical conditioning. In *Miami Symposium on the Prediction of Behavior: Aversive Stimulation* (Jones, M. R., ed.), pp. 9-33. University of Miami Press, Miami.
- Kamin, L. K. (1969). Predictability, surprise, attention and conditioning. In *Punishment and Aversive Behavior* (Campbell, B. A. & Church, R. M., eds.), pp. 279-296. Appleton-Century-Crofts, New York.
- Kelley, A. E., SmithRoe, S. L. & Holahan, M. R. (1997). Response-reinforcement learning is dependent on N-methyl-D-aspartate receptor activation in the nucleus accumbens core. *Proceedings of the National Academy of Sciences of the United States of America* **94**: 12174-12179.
- Kelley, A. E. & Stinus, L. (1985). Disappearance of hoarding behavior after 6-hydroxydopamine lesions of the mesolimbic dopamine neurons and its reinstatement with l-dopa. *Behavioral Neuroscience* **99**: 531-545.
- Kemp, J. M. & Powell, T. P. S. (1971). The connections of the striatum and globus pallidus: synthesis and speculation. *Philosophical Transactions of the Royal Society of London, Series B - Biological Sciences* **262**: 441-457.
- Keppel, G. (1982). *Design and analysis: a researcher's handbook*. Second edition, Englewood Cliffs: Prentice-Hall, London.
- Keppel, G. (1991). *Design and analysis: a researcher's handbook*. Third edition, Prentice-Hall, London.
- Killcross, A. S., Everitt, B. J. & Robbins, T. W. (1997a). Symmetrical effects of amphetamine and alpha-flupenthixol on conditioned punishment and conditioned reinforcement: contrasts with midazolam. *Psychopharmacology* **129**: 141-152.
- Killcross, A. S., Everitt, B. J. & Robbins, T. W. (1998). Dissociable effects of excitotoxic lesions of amygdala sub-nuclei on appetitive conditioning. *Journal of Psychopharmacology* **12 (supplement A)**: A4.

- Killcross, S., Robbins, T. W. & Everitt, B. J. (1997b). Different types of fear-conditioned behaviour mediated by separate nuclei within amygdala. *Nature* **388**: 377-380.
- Killeen, P. R. (1972). The matching law. *Journal of the Experimental Analysis of Behavior* **17**: 489-495.
- Killeen, P. R. (1981). Averaging theory. In *Quantification of steady-state operant behaviour* (Bradshaw, C. M. & Szabadi, E., eds.), pp. 21-34. Elsevier, Amsterdam.
- Killeen, P. R. & Fetterman, J. G. (1988). A behavioral theory of timing. *Psychological Review* **95**: 274-295.
- Kish, G. B. (1966). Studies of sensory reinforcement. In *Operant behavior: Areas of research and application* (Honig, W. K., ed.), pp. 109-159. Appleton-Century-Crofts, New York.
- Konorski, J. (1948). *Conditioned reflexes and neuron organization*, Cambridge University Press, Cambridge.
- Konorski, J. (1967). *Integrative activity of the brain*, University of Chicago Press, Chicago.
- Koob, G. F. (1992). Dopamine, addiction and reward. *Seminars in the Neurosciences* **4**: 139-148.
- Koob, G. F., Riley, S. J., Smith, S. C. & Robbins, T. W. (1978). Effects of 6-hydroxydopamine lesions of the nucleus accumbens septi and olfactory tubercle on feeding, locomotor activity, and amphetamine anorexia in the rat. *Journal of Comparative and Physiological Psychology* **92**: 917-927.
- Kopp, B. & Wolff, M. (2000). Brain mechanisms of selective learning: event-related potentials provide evidence for error-driven learning in humans. *Biological Psychology* **51**: 223-246.
- Krettek, J. E. & Price, J. L. (1977). The cortical projections of the mediodorsal nucleus and adjacent thalamic nuclei in the rat. *Journal of Comparative Neurology* **171**: 157-192.
- Krieg, W. J. S. (1946). Connections of the cerebral cortex. I. The albino rat. A topography of the cortical areas. *Journal of Comparative Neurology* **84**: 221-275.
- Kupferman, I. (1991). Hypothalamus and limbic system: motivation. In *Principles of Neural Science*, Third edition (Kandel, E. R., Schwartz, J. H. & Jessell, T. M., eds.), pp. 750-760. Appleton-Lange, East Norwalk, Connecticut.
- Laties, V. G. (1972). The modification of drug effects on behaviour by external discriminative stimuli. *Journal of Pharmacology and Experimental Therapeutics* **183**: 1-13.
- Laties, V. G. & Weiss, B. (1966). Influence of drugs on behavior controlled by internal and external stimuli. *Journal of Pharmacology and Experimental Therapeutics* **152**: 388-396.
- Laties, V. G., Wood, R. W. & Rees, D. C. (1981). Stimulus control and the effects of d-amphetamine in the rat. *Psychopharmacology* **75**: 277-282.
- Lattal, K. A. (1987). Considerations in the experimental analysis of reinforcement delay. In *Quantitative Analyses of Behavior: V. The Effect of Delay and of Intervening Events on Reinforcement Value* (Commons, M. L., Mazur, J. E., Nevin, J. A. & Rachlin, H., eds.), pp. 107-123. Lawrence Erlbaum, Hillsdale, New Jersey.
- Lattal, K. A. & Gleeson, S. (1990). Response acquisition with delayed reinforcement. *Journal of Experimental Psychology: Animal Behavior Processes* **16**: 27-39.
- LeDoux, J. E. (1992). Emotion and the amygdala. In *The amygdala: neurobiological aspects of emotion, memory, and mental dysfunction* (Aggleton, J. P., ed.), pp. 339-352. Wiley-Liss, New York.
- LeDoux, J. E. (2000). Emotion circuits in the brain. *Annual Review of Neuroscience* **23**: 155-184.
- Linnoila, M., Virkkunen, M., George, T. & Higley, D. (1993). Impulse control disorders. *International Clinical Psychopharmacology* **8 (Supplement 1)**: 53-56.
- Linnoila, M., Virkkunen, M., Scheinin, M., Nuutila, A., Rimon, R. & Goodwin, F. K. (1983). Low cerebrospinal fluid 5-hydroxyindoleacetic acid concentration differentiates impulsive from nonimpulsive violent behavior. *Life Sciences* **33**: 2609-2614.
- Liotti, M., Woldorff, M. G., Perez, R. & Mayberg, H. S. (2000). An ERP study of the temporal course of the Stroop color-word interference effect. *Neuropsychologia* **38**: 701-711.
- Lorenz (1939). Vergleichende Verhaltensforschung [Comparative behaviour research]. *Zoologischer Anzeiger Supplement* **12**: 69-109.

- Lovibond, P. F. (1983). Facilitation of instrumental behavior by a Pavlovian appetitive conditioned stimulus. *Journal of Experimental Psychology: Animal Behavior Processes* **9**: 225-247.
- Luu, P., Collins, P. & Tucker, D. M. (2000a). Mood, personality, and self-monitoring: negative affect and emotionality in relation to frontal lobe mechanisms of error monitoring. *Journal of Experimental Psychology: General* **129**: 43-60.
- Luu, P., Flaisch, T. & Tucker, D. M. (2000b). Medial frontal cortex in action monitoring. *Journal of Neuroscience* **20**: 464-469.
- Lyon, M. & Robbins, T. W. (1975). The action of central nervous system stimulant drugs: a general theory concerning amphetamine effects. In *Current Developments in Psychopharmacology* (Essman, W. B. & Valzelli, L., eds.), Vol. 2, pp. 79-163. Spectrum Publications, New York.
- Maas, L. C., Lukas, S. E., Kaufman, M. J., Weiss, R. D., Daniels, S. L., Rogers, V. W., Kukes, T. J. & Renshaw, P. F. (1998). Functional magnetic resonance imaging of human brain activation during cue-induced cocaine craving. *American Journal of Psychiatry* **155**: 124-126.
- MacDonald, A. W., Cohen, J. D., Stenger, V. A. & Carter, C. S. (2000). Dissociating the role of the dorsolateral prefrontal and anterior cingulate cortex in cognitive control. *Science* **288**: 1835-1838.
- Mackintosh, N. J. (1974). *The Psychology of Animal Learning*, Academic Press, London.
- Mackintosh, N. J. (1983). *Conditioning and associative learning*, Oxford University Press, Oxford.
- MacLean, P. D. (1949). Psychosomatic disease and the "visceral brain": recent developments bearing on the Papez theory of emotion. *Psychosomatic Medicine* **11**: 338-353.
- MacLean, P. D. (1952). Some psychiatric implications of physiological studies on the frontotemporal portion of the limbic system (visceral brain). *Electroencephalography and Clinical Neurophysiology* **4**: 407-418.
- MacLean, P. D. (1993). Introduction: perspectives on cingulate cortex in the limbic system. In *Neurobiology of cingulate cortex and limbic thalamus: a comprehensive handbook* (Vogt, B. A. & Gabriel, M., eds.), pp. 1-15. Birkhauser, Boston, Massachusetts.
- MacLeod, C. M. & MacDonald, P. A. (2000). Interdimensional interference in the Stroop effect: uncovering the cognitive and neural anatomy of attention. *Trends in Cognitive Sciences* **4**: 383-391.
- Maldonado-Irizarry, C. S. & Kelley, A. E. (1995). Excitotoxic lesions of the core and shell subregions of the nucleus accumbens differentially disrupt body-weight regulation and motor activity in the rat. *Brain Research Bulletin* **38**: 551-559.
- Málková, L., Gaffan, D. & Murray, E. A. (1997). Excitotoxic lesions of the amygdala fail to produce impairment in visual learning for auditory secondary reinforcement but interfere with reinforcer devaluation effects in rhesus monkeys. *Journal of Neuroscience* **17**: 6011-6020.
- Maren, S. (1999). Neurotoxic or electrolytic lesions of the ventral subiculum produce deficits in the acquisition and expression of Pavlovian fear conditioning in rats. *Behavioral Neuroscience* **113**: 283-290.
- Mark, T. A. & Gallistel, C. R. (1994). Kinetics of matching. *Journal of Experimental Psychology: Animal Behavior Processes* **20**: 79-95.
- Marsden, C. D. (1992). Dopamine and basal ganglia disorders in humans. *Seminars in the Neurosciences* **4**: 171-178.
- Marshall, J. F. & Teitelbaum, P. (1977). New considerations in the neuropsychology of motivated behaviors. In *Handbook of Psychopharmacology* (Iversen, L. L., Iversen, S. D. & Snyder, S. H., eds.), Vol. 7, pp. 201-222. Plenum Press, New York.
- Mayberg, H. S. (1997). Limbic-cortical dysregulation: A proposed model of depression. *Journal of Neuropsychiatry and Clinical Neurosciences* **9**: 471-481.
- Mayberg, H. S. (2000). The neuropsychopathology of mood regulation and depression: converging evidence from PET studies of unipolar and bipolar patients. *Journal of Psychopharmacology* **14 (supplement)**: A1.
- Mayberg, H. S., Brannan, S. K., Mahurin, R. K., Brickman, J. S., Jerabek, P. A., Martin, C. C. & Fox, P. T. (1996). Anterior cingulate function and mood: Evidence from FDG PET studies of primary and secondary depression. *Neurology* **46**: 28004-28004.
- Mayberg, H. S., Brannan, S. K., Mahurin, R. K., Jerabek, P. A., Brickman, J. S., Tekell, J. L., Silva, J. A., McGinnis, S., Glass, T. G., Martin, C. C. & Fox, P. T. (1997). Cingulate function in depression: A potential predictor of treatment response. *Neuroreport* **8**: 1057-1061.
- Mayberg, H. S., Lewis, P. J., Regenold, W. & Wagner, H. N. (1994). Paralimbic hypoperfusion in unipolar depression. *Journal of Nuclear Medicine* **35**: 929-934.
- Mayberg, H. S., Liotti, M., Brannan, S. K., McGinnis, S., Mahurin, R. K., Jerabek, P. A., Silva, J. A., Tekell, J. L., Martin, C. C., Lancaster, J. L. & Fox, P. T. (1999). Reciprocal limbic-cortical function and negative mood: Converging PET findings in depression and normal sadness. *American Journal of Psychiatry* **156**: 675-682.

- Mazur, J. E. (1984). Tests of an equivalence rule for fixed and variable reinforcer delays. *Journal of Experimental Psychology: Animal Behavior Processes* **10**: 426-436.
- Mazur, J. E. (1987). An adjusting procedure for studying delayed reinforcement. In *Quantitative Analyses of Behavior: V. The Effect of Delay and of Intervening Events on Reinforcement Value* (Commons, M. L., Mazur, J. E., Nevin, J. A. & Rachlin, H., eds.), pp. 55-73. Lawrence Erlbaum, Hillsdale, New Jersey.
- Mazur, J. E. (1988). Estimation of indifference points with an adjusting-delay procedure. *Journal of the Experimental Analysis of Behavior* **49**: 37-47.
- Mazur, J. E. (1991). Choice with probabilistic reinforcement - effects of delay and conditioned reinforcers. *Journal of the Experimental Analysis of Behavior* **55**: 63-77.
- Mazur, J. E. (1995). Conditioned reinforcement and choice with delayed and uncertain primary reinforcers. *Journal of the Experimental Analysis of Behavior* **63**: 139-150.
- Mazur, J. E. (1997). Choice, delay, probability, and conditioned reinforcement. *Animal Learning & Behavior* **25**: 131-147.
- Mazur, J. E. (2000). Tradeoffs among delay, rate, and amount of reinforcement. *Behavioural Processes* **49**: 1-10.
- Mazur, J. E., Stellar, J. R. & Waraczynski, M. (1987). Self-control choice with electrical stimulation of the brain as a reinforcer. *Behavioural Processes* **15**: 143-153.
- McAlonan, G. M., Robbins, T. W. & Everitt, B. J. (1993). Effects of medial dorsal thalamic and ventral pallidal lesions on the acquisition of a conditioned place preference: further evidence for the involvement of the ventral striatopallidal system in reward-related processes. *Neuroscience* **52**: 605-620.
- McCleaney, R. & Hay, R. A. (1980). *Applied time series analysis for the social sciences*, Sage, London.
- McCullough, L. D., Cousins, M. S. & Salamone, J. D. (1993). The role of nucleus accumbens dopamine in responding on a continuous reinforcement operant schedule: a neurochemical and behavioral study. *Pharmacology, Biochemistry and Behavior* **46**: 581-586.
- McDonald, A. J. (1998). Cortical pathways to the mammalian amygdala. *Progress in Neurobiology* **55**: 257-332.
- McGeorge, A. J. & Faull, R. L. M. (1989). The organization of the projection from the cerebral cortex to the striatum in the rat. *Neuroscience* **29**: 503-537.
- Mead, A. N. & Stephens, D. N. (1998). AMPA-receptors are involved in the expression of amphetamine-induced behavioural sensitisation, but not in the expression of amphetamine-induced conditioned activity in mice. *Neuropharmacology* **37**: 1131-1138.
- Meck, W. H. (1983). Selective adjustment of the speed of internal clock and memory processes. *Journal of Experimental Psychology: Animal Behavior Processes* **9**: 171-201.
- Mehlman, P. T., Higley, J. D., Faucher, I., Lilly, A. A., Taub, D. M., Vickers, J., Suomi, S. J. & Linnoila, M. (1994). Low CSF 5-HIAA concentrations and severe aggression and impaired impulse control in nonhuman primates. *American Journal of Psychiatry* **151**: 1485-1491.
- Mérö, L. (1998). *Moral Calculations: Game Theory, Logic, and Human Frailty*, Springer-Verlag, New York.
- Meunier, M. & Destrade, C. (1986). [Paradoxical transitory facilitation of performance in the Hebb-Williams labyrinth after lesion of the cingulate cortex in mice]. *Comptes Rendus de l'Academie des Sciences. Serie III, Sciences de la Vie* **302**: 43-46.
- Meunier, M. & Destrade, C. (1988). Electrolytic but not ibotenic acid lesions of the posterior cingulate cortex produce transitory facilitation of learning in mice. *Behavioural Brain Research* **27**: 161-172.
- Meunier, M., Jaffard, R. & Destrade, C. (1991). Differential involvement of anterior and posterior cingulate cortices in spatial discriminative learning in a T-maze in mice. *Behavioural Brain Research* **44**: 133-143.
- Miltner, W. H. R., Braun, C. H. & Coles, M. G. H. (1997). Event-related brain potentials following incorrect feedback in a time-estimation task: Evidence for a "generic" neural system for error detection. *Journal of Cognitive Neuroscience* **9**: 788-798.
- Mirenowicz, J. & Schultz, W. (1994). Importance of unpredictability for reward responses in primate dopamine neurons. *Journal of Neurophysiology* **72**: 1024-1027.
- Mirenowicz, J. & Schultz, W. (1996). Preferential activation of midbrain dopamine neurons by appetitive rather than aversive stimuli. *Nature* **379**: 449-451.

- Mishkin, M., Malamut, B. & Bachevalier, J. (1984). Memories and habits: two neural systems. In *Neurobiology of Learning and Memory* (Lynch, G., McGaugh, J. L. & Weinberger, N. M., eds.), pp. 65-77. Guildford Press, New York.
- Mitchell, S. H. (1999). Measures of impulsivity in cigarette smokers and non-smokers. *Psychopharmacology* **146**: 455-464.
- Mittleman, G., Brener, J. & Robbins, T. W. (1990). Physiological correlates of schedule-induced activities in rats. *American Journal of Physiology* **259**: R485-491.
- Moerschbaecher, J. M., Boren, J. J., Schrot, J. & Fontes, J. C. (1979). Effects of cocaine and d-amphetamine on the repeated acquisition and performance of conditional discriminations. *Journal of the Experimental Analysis of Behavior* **31**: 127-140.
- Mogenson, G. J., Jones, D. L. & C.Y., Y. (1980). From motivation to action: functional interface between the limbic system and the motor system. *Progress in Neurobiology* **14**: 69-97.
- Montague, P. R., Dayan, P. & Sejnowski, T. J. (1996). A framework for mesencephalic dopamine systems based on predictive Hebbian learning. *Journal of Neuroscience* **16**: 1936-1947.
- Morgan, M. A. & Ledoux, J. E. (1995). Differential contribution of dorsal and ventral medial prefrontal cortex to the acquisition and extinction of conditioned fear in rats. *Behavioral Neuroscience* **109**: 681-688.
- Morgan, M. J. & Nicholas, D. J. (1979). Discrimination between reinforced action patterns in the rat. *Learning & Motivation* **10**: 1-22.
- Morrissey, G., Ho, M. Y., Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1994). Effect of lesions of the ascending 5-hydroxytryptaminergic pathways on timing behaviour investigated with the fixed-interval peak procedure. *Psychopharmacology* **114**: 463-468.
- Morrissey, G., Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1993). Effect of lesions of the ascending 5-hydroxytryptaminergic pathways on timing behaviour investigated with an interval bisection task. *Psychopharmacology* **112**: 80-85.
- Mowrer, O. H. (1960). *Learning Theory and Behavior*, Wiley, New York.
- Muir, J. L., Everitt, B. J. & Robbins, T. W. (1996). The cerebral cortex of the rat and visual attentional function: dissociable effects of medio-frontal, cingulate, anterior dorsolateral, and parietal cortex lesions on a five-choice serial reaction time task. *Cerebral Cortex* **6**: 470-481.
- Mullen, R. J., Buck, C. R. & Smith, A. M. (1992). NeuN, a neuronal specific nuclear protein in vertebrates. *Development* **116**: 201-211.
- Murray, E. A. & Bussey, T. J. (1999). Perceptual-mnemonic functions of the perirhinal cortex. *Trends in Cognitive Sciences* **3**: 142-151.
- Murray, E. A., Bussey, T. J., Hampton, R. R. & Saksida, L. M. (2000). The parahippocampal region and object identification. *Annals of the New York Academy of Sciences* **911**: 166-174.
- Myerson, J. & Green, L. (1995). Discounting of delayed rewards: models of individual choice. *Journal of the Experimental Analysis of Behavior* **64**: 263-276.
- Nauta, W. J. H. (1971). The problem of the frontal lobe: a reinterpretation. *Journal of Psychiatric Research* **8**: 167-187.
- Neafsey, E. J., Terreberry, K. M., Hurley, K. M., Ruit, K. G. & Frysztak, R. J. (1993). Anterior cingulate cortex in rodents: connections, visceral control functions, and implications for emotion. In *Neurobiology of cingulate cortex and limbic thalamus: a comprehensive handbook* (Vogt, B. A. & Gabriel, M., eds.), pp. 206-233. Birkhäuser, Boston, Massachusetts.
- Neave, N., Lloyd, S., Sahgal, A. & Aggleton, J. P. (1994). Lack of effect of lesions in the anterior cingulate cortex and retrosplenial cortex on certain tests of spatial memory in the rat. *Behavioural Brain Research* **65**: 89-101.
- Nicholson, D. A. & Freeman, J. H. (2000). Lesions of the perirhinal cortex impair sensory preconditioning in rats. *Behavioural Brain Research* **112**: 69-75.
- Norgren, R. (1995). Gustatory system. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 751-771. Academic Press, London.
- Norman, D. A. & Shallice, T. (1986). Attention to action: willed and automatic control of behaviour. In *Consciousness and Self-Regulation (Volume 4): Advances in Research and Theory* (Davidson, R. J., Schwartz, G. E. & Shapiro, D., eds.), pp. 1-18. Plenum Press, New York.
- Oakley, D. A. & Russell, I. S. (1972). Neocortical lesions and Pavlovian conditioning. *Physiology and Behavior* **8**: 915-922.
- Oakley, D. A. & Russell, I. S. (1975). Role of cortex on Pavlovian discrimination learning. *Physiology and Behavior* **15**: 315-321.
- Oakley, D. A. & Russell, I. S. (1976). Subcortical nature of Pavlovian differentiation in the rabbit. *Physiology and Behavior* **17**: 947-954.
- O'Brien, C. P., Childress, A. R., Ehrman, R. & Robbins, S. J. (1998). Conditioning factors in drug abuse: can they explain compulsion? *Journal of Psychopharmacology* **12**: 15-22.

- O'Brien, C. P., Ehrman, R. N. & Ternes, J. W. (1986). Classical conditioning in human opioid dependence. In *Behavioural analysis of drug dependence* (Goldberg, S. R. & Stolerman, I. P., eds.), pp. 329-356. Academic Press, London.
- Öngür, D., An, X. & Price, J. L. (1998). Prefrontal cortical projections to the hypothalamus in macaque monkeys. *Journal of Comparative Neurology* **401**: 480-505.
- Öngür, D. & Price, J. L. (2000). The organization of networks within the orbital and medial prefrontal cortex of rats, monkeys and humans. *Cerebral Cortex* **10**: 206-219.
- Packard, M. G., Hirsh, R. & White, N. M. (1989). Differential effects of fornix and caudate nucleus lesions on two radial maze tasks: evidence for multiple memory systems. *Journal of Neuroscience* **9**: 1465-1472.
- Packard, M. G. & McGaugh, J. L. (1996). Inactivation of hippocampus or caudate nucleus with lidocaine differentially affects expression of place and response learning. *Neurobiology of Learning and Memory* **65**: 65-72.
- Packard, M. G. & White, N. M. (1991). Dissociation of hippocampus and caudate nucleus memory systems by posttraining intracerebral injection of dopamine agonists. *Behavioral Neuroscience* **105**: 295-306.
- Papa, M., Sagvolden, T., Sergeant, J. A. & Sadile, A. G. (1996). Reduced CaMKII-positive neurones in the accumbens shell of an animal model of attention-deficit hyperactivity disorder. *Neuroreport* **7**: 3017-3020.
- Papa, M., Sellitti, S. & Sadile, A. G. (2000). Remodeling of neural networks in the anterior forebrain of an animal model of hyperactivity and attention deficits as monitored by molecular imaging probes. *Neuroscience and Biobehavioral Reviews* **24**: 149-156.
- Papa, M., Sergeant, J. A. & Sadile, A. G. (1998). Reduced transduction mechanisms in the anterior accumbal interface of an animal model of attention-deficit hyperactivity disorder. *Behavioural Brain Research* **94**: 187-195.
- Papez, J. W. (1937). A proposed mechanism of emotion. *Archives of Neurology and Psychiatry* **38**: 725-743.
- Pardo, J. V., Pardo, P. J., Janer, K. W. & Raichle, M. E. (1990). The anterior cingulate cortex mediates processing selection in the Stroop attentional conflict paradigm. *Proceedings of the National Academy of Sciences of the United States of America* **87**: 256-259.
- Parkinson, J. A. (1998). Limbic corticostriatal circuitry underlying Pavlovian associative learning. Unpublished PhD thesis, University of Cambridge.
- Parkinson, J. A., Buckby, T. B., Zandi, M. S., Robbins, T. W. & Everitt, B. J. (1999a). Nucleus accumbens lesions enhance the acquisition of a simple instrumental visual discrimination. *Society for Neuroscience Abstracts* **25**: 90.
- Parkinson, J. A., Cardinal, R. N. & Everitt, B. J. (2000a). Limbic cortical-ventral striatal systems underlying appetitive conditioning. *Progress in Brain Research* **126**: 263-285.
- Parkinson, J. A., Dalley, J. W., Cardinal, R. N., Bamford, A., Fehnert, B., Lachenal, G., Rudarakanchana, N., Halkerston, K. M., Robbins, T. W. & Everitt, B. J. (submitted). Nucleus accumbens dopamine depletion impairs both acquisition and performance of appetitive Pavlovian approach behaviour: implications for mesoaccumbens dopamine function.
- Parkinson, J. A., Olmstead, M. C., Burns, L. H., Robbins, T. W. & Everitt, B. J. (1999b). Dissociation in effects of lesions of the nucleus accumbens core and shell on appetitive Pavlovian approach behavior and the potentiation of conditioned reinforcement and locomotor activity by d-amphetamine. *Journal of Neuroscience* **19**: 2401-2411.
- Parkinson, J. A., Robbins, T. W. & Everitt, B. J. (1996). Lesions of the nucleus accumbens core, but not basolateral amygdala or subiculum, disrupt stimulus-reward learning in a novel autoshaping procedure. *Society for Neuroscience Abstracts* **22**: 1118.
- Parkinson, J. A., Robbins, T. W. & Everitt, B. J. (1999c). Selective excitotoxic lesions of the nucleus accumbens core and shell differentially affect aversive Pavlovian conditioning to discrete and contextual cues. *Psychobiology* **27**: 256-266.
- Parkinson, J. A., Robbins, T. W. & Everitt, B. J. (2000b). Dissociable roles of the central and basolateral amygdala in appetitive emotional learning. *European Journal of Neuroscience* **12**: 405-413.
- Parkinson, J. A., Willoughby, P. J., Robbins, T. W. & Everitt, B. J. (2000c). Disconnection of the anterior cingulate cortex and nucleus accumbens core impairs Pavlovian approach behavior: Further evidence for limbic cortical-ventral striatopallidal systems. *Behavioral Neuroscience* **114**: 42-63.
- Paus, T., Petrides, M., Evans, A. C. & Meyer, E. (1993). Role of the human anterior cingulate cortex in the control of oculomotor, manual, and speech responses: a positron emission tomography study. *Journal of Neurophysiology* **70**: 453-469.

- Pavlov, I. P. (1927). *Conditioned Reflexes*, Oxford University Press, Oxford.
- Paxinos, G. & Watson, C. (1996). *The Rat Brain in Stereotaxic Coordinates*. Compact Third (CD-Rom) edition, Academic Press.
- Paxinos, G. & Watson, C. (1998). *The Rat Brain in Stereotaxic Coordinates*. Fourth edition, Academic Press.
- Pearce, J. M. & Hall, G. (1980). A model for Pavlovian learning: variations in the effectiveness of conditioned but not of unconditioned stimuli. *Psychological Review* **106**: 532-552.
- Pennartz, C. M., Ameerun, R. F., Groenewegen, H. J. & Lopes da Silva, F. H. (1993). Synaptic plasticity in an in vitro slice preparation of the rat nucleus accumbens. *European Journal of Neuroscience* **5**: 107-117.
- Pennartz, C. M., Groenewegen, H. J. & Lopes da Silva, F. H. (1994). The nucleus accumbens as a complex of functionally distinct neuronal ensembles: an integration of behavioural, electrophysiological and anatomical data. *Progress in Neurobiology* **42**: 719-761.
- Pennartz, C. M. & Kitai, S. T. (1991). Hippocampal inputs to identified neurons in an in vitro slice preparation of the rat nucleus accumbens: evidence for feed-forward inhibition. *Journal of Neuroscience* **11**: 2838-2847.
- Pennartz, C. M. A. (1995). The ascending neuromodulatory systems in learning by reinforcement: Comparing computational conjectures with experimental findings. *Brain Research Reviews* **21**: 219-245.
- Petersen, S. E., van Mier, H., Fiez, J. A. & Raichle, M. E. (1998). The effects of practice on the functional anatomy of task performance. *Proceedings of the National Academy of Sciences of the United States of America* **95**: 853-860.
- Phillips, R. G. & LeDoux, J. E. (1992). Differential contribution of amygdala and hippocampus to cued and contextual fear conditioning. *Behavioral Neuroscience* **106**: 274-285.
- Pinker, S. (1997). *How The Mind Works*, Allen Lane - The Penguin Press, London.
- Pitkänen, A. (2000). Connectivity of the rat amygdaloid complex. In *The amygdala: a functional analysis*, Second edition (Aggleton, J. P., ed.), pp. 31-115. Oxford University Press, New York.
- Poremba, A. & Gabriel, M. (1997). Amygdalar lesions block discriminative avoidance learning and cingulothalamic training-induced neuronal plasticity in rabbits. *Journal of Neuroscience* **17**: 5237-5244.
- Poremba, A. & Gabriel, M. (1999). Amygdala neurons mediate acquisition but not maintenance of instrumental avoidance behavior in rabbits. *Journal of Neuroscience* **19**: 9635-9641.
- Posner, M. I. (1995). Attention in cognitive neuroscience: an overview. In *The Cognitive Neurosciences* (Gazzaniga, M. S., ed.), pp. 615-624. MIT Press, Cambridge.
- Poulos, C. X., Le, A. D. & Parker, J. L. (1995). Impulsivity predicts individual susceptibility to high levels of alcohol self-administration. *Behavioural Pharmacology* **6**: 810-814.
- Powell, D. A., Watson, K. & Maxwell, B. (1994). Involvement of subdivisions of the medial prefrontal cortex in learned cardiac adjustments in rabbits. *Behavioral Neuroscience* **108**: 294-307.
- Price, J. L. (1995). Thalamus. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 629-648. Academic Press, London.
- Rachlin, H. (1971). On the tautology of the matching law. *Journal of the Experimental Analysis of Behavior* **15**: 249-251.
- Rachlin, H., Rainieri, A. & Cross, D. (1991). Subjective probability and delay. *Journal of the Experimental Analysis of Behavior* **55**: 233-244.
- Ragozzino, M. E., Adams, S. & Kesner, R. P. (1998). Differential involvement of the dorsal anterior cingulate and prelimbic-infralimbic areas of the rodent prefrontal cortex in spatial working memory. *Behavioral Neuroscience* **112**: 293-303.
- Ragozzino, M. E., Wilcox, C., Raso, M. & Kesner, R. P. (1999). Involvement of rodent prefrontal cortex subregions in strategy switching. *Behavioral Neuroscience* **113**: 32-41.
- Raichle, M. E., Fiez, J. A., Videen, T. O., MacLeod, A. M., Pardo, J. V., Fox, P. T. & Petersen, S. E. (1994). Practice-related changes in human brain functional anatomy during nonmotor learning. *Cerebral Cortex* **4**: 8-26.
- Reading, P. J. & Dunnett, S. B. (1991). The effects of excitotoxic lesions of the nucleus accumbens on a matching to position task. *Behavioural Brain Research* **46**: 17-29.
- Reading, P. J., Dunnett, S. B. & Robbins, T. W. (1991). Dissociable roles of the ventral, medial and lateral striatum on the acquisition and performance of a complex visual stimulus-response habit. *Behavioural Brain Research* **45**: 147-161.

- Redgrave, P., Prescott, T. J. & Gurney, K. (1999a). The basal ganglia: A vertebrate solution to the selection problem? *Neuroscience* **89**: 1009-1023.
- Redgrave, P., Prescott, T. J. & Gurney, K. (1999b). Is the short-latency dopamine response too short to signal reward error? *Trends in Neuroscience* **22**: 146-151.
- Rescorla, R. A. (1990a). Evidence for an association between the discriminative stimulus and the response-outcome association in instrumental learning. *Journal of Experimental Psychology: Animal Behavior Processes* **16**: 326-334.
- Rescorla, R. A. (1990b). Instrumental responses become associated with reinforcers that differ in one feature. *Animal Learning & Behavior* **18**: 206-211.
- Rescorla, R. A. (1990c). The role of information about the response-outcome relation in instrumental discrimination learning. *Journal of Experimental Psychology: Animal Behavior Processes* **16**: 262-270.
- Rescorla, R. A. & Wagner, A. R. (1972). A theory of Pavlovian conditioning: variations in the effectiveness of reinforcement and non-reinforcement. In *Classical Conditioning II: Current Research and Theory* (Black, A. & Prokasy, W., eds.), pp. 64-99. Appleton-Century-Crofts, New York.
- Revusky, S. & Garcia, J. (1970). Learned associations over long delays. In *The Psychology of Learning and Motivation* (Bower, G. H., ed.), Vol. 4, pp. 1-84. Academic Press, New York.
- Richards, J. B., Chock, M. A., Carlson, B., de Wit, H. & Seiden, L. (1997a). Comparison of two models of impulsive behavior in rats: effects of amphetamine and haloperidol. *Society for Neuroscience Abstracts* **23**: 2406.
- Richards, J. B., Mitchell, S. H., de Wit, H. & Seiden, L. S. (1997b). Determination of discount functions in rats with an adjusting-amount procedure. *Journal of the Experimental Analysis of Behavior* **67**: 353-366.
- Richards, J. B., Sabol, K. E. & de Wit, H. (1999). Effects of methamphetamine on the adjusting amount procedure, a model of impulsive behavior in rats. *Psychopharmacology* **146**: 432-439.
- Richards, J. B. & Seiden, L. S. (1995). Serotonin depletion increases impulsive behavior in rats. *Society for Neuroscience Abstracts* **21**: 1693.
- Richardson, N. R. & Gratton, A. (1998). Changes in medial prefrontal cortical dopamine levels associated with response-contingent food reward: an electrochemical study in rat. *Journal of Neuroscience* **18**: 9130-9138.
- Robbins, T. W. (1976). Relationship between reward-enhancing and stereotypical effects of psychomotor stimulant drugs. *Nature* **264**: 57-59.
- Robbins, T. W. (1978). The acquisition of responding with conditioned reinforcement: effects of pipradrol, methylphenidate, d-amphetamine, and nomifensine. *Psychopharmacology* **58**: 79-87.
- Robbins, T. W. & Everitt, B. J. (1992). Functions of dopamine in the dorsal and ventral striatum. *Seminars in the Neurosciences* **4**: 119-127.
- Robbins, T. W. & Everitt, B. J. (1996). Neurobehavioural mechanisms of reward and motivation. *Current Opinion in Neurobiology* **6**: 228-236.
- Robbins, T. W., Giardini, V., Jones, G. H., Reading, P. & Sahakian, B. J. (1990a). Effects of dopamine depletion from the caudate-putamen and nucleus accumbens septi on the acquisition and performance of a conditional discrimination task. *Behavioural Brain Research* **38**: 243-261.
- Robbins, T. W., Hutcheson, D. M., Parkinson, J. A. & Everitt, B. J. (2000). The effects of nucleus accumbens core and shell lesions on intravenous heroin self-administration and the acquisition of heroin-seeking behaviour (under a second-order schedule). *European Journal of Neuroscience* **12 (supplement 11)**: 156.
- Robbins, T. W. & Koob, G. F. (1978). Pipradrol enhances reinforcing properties of stimuli paired with brain stimulation. *Pharmacology, Biochemistry and Behavior* **8**: 219-222.
- Robbins, T. W. & Koob, G. F. (1980). Selective disruption of displacement behaviour by lesions of the mesolimbic dopamine system. *Nature* **285**: 409-412.
- Robbins, T. W., Mittleman, G., O'Brien, J. & Winn, P. (1990b). The neuropsychological significance of stereotypy induced by stimulant drugs. In *Neurobiology of stereotyped behaviour* (Cooper, S. J. & Dourish, C. T., eds.), pp. 25-63. Oxford University Press, Oxford.
- Robbins, T. W. & Sahakian, B. J. (1983). Behavioural effects of psychomotor stimulant drugs: clinical and neuropsychological implications. In *Stimulants: Neurochemical, Behavioural, and Clinical Perspectives* (Creese, I., ed.), pp. 301-338. Raven Press, New York.
- Robbins, T. W., Watson, B. A., Gaskin, M. & Ennis, C. (1983). Contrasting interactions of pipradrol, d-amphetamine, cocaine, cocaine analogues, apomorphine and other drugs with conditioned reinforcement. *Psychopharmacology* **80**: 113-119.

- Roberts, A. C., Robbins, T. W. & Weiskrantz, L. (1998). Discussion and conclusions. In *The prefrontal cortex: executive and cognitive functions* (Roberts, A. C., Robbins, T. W. & Weiskrantz, L., eds.), pp. 221-242. Oxford University Press, Oxford.
- Roberts, S. (1981). Isolation of an internal clock. *Journal of Experimental Psychology: Animal Behavior Processes* **7**: 242-268.
- Robinson, T. E. & Berridge, K. C. (1993). The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain Research Reviews* **18**: 247-291.
- Robledo, P., Robbins, T. W. & Everitt, B. J. (1996). Effects of excitotoxic lesions of the central amygdaloid nucleus on the potentiation of reward-related stimuli by intra-accumbens amphetamine. *Behavioral Neuroscience* **110**: 981-990.
- Rogers, R. D., Owen, A. M., Middleton, H. C., Williams, E. J., Pickard, J. D., Sahakian, B. J. & Robbins, T. W. (1999). Choosing between small, likely rewards and large, unlikely rewards activates inferior and orbital prefrontal cortex. *Journal of Neuroscience* **19**: 9029-9038.
- Rolls, E. T. (1999). *The Brain and Emotion*, Oxford University Press, Oxford.
- Rolls, E. T. (2000). Orbitofrontal cortex and reward. *Cerebral Cortex* **10**: 284-294.
- Rubia, K., Overmeyer, S., Taylor, E., Brammer, M., Williams, S. C. R., Simmons, A. & Bullmore, E. T. (1999). Hypofrontality in attention deficit hyperactivity disorder during higher-order motor control: A study with functional MRI. *American Journal of Psychiatry* **156**: 891-896.
- Russell, S. J. & Norvig, P. N. (1995). *Artificial Intelligence: a modern approach*, Prentice-Hall, Upper Saddle River, New Jersey.
- Russell, V., de Villiers, A., Sagvolden, T., Lamm, M. & Taljaard, J. (1998). Differences between electrically-, ritalin- and D-amphetamine-stimulated release of [H-3]dopamine from brain slices suggest impaired vesicular storage of dopamine in an animal model of attention-deficit hyperactivity disorder. *Behavioural Brain Research* **94**: 163-171.
- Russell, V., Devilliers, A., Sagvolden, T., Lamm, M. & Taljaard, J. (1995). Altered dopaminergic function in the prefrontal cortex, nucleus accumbens and caudate-putamen of an animal model of attention-deficit hyperactivity disorder - the spontaneously hypertensive rat. *Brain Research* **676**: 343-351.
- Russell, V. A. (2000). The nucleus accumbens motor-limbic interface of the spontaneously hypertensive rat as studied in vitro by the superfusion slice technique. *Neuroscience and Biobehavioral Reviews* **24**: 133-136.
- Sadile, A. G. (2000). Multiple evidence of a segmental defect in the anterior forebrain of an animal model of hyperactivity and attention deficit. *Neuroscience and Biobehavioral Reviews* **24**: 161-169.
- Sagvolden, T. (2000). Behavioral validation of the spontaneously hypertensive rat (SHR) as an animal model of attention-deficit/hyperactivity disorder (AD/HD). *Neuroscience and Biobehavioral Reviews* **24**: 31-39.
- Sagvolden, T., Aase, H., Zeiner, P. & Berger, D. (1998). Altered reinforcement mechanisms in attention-deficit/hyperactivity disorder. *Behavioural Brain Research* **94**: 61-71.
- Sagvolden, T., Metzger, M. A., Schiorbeck, H. K., Rugland, A. L., Spinnangr, I. & Sagvolden, G. (1992). The spontaneously hypertensive rat (SHR) as an animal model of childhood hyperactivity (ADHD): changed reactivity to reinforcers and to psychomotor stimulants. *Behavioral and Neural Biology* **58**: 103-112.
- Sagvolden, T., Pettersen, M. B. & Larsen, M. C. (1993). Spontaneously hypertensive rats (SHR) as a putative animal model of childhood hyperkinesis: SHR behavior compared to four other rat strains. *Physiology and Behavior* **54**: 1047-1055.
- Sagvolden, T. & Sergeant, J. A. (1998). Attention deficit/hyperactivity disorder - from brain dysfunctions to behaviour. *Behavioural Brain Research* **94**: 1-10.
- Saksida, L. M. & Bussey, T. J. (1998). Toward a neural network model of visual object identification in primate inferotemporal cortex. *Society for Neuroscience Abstracts* **24**: 1906.
- Saksida, L. M., Bussey, T. J. & Murray, E. A. (2000). One-pair discrimination learning in rhesus monkeys with perirhinal cortex lesions. *Society for Neuroscience Abstracts* **26**: 546.
- Salamone, J. D. (1994). The involvement of nucleus accumbens dopamine in appetitive and aversive motivation. *Behavioural Brain Research* **61**: 117-133.
- Salamone, J. D., Cousins, M. S. & Bucher, S. (1994). Anhedonia or anergia? Effects of haloperidol and nucleus accumbens dopamine depletion on instrumental response selection in a T-maze cost/benefit procedure. *Behavioural Brain Research* **65**: 221-229.

- Salamone, J. D., Cousins, M. S. & Snyder, B. J. (1997). Behavioral functions of nucleus accumbens dopamine: empirical and conceptual problems with the anhedonia hypothesis. *Neuroscience and Biobehavioral Reviews* **21**: 341-359.
- Salamone, J. D., Kurth, P. A., McCullough, L. D., Sokolowski, J. D. & Cousins, M. S. (1993). The role of brain dopamine in response initiation: effects of haloperidol and regionally specific dopamine depletions on the local rate of instrumental responding. *Brain Research* **628**: 218-226.
- Salamone, J. D., Steinpreis, R. E., McCullough, L. D., Smith, P., Grebel, D. & Mahan, K. (1991). Haloperidol and nucleus accumbens dopamine depletion suppress lever pressing for food but increase free food consumption in a novel food choice procedure. *Psychopharmacology* **104**: 515-521.
- Sarter, M. & Markowitsch, H. (1985). Involvement of the amygdala in learning and memory: a critical review with emphasis on anatomical relations. *Behavioral Neuroscience* **99**: 342-380.
- Scheffers, M. K. & Coles, M. G. H. (2000). Performance monitoring in a confusing world: Error-related brain activity, judgments of response accuracy, and types of errors. *Journal of Experimental Psychology: Human Perception and Performance* **26**: 141-151.
- Scheffers, M. K., Coles, M. G. H., Bernstein, P., Gehring, W. J. & Donchin, E. (1996). Event-related brain potentials and error-related processing: An analysis of incorrect responses to go and no-go stimuli. *Psychophysiology* **33**: 42-53.
- Scheffers, M. K., Humphrey, D. G., Stanny, R. R., Kramer, A. F. & Coles, M. G. H. (1999). Error-related processing during a period of extended wakefulness. *Psychophysiology* **36**: 149-157.
- Schoenbaum, G., Chiba, A. A. & Gallagher, M. (1998). Orbitofrontal cortex and basolateral amygdala encode expected outcomes during learning. *Nature Neuroscience* **1**: 155-159.
- Schoenbaum, G., Chiba, A. A. & Gallagher, M. (1999). Neural encoding in orbitofrontal cortex and basolateral amygdala during olfactory discrimination learning. *Journal of Neuroscience* **19**: 1876-1884.
- Schultz, W. (1994). Behavior-related activity of primate dopamine neurons. *Revue Neurologique (Paris)* **150**: 634-639.
- Schultz, W., Apicella, P. & Ljungberg, T. (1993). Responses of monkey dopamine neurons to reward and conditioned stimuli during successive steps of learning a delayed response task. *Journal of Neuroscience* **13**: 900-913.
- Schultz, W., Apicella, P., Romo, R. & Scarnati, E. (1995a). Context-dependent activity in primate striatum reflecting past and future behavioral events. In *Models of Information Processing in the Basal Ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 11-27. MIT Press, Cambridge, Massachusetts / London.
- Schultz, W., Apicella, P., Scarnati, E. & Ljungberg, T. (1992). Neuronal activity in monkey ventral striatum related to the expectation of reward. *Journal of Neuroscience* **12**: 4595-4610.
- Schultz, W., Dayan, P. & Montague, P. R. (1997). A neural substrate of prediction and reward. *Science* **275**: 1593-1599.
- Schultz, W. & Dickinson, A. (2000). Neuronal coding of prediction errors. *Annual Review of Neuroscience* **23**: 473-500.
- Schultz, W., Romo, R., Ljungberg, T., Mirenowicz, J., Hollerman, J. R. & Dickinson, A. (1995b). Reward-related signals carried by dopamine neurons. In *Models of Information Processing in the Basal Ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 233-248. MIT Press, Cambridge, Massachusetts.
- Schultz, W., Tremblay, L. & Hollerman, J. R. (1998). Reward prediction in primate basal ganglia and frontal cortex. *Neuropharmacology* **37**: 421-429.
- Schultz, W., Tremblay, W. & Hollerman, J. R. (2000). Reward processing in primate orbitofrontal cortex and basal ganglia. *Cerebral Cortex* **10**: 272-283.
- Schwartzbaum, J. S. (1965). Discrimination behavior after amygdalectomy in monkeys: visual and somesthetic learning and perceptual capacity. *Journal of Comparative and Physiological Psychology* **60**: 314-319.
- Seamans, J. K., Floresco, S. B. & Phillips, A. G. (1995). Functional differences between the prelimbic and anterior cingulate regions of the rat prefrontal cortex. *Behavioral Neuroscience* **109**: 1063-1073.
- Selden, N. R., Everitt, B. J., Jarrard, L. E. & Robbins, T. W. (1991). Complementary roles for the amygdala and hippocampus in aversive conditioning to explicit and contextual cues. *Neuroscience* **42**: 335-350.

- Setlow, B., Holland, P. C. & Gallagher, M. (2000). Involvement of a basolateral amygdala complex-nucleus accumbens system in appetitive Pavlovian second-order conditioning. *Society for Neuroscience Abstracts* **26**: 1504.
- Setlow, B. & McGaugh, J. L. (1998). Sulpiride infused into the nucleus accumbens posttraining impairs memory of spatial water maze training. *Behavioral Neuroscience* **112**: 603-610.
- Setlow, B. & McGaugh, J. L. (1999). Differential effects of immediate posttraining sulpiride microinfusions into the nucleus accumbens shell and core on Morris water maze retention. *Psychobiology* **27**: 248-255.
- Shastri, L. & Ajjanagadde, V. (1993). From simple associations to systematic reasoning: a connectionist representation of rules, variables and dynamic bindings using temporal synchrony. *Behavioral and Brain Sciences* **16**: 417-494.
- Sheffield, F. D. (1965). Relation between classical conditioning and instrumental learning. In *Classical conditioning: a symposium* (Prokasy, W. F., ed.), pp. 302-322. Appleton-Century-Crofts, New York.
- Shuttleworth, S. J. (1975). Reinforcement and the organization of behavior in golden hamsters: Hunger, environment, and food reinforcement. *Journal of Experimental Psychology: Animal Behavior Processes* **1**: 56-87.
- Shimp, C. P. (1967). The reinforcement of short interresponse times. *Journal of the Experimental Analysis of Behavior* **10**: 425-434.
- Shimp, C. P. (1969). Optimal behaviour in free-operant experiments. *Journal of Experimental Psychology: General* **108**: 48-67.
- Shizgal, P. (1997). Neural basis of utility estimation. *Current Opinion in Neurobiology* **7**: 198-208.
- Simerly, R. B. (1995). Anatomical substrates of hypothalamic integration. In *The Rat Nervous System* (Paxinos, G., ed.), pp. 353-376. Academic Press, London.
- Smith, J. W. & Dickinson, A. (1998). The dopamine antagonist, pimozide, abolishes Pavlovian-instrumental transfer. *Journal of Psychopharmacology* **12 (supplement A)**: A6.
- Sokolowski, J. D. & Salamone, J. D. (1998). The role of accumbens dopamine in lever pressing and response allocation: effects of 6-OHDA injected into core and dorsomedial shell. *Pharmacology, Biochemistry and Behavior* **59**: 557-566.
- Solanto, M. V. (1998). Neuropsychopharmacological mechanisms of stimulant drug action in attention-deficit hyperactivity disorder: a review and integration. *Behavioural Brain Research* **94**: 127-152.
- Sonuga-Barke, E. J. S., Saxton, T. & Hall, M. (1998). The role of interval underestimation in hyperactive children's failure to suppress responses over time. *Behavioural Brain Research* **94**: 45-50.
- Soubrié, P. (1986). Reconciling the role of central serotonin neurons in human and animal behavior. *Behavioral and Brain Sciences* **9**: 319-335.
- Soubrié, P., Blas, C., Ferron, A. & Glowinski, J. (1983). Chlordiazepoxide reduces in vivo serotonin release in the basal ganglia of encephale isolé but not anesthetized cats: evidence for a dorsal raphe site of action. *Journal of Pharmacology and Experimental Therapeutics* **226**: 526-532.
- Sougné, J. (1998). Connectionism and the problem of multiple instantiation. *Trends in Cognitive Sciences* **2**: 183-189.
- Spence, K. W. (1956). *Behavior Theory and Conditioning*, Prentice-Hall, Englewood Cliffs, New Jersey.
- StatSoft (1999). *Electronic Statistics Textbook* (URL: <http://www.statsoft.com/textbook/stathome.html>), StatSoft, Tulsa, Oklahoma.
- Steinmetz, J. E. (2000). Brain substrates of classical eyeblink conditioning: a highly localized but also distributed system. *Behavioural Brain Research* **110**: 13-24.
- Steinmetz, J. E., Sears, L. L., Gabriel, M., Kubota, Y. & Poremba, A. (1991). Cerebellar interpositus nucleus lesions disrupt classical nictitating-membrane conditioning but not discriminative avoidance learning in rabbits. *Behavioural Brain Research* **45**: 71-80.
- Stephens, D. N. (1995). A glutamatergic hypothesis of drug dependence - extrapolations from benzodiazepine receptor ligands. *Behavioural Pharmacology* **6**: 425-446.
- Stern, C. E. & Passingham, R. E. (1995). The nucleus accumbens in monkeys (*Macaca fascicularis*): III. Reversal learning. *Experimental Brain Research* **106**: 239-247.
- Stricker, E. M. & Zigmond, M. J. (1976). Recovery of function after damage to central catecholamine-containing neurons: a neurochemical model for the lateral hypothalamic syndrome. In *Progress in Psychology and Physiological Psychology* (Sprague, J. M. & Epstein, A. N., eds.), pp. 121-188. Academic Press, New York.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology* **18**: 643-662.

- Stroustrup, B. (1986). *The C++ Programming Language*, Addison-Wesley, Reading, Massachusetts.
- Stroustrup, B. (2000). *The C++ Programming Language: Special Edition*, Addison-Wesley, Reading, Massachusetts.
- Sutton, R. S. (1988). Learning to predict by the method of temporal differences. *Machine Learning* **3**: 9-44.
- Swanson, L. W. (1987). The hypothalamus. In *Handbook of Chemical Neuroanatomy* (Björklund, A., Hökfelt, T. & Swanson, L. W., eds.), Vol. 5, pp. 1-124. Elsevier, Amsterdam.
- Szostak, C. & Tombaugh, T. N. (1981). Use of a fixed consecutive number schedule of reinforcement to investigate the effects of pimozide on behavior controlled by internal and external stimuli. *Pharmacology, Biochemistry and Behavior* **15**: 609-617.
- Tarpy, R. M. (1997). *Contemporary Learning Theory and Research*, McGraw-Hill, New York.
- Taylor, J. R. & Horger, B. A. (1999). Enhanced responding for conditioned reward produced by intra-accumbens amphetamine is potentiated after cocaine sensitization. *Psychopharmacology* **142**: 31-40.
- Taylor, J. R. & Robbins, T. W. (1984). Enhanced behavioural control by conditioned reinforcers following microinjections of d-amphetamine into the nucleus accumbens. *Psychopharmacology* **84**: 405-412.
- Taylor, J. R. & Robbins, T. W. (1986). 6-Hydroxydopamine lesions of the nucleus accumbens, but not of the caudate nucleus, attenuate enhanced responding with reward-related stimuli produced by intra-accumbens d-amphetamine. *Psychopharmacology* **90**: 390-397.
- Terrace, H. S. (1963). Errorless discrimination learning in the pigeon: effects of chlorpromazine and imipramine. *Science* **140**: 318-319.
- Thiébot, M. H. (1986). Are serotonergic neurons involved in the control of anxiety and in the anxiolytic activity of benzodiazepines? *Pharmacology, Biochemistry and Behavior* **24**: 1471-1477.
- Thiébot, M. H., Hamon, M. & Soubrié, P. (1982). Attenuation of induced-anxiety in rats by chlordiazepoxide: role of raphe dorsalis benzodiazepine binding sites and serotoninergic neurons. *Neuroscience* **7**: 2287-2294.
- Thiébot, M. H., Le Bihan, C., Soubrié, P. & Simon, P. (1985). Benzodiazepines reduce the tolerance to reward delay in rats. *Psychopharmacology* **86**: 147-152.
- Thompson, R. F., Swain, R., Clark, R. & Shinkman, P. (2000). Intracerebellar conditioning — Brogden and Gantt revisited. *Behavioural Brain Research* **110**: 3-11.
- Thorndike, E. L. (1911). *Animal intelligence: experimental studies*, Macmillan, New York.
- Tiffany, S. T. & Drobes, D. J. (1990). Imagery and smoking urges: the manipulation of affective content. *Addictive Behaviors* **15**: 531-539.
- Tinbergen, N. (1948). Social releasers and the experimental method required for their study. *Wilson Bulletin* **60**: 6-52.
- Tolman, E. C. (1932). *Purposive Behavior in Animals and Men*, Century, New York.
- Tolman, E. C. (1934). Theories of learning. In *Comparative Psychology* (Moss, F. A., ed.), pp. 367-408. Prentice-Hall, New York.
- Tomie, A. (1996). Locating reward cue at response manipulandum (CAM) induces symptoms of drug abuse. *Neuroscience and Biobehavioral Reviews* **20**: 505-535.
- Tomie, A., Aguado, A. S., Pohorecky, L. A. & Benjamin, D. (1998). Ethanol induces impulsive-like responding in a delay-of-reward operant choice procedure: impulsivity predicts autosshaping. *Psychopharmacology* **139**: 376-382.
- Tomie, A., Aguado, A. S., Pohorecky, L. A. & Benjamin, D. (2000). Individual differences in Pavlovian autosshaping of lever pressing in rats predict stress-induced corticosterone release and mesolimbic levels of monoamines. *Pharmacology, Biochemistry and Behavior* **65**: 509-517.
- Trapold, M. A. (1970). Are expectancies based upon different positive reinforcing events discriminably different? *Learning & Motivation* **1**: 129-140.
- Trapold, M. A. & Overmier, J. B. (1972). The second learning process in instrumental learning. In *Classical conditioning II: Current research and theory* (Black, A. H. & Prokasy, W. F., eds.), pp. 427-452. Appleton-Century-Crofts, New York.
- Turken, A. U. & Swick, D. (1999). Response selection in the human anterior cingulate cortex. *Nature Neuroscience* **2**: 920-924.
- Tzschentke, T. M. (2000). The medial prefrontal cortex as a part of the brain reward system. *Amino Acids* **19**: 211-219.
- Uylings, H. B. M. & van Eden, C. G. (1990). Qualitative and quantitative comparisons of the prefrontal cortex in rat and in primates, including humans. *Progress in Brain Research* **85**: 147-166.

- Vogt, B. A. (1993). Structural organization of cingulate cortex: areas, neurons, and somatodendritic transmitter receptors. In *Neurobiology of cingulate cortex and limbic thalamus: a comprehensive handbook* (Vogt, B. A. & Gabriel, M., eds.), pp. 19-70. Birkhäuser, Boston, Massachusetts.
- Vogt, B. A., Finch, D. M. & Olson, C. R. (1992). Functional heterogeneity in cingulate cortex: the anterior executive and posterior evaluative regions. *Cerebral Cortex* **2**: 435-443.
- Vogt, B. A. & Peters, A. (1981). Form and distribution of neurons in rat cingulate cortex: areas 32, 24, and 29. *Journal of Comparative Neurology* **195**: 603-625.
- Volkow, N. D., Ding, Y. S., Fowler, J. S. & Wang, G. J. (1996). Cocaine addiction: hypothesis derived from imaging studies with PET. *Journal of Addictive Diseases* **15**: 55-71.
- Volkow, N. D., Wang, G. J. & Fowler, J. S. (1997). Imaging studies of cocaine in the human brain and studies of the cocaine addict. *Annals of the New York Academy of Sciences* **820**: 41-54; discussion 54-45.
- von Neumann, J. & Morgenstern, O. (1947). *Theory of games and economic behavior*, Princeton University Press, Princeton, New Jersey.
- Wade, T. R., de Wit, H. & Richards, J. B. (2000). Effects of dopaminergic drugs on delayed reward as a measure of impulsive behavior in rats. *Psychopharmacology* **150**: 90-101.
- Wagner, A. R. (1978). Expectancies and the priming of STM. In *Cognitive Processes in Animal Behavior* (Hulse, S. H., Fowler, H. & Honig, W. K., eds.), pp. 177-210. Lawrence Erlbaum, Hillsdale, New Jersey.
- Wagner, R. F. (1970). Secondary emotional reactions in children with learning disabilities. *Mental Hygiene* **54**: 577-579.
- Walker, D. L. & Davis, M. (1997). Double dissociation between the involvement of the bed nucleus of the stria terminalis and the central nucleus of the amygdala in startle increases produced by conditioned versus unconditioned fear. *Journal of Neuroscience* **17**: 9375-9383.
- Warburton, E. C., Aggleton, J. P. & Muir, J. L. (1998). Comparing the effects of selective cingulate cortex lesions and cingulum bundle lesions on water maze performance by rats. *European Journal of Neuroscience* **10**: 622-634.
- Weinberger, N. M. (1995). Retuning the brain by fear conditioning. In *The Cognitive Neurosciences* (Gazzaniga, M., ed.), pp. 1071-1089. MIT Press, Cambridge, Massachusetts.
- Weinberger, N. M. (1998a). Physiological memory in primary auditory cortex: characteristics and mechanisms. *Neurobiology of Learning and Memory* **70**: 226-251.
- Weinberger, N. M. (1998b). Tuning the brain by learning and by stimulation of the nucleus basalis. *Trends in Cognitive Sciences* **2**: 271-273.
- Weissenborn, R., Robbins, T. W. & Everitt, B. J. (1997). Effects of medial prefrontal or anterior cingulate cortex lesions on responding for cocaine under fixed-ratio and second-order schedules of reinforcement in rats. *Psychopharmacology* **134**: 242-257.
- Whalen, P. J., Bush, G., McNally, R. J., Wilhelm, S., McInerney, S. C., Jenike, M. A. & Rauch, S. L. (1998). The emotional counting Stroop paradigm: a functional magnetic resonance imaging probe of the anterior cingulate affective division. *Biological Psychiatry* **44**: 1219-1228.
- Whishaw, I. Q. & Kornelsen, R. A. (1993). Two types of motivation revealed by ibotenic acid nucleus accumbens lesions: dissociation of food carrying and hoarding and the role of primary and incentive motivation. *Behavioural Brain Research* **55**: 283-295.
- White, K. G. & Pipe, M. E. (1987). Sensitivity to reinforcer duration in a self-control procedure. *Journal of the Experimental Analysis of Behavior* **48**: 235-250.
- White, N. M. (1997). Mnemonic functions of the basal ganglia. *Current Opinion in Neurobiology* **7**: 164-169.
- Whitelaw, R. B., Markou, A., Robbins, T. W. & Everitt, B. J. (1996). Excitotoxic lesions of the basolateral amygdala impair the acquisition of cocaine-seeking behaviour under a second-order schedule of reinforcement. *Psychopharmacology* **127**: 213-224.
- Wickens, J. & Köller, R. (1995). Cellular models of reinforcement. In *Models of Information Processing in the Basal Ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 187-214. MIT Press, Cambridge, Massachusetts / London.
- Wickens, J. R., Begg, A. J. & Arbuthnott, G. W. (1996). Dopamine reverses the depression of rat corticostriatal synapses which normally follows high-frequency stimulation of cortex in vitro. *Neuroscience* **70**: 1-5.
- Williams, B. A. (1991). Marking and bridging versus conditioned reinforcement. *Animal Learning & Behavior* **19**: 264-269.
- Williams, B. A. (1994a). Conditioned reinforcement: neglected or outmoded explanatory construct? *Psychonomic Bulletin & Review* **1**: 457-475.
- Williams, B. A. (1994b). Reinforcement and choice. In *Animal Learning and Cognition* (Mackintosh, N. J., ed.), pp. 81-108. Academic Press.

- Williams, B. A. & Dunn, R. (1991). Preference for conditioned reinforcement. *Journal of the Experimental Analysis of Behavior* **55**: 37-46.
- Williams, D. R. & Williams, H. (1969). Auto-maintenance in the pigeon: sustained pecking despite contingent nonreinforcement. *Journal of the Experimental Analysis of Behavior* **12**: 511-520.
- Wilson, C. J. (1995). The contribution of cortical neurons to the firing pattern of striatal spiny neurons. In *Models of Information Processing in the Basal Ganglia* (Houk, J. C., Davis, J. L. & Beiser, D. G., eds.), pp. 29-50. MIT Press, Cambridge, Massachusetts / London.
- Wilson, P. N., Boumphrey, P. & Pearce, J. M. (1992). Restoration of the orienting response to a light by a change in its predictive accuracy. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **44**: 17-36.
- Wise, R. A. (1981). Brain dopamine and reward. In *Theory in Psychopharmacology Volume 1* (Cooper, S. J., ed.), pp. 103-122. Academic Press, London.
- Wise, R. A. (1982). Neuroleptics and operant behavior: the anhedonia hypothesis. *Behavioral and Brain Sciences* **5**: 39-87.
- Wise, R. A. (1985). The anhedonia hypothesis: Mark III. *Behavioral and Brain Sciences* **8**: 178-186.
- Wise, R. A. (1994). A brief history of the anhedonia hypothesis. In *Appetite: Neural and Behavioural Bases* (Legg, C. R. & Booth, D., eds.), pp. 243-263. Oxford University Press, New York.
- Wise, S. P. (1996). The role of the basal ganglia in procedural memory. *Seminars in the Neurosciences* **8**: 39-46.
- Wise, S. P., Murray, E. A. & Gerfen, C. R. (1996). The frontal cortex-basal ganglia system in primates. *Critical Reviews in Neurobiology* **10**: 317-356.
- Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1992). Choice between delayed reinforcers in an adjusting-delay schedule - the effects of absolute reinforcer size and deprivation level. *Quarterly Journal of Experimental Psychology, Section B - Comparative and Physiological Psychology* **45B**: 1-13.
- Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1993a). Does the effect of central 5-hydroxytryptamine depletion on timing depend on motivational change? *Psychopharmacology* **112**: 86-92.
- Wogar, M. A., Bradshaw, C. M. & Szabadi, E. (1993b). Effect of lesions of the ascending 5-hydroxytryptaminergic pathways on choice between delayed reinforcers. *Psychopharmacology* **111**: 239-243.
- Wolterink, G., Phillips, G., Cador, M., Donselaar-Wolterink, I., Robbins, T. W. & Everitt, B. J. (1993). Relative roles of ventral striatal D1 and D2 dopamine receptors in responding with conditioned reinforcement. *Psychopharmacology* **110**: 355-364.
- Wultz, B., Sagvolden, T., Moser, E. I. & Moser, M. B. (1990). The spontaneously hypertensive rat as an animal model of attention-deficit hyperactivity disorder: effects of methylphenidate on exploratory behavior. *Behavioral and Neural Biology* **53**: 88-102.
- Wyvill, C. L. & Berridge, K. C. (2000). Intra-accumbens amphetamine increases the conditioned incentive salience of sucrose reward: enhancement of reward "wanting" without enhanced "liking" or response reinforcement. *Journal of Neuroscience* **20**: 8122-8130.
- Zaborszky, L., Alheid, G. F., Beinfeld, M. C., Eiden, L.E., Heimer, L. & Palkovits, M. (1985). Cholecystokinin innervation of the ventral striatum - a morphological and radioimmunological study. *Neuroscience* **14**: 427.
- Zahm, D. S. & Brog, J. S. (1992). On the significance of subterritories in the "accumbens" part of the rat ventral striatum. *Neuroscience* **50**: 751-767.
- Zahm, D. S., Jensen, S. L., Williams, E. S. & Martin, J. R. (1999). Direct comparison of projections from the central amygdaloid region and nucleus accumbens shell. *European Journal of Neuroscience* **11**: 1119-1126.
- Zilles, K. (1985). *The cortex of the rat: a stereotaxic atlas*. First edition, Springer-Verlag, Berlin.
- Zilles, K. & Wree, A. (1985). Cortex: areal and laminar structure. In *The Rat Nervous System* (Paxinos, G., ed.), Vol. 1, pp. 375-415. Academic Press, Sydney.
- Zilles, K. & Wree, A. (1995). Cortex: areal and laminar structure. In *The Rat Nervous System*, Second edition (Paxinos, G., ed.), pp. 649-685. Academic Press, London.
- Zoli, M., Torri, C., Ferrari, R., Jansson, A., Zini, I., Fuxe, K. & Agnati, L. F. (1998). The emergence of the volume transmission concept. *Brain Research Reviews* **26**: 136-147.