

REFEREED PAPERS AND REVIEWS

166. Pastor-Bernier A, Stasiak A, Schultz W. Orbitofrontal signals for two-component choice options comply with indifference curves of Revealed Preference Theory. *Nat Comm* 10: 4885, 2019. (57 pages) DOI: 10.1038/s41467-019-12792-4.
165. Schultz W. Recent advances in understanding the role of phasic dopamine activity. F1000, 2019.
164. Grabenhorst* F, Tsutsui* KI, Kobayashi S, Schultz W. Primate prefrontal neurons signal economic risk derived from the statistics of recent reward experience. *eLife* 8: e44838, 2019 (30 pages). DOI: 10.7554/eLife.44838.
163. Grabenhorst F, Báez-Mendoza R, Genest W, Deco G, Schultz W. Primate amygdala neurons simulate decision processes of social partners. *Cell* 177: 986-998, 2019. DOI: 10.1016/j.cell.2019.02.042.
162. Ferrari-Toniolo S, Bujold P, Schultz W. Probability distortion depends on choice sequence in rhesus monkeys. *J Neurosci* 39: 2915-2929, 2019. PMID: 30705103. DOI: 10.1523/JNEUROSCI.1454-18.2018.
161. O'Neill M, Schultz W. Predictive coding of the statistical parameters of uncertain rewards by orbitofrontal neurons. *Behav Brain Res* 355: 90-94, 2018. PMID: 29709608. DOI: 10.1016/j.bbr.2018.04.041.
160. Cromwell HC, Tremblay L, Schultz W. Neural encoding of choice during a delayed response task in primate striatum and orbitofrontal cortex. *Exp Brain Res* 236: 1679-1688, 2018. PMID: 29610950. DOI: 10.1007/s00221-018-5253-z.
159. Brzosko Z, Zannone S, Schultz W, Clopath C, Paulsen O. Sequential neuromodulation of Hebbian plasticity offers mechanism for effective reward-based navigation. *eLife* 6:e27756, 2017 (18 pages). PMID: 28691903. DOI: 10.7554/eLife.27756.
158. Schultz W, Stauffer WR, Lak A. The phasic dopamine signal maturing: from reward via behavioural activation to formal economic utility. *Curr Op Neurobiol* 43: 139-148, 2017. PMID: 28390863. DOI: 10.1016/j.conb.2017.03.013.
157. Pastor-Bernier A, Plott CR, Schultz W. Monkeys choose as if maximizing utility compatible with basic principles of revealed preference theory. *Proc Natl Acad Sci (USA)* 114: E1766-E1775, 2017. PMID: 28202727. DOI: 10.1073/pnas.1612010114.
156. Diederer K MJ, Ziauddeen H, Vestergaard M, Spencer T, Schultz W, Fletcher P. Dopamine modulates adaptive prediction error coding in the human midbrain and striatum. *J Neurosci* 37: 1708-1720, 2017. PMID: 28202786.
155. Báez-Mendoza R, Schultz W. Performance error-related activity in monkey striatum during social interactions. *Sci Reports* 6: 37199, 2016 (8 pages). PMID: 27849004. DOI: 10.1038/srep37199.
154. Lak A, Stauffer WR, Schultz W. Dopamine neurons learn relative chosen value from probabilistic rewards. *eLife* 5: e18044, 2016 (19 pages). PMID: 27787196. DOI: 10.7554/eLife.18044.
153. Zangemeister* L, Grabenhorst* F, Schultz W. Neural basis for economic saving strategies in human amygdala-prefrontal reward circuits. *Curr Biol* 26: 3004-3013, 2016. PMID: 27773572. DOI: 10.1016/j.cub.2016.09.016.
152. Grabenhorst* F, Hernadi* I, Schultz W. Primate amygdala neurons evaluate the progress of self-defined economic choice sequences. *eLife* 5: e18731, 2016 (24 pages). PMID: 27731795. DOI: 10.7554/eLife.18731.
151. Burke C, Baddeley M, Tobler PN, Schultz W. Partial adaptation of obtained and observed value signals preserves information about gains and losses. *J Neurosci* 36: 10016-10025, 2016. PMID: 27683899.
150. Tsutsui* KI, Grabenhorst* F, Kobayashi S, Schultz W. A dynamic code for economic object valuation in prefrontal cortex neurons. *Nat Comm* 7: 12554, 2016 (14 pages). PMID: 27618960.
149. Stauffer WR, Lak A, Yang A, Borel M, Paulsen O, Boyden E, Schultz W. Dopamine neuron-specific optogenetic stimulation in Rhesus macaques. *Cell* 166: 1564-1571, 2016. PMID: 27610576. DOI: 10.1016/j.cell.2016.08.024.

148. Genest W, Stauffer WR, Schultz W. Utility functions predict variance and skewness risk preferences in monkeys. *Proc Natl Acad Sci (USA)* 113: 8402-8407, 2016. PMID: 27402743. DOI: 10.1073/pnas.1602217113.
147. Schultz W. Reward functions of the basal ganglia. *J Neur Transm* 123: 679-693, 2016. PMID: 26838982. DOI: 10.1007/s00702-016-1510-0.
146. Diederer K, Spencer T, Vestergaard MD, Fletcher P, Schultz W. Adaptive prediction error coding in the human midbrain and striatum facilitates behavioral adaptation and learning efficiency. *Neuron* 90: 1127-1138, 2016. PMID: 27181060.
145. Stauffer WR, Lak A, Kobayashi S, Schultz W. Components and characteristics of the dopamine reward utility signal. *J comp Neurol* 524: 1699-1711, 2016. PMID: 26272220. DOI: 10.1002/cne.23880.
144. Schultz W. Dopamine reward prediction error signalling: a two-component response. *Nat Rev Neurosci* 17: 183-195, 2016. PMID: 26865020. DOI: 10.1038/nrn.2015.26.
143. Báez-Mendoza R, van Coeverden C, Schultz W. A neuronal reward inequity signal in primate striatum. *J Neurophysiol* 115: 68-79, 2016. PMID: 26378202. DOI: 10.1152/jn.00321.2015.
142. Schultz W, Carelli RM, Wightman RM. Phasic dopamine signals: from subjective reward value to formal economic utility. *Curr Op Behav Sci* 5: 147-154, 2015. PMID: 26719853. DOI: 10.1016/j.cobeha.2015.09.006.
141. Brzosko Z, Schultz W, Paulsen O. Retroactive modulation of spike timing-dependent plasticity by dopamine. *eLife* 4: e09685, 2015 (13 pages). PMID: 26516682. DOI: 10.7554/eLife.09685.001.
140. Diederer K, Schultz W. Scaling prediction errors to reward variability benefits error-driven learning in humans. *J Neurophysiol* 114: 1628-1640, 2015. PMID: 26180123.
139. Vestergaard MD, Schultz W. Choice mechanisms for past, temporally extended outcomes. *Proc Roy Soc B* 282: 20141766, 1810 (10 pages), 2015. PMID: 26063841.
138. Schultz W. Neuronal reward and decision signals: from theories to data. *Physiol Rev* 95: 853-951, 2015. PMID: 26109341.
137. O'Neill, M, Schultz W. Economic risk coding by single neurons in the orbitofrontal cortex. *J Physiol (Paris)* 109: 70-77, 2015. PMID: 24954027.
136. Hernadi* I, Grabenhorst* F, Schultz W. Planning activity for internally generated reward goals in monkey amygdala neurons. *Nat Neurosci* 18: 461-469, 2015. PMID: 25622146.
135. Stauffer WR, Lak A, Bossaerts P, Schultz W. Economic choices reveal probability distortion in macaque monkeys. *J Neurosci* 35: 3146-3154, 2015. PMID: 25698750.
134. Medic N, Ziauddeen H, Vestergaard MD, Henning E, Schultz W, Farooqi IS, Fletcher PC. Dopamine modulates the neural representation of subjective value of food in hungry subjects. *J Neurosci* 34: 16877-16889, 2014. PMID: 25505337.
133. Stauffer WR, Lak A, Schultz W. Dopamine reward prediction error responses reflect marginal utility. *Curr Biol* 24: 2491-2500, 2014. PMID: 25283778.
132. Bermudez M, Schultz W. Timing in reward and decision processes. *Phil Trans Roy Soc B* 369: 20120468, 2014. PMID: 24446502.
131. Lak A, Stauffer WR, Schultz W. Dopamine prediction error responses integrate subjective value from different reward dimensions. *Proc Natl Acad Sci (USA)* 111: 2343-2348, 2014. PMID: 24453218.
130. Kobayashi S, Schultz W. Reward contexts extend dopamine signals to unrewarded stimuli. *Curr Biol* 24: 56-62, 2014. PMID: 24332545.
129. Báez-Mendoza R, Harris C, Schultz W. The role of the striatum in social behavior. *Front Neurosci* 7: 233, 1-14, 2013. PMID: 24339801.
128. Báez-Mendoza R, Harris C, Schultz W. Activity of striatal neurons reflects social action and own reward. *Proc Natl Acad Sci (USA)* 110: 16634-16639, 2013. PMID: 24062436.
127. O'Neill, M, Schultz W. Risk prediction error coding in orbitofrontal neurons. *J Neurosci* 33: 15810-15814, 2013.

126. d'Acremont M, Schultz W, Bossaerts P. The human brain encodes event frequencies while forming subjective beliefs. *J Neurosci* 33: 10887-10897, 2013.
125. Schultz W. Updating dopamine reward signals. *Curr Op Neurobiol* 23: 229-238, 2013.
124. Prescott, MJ, Brown VJ, Flecknell PA, Garrod K, Lemon RN, Parker AJ, Ryder K, Schultz W, Scott L, Watson J, Whitfield L. Response to Westlund's commentary: 'Can conditioned reinforcers and variable-Ratio Schedules make food- and fluid control redundant?' *J Neurosci Meth* 204: 206– 209, 2012.
123. Grabenhorst* F, Hernadi* I, Schultz W. Prediction of economic choice by primate amygdala neurons. *Proc Natl Acad Sci (USA)* 109: 18950-18955, 2012.
122. Bermudez MA, Göbel C, Schultz W. Sensitivity to temporal reward structure in amygdala neurons. *Curr Biol* 22: 1839-1844, 2012. PMID: 22959346.
121. Ariansen JL, Heien MLAV, Hermans A, Phillips PEM, Hernadi I, Bermudez MA, Schultz W, Wightman RM. Monitoring extracellular pH, oxygen, and dopamine during reward delivery in the striatum of primates. *Front Behav Neurosci* 6: 36, 1-10, 2012. PMID: 22783176.
120. Schultz W, O'Neill M, Tobler PN, Kobayashi S. Neuronal signals for reward risk in frontal cortex. *NY Acad Sci* 1239: 109-117, 2011. PMID: 22145880.
119. Hare TA, Schultz W, Camerer CF, O'Doherty JP, Rangel A. Transformation of stimulus value signals into motor commands during simple choice. *Proc Natl Acad Sci (USA)* 108: 18120-18125, 2011.
118. Miyapuram KP, Tobler PN, Gregorios-Pippas, L, Schultz W. BOLD responses in reward regions to hypothetical and imaginary monetary rewards. *NeuroImage* 59: 1692-1699, 2011.
117. Schultz W. Potential vulnerabilities of neuronal reward, risk, and decision mechanisms to addictive drugs. *Neuron* 69: 603-617, 2011. (highlighted in Featured Topic on Decision Making in Neuron, September 2011)
116. Prescott MJ, Brown VJ, Flecknell PA, Gaffan D, Garrod K, Lemon RN, Parker AJ, Ryder K, Schultz W, Scott L, Watson J, Whitfield L. Refinement of the use of food and fluid control as motivational tools for macaques used in behavioural neuroscience research: Report of a Working Group of the NC3Rs. *J Neurosci Methods* 193: 167-188, 2010.
115. O'Neill M, Schultz W. Coding of reward risk by orbitofrontal neurons is mostly distinct from coding of reward value. *Neuron* 68: 789-800, 2010. PMID: 21092866.
114. Bermudez MA, Schultz W. Reward magnitude coding in primate amygdala neurons. *J Neurophysiol* 104: 3424-3432, 2010. PMID: 20861431.
113. Nomoto K, Schultz W, Watanabe T, Sakagami M. Temporally extended dopamine response to perceptually demanding reward-predictive stimuli. *J Neurosci* 30: 10692-10702, 2010.
112. Burke CJ, Tobler PN, Baddeley M, Schultz W. Neuronal mechanisms of observational learning. *Proc Natl Acad Sci (USA)* 107, 14431-14436, 2010. PMID: 20660717.
111. Schultz W. Subjective neuronal coding of reward: temporal value discounting and risk. *Eur J Neurosci* 31: 2124–2135, 2010.
110. Burke CJ, Tobler PN, Schultz W, Baddeley M. Striatal BOLD response reflects the impact of herd information on financial decisions. *Front Hum Neurosci* 4: 48, 1-11, 2010. PMID: 20589242.
109. Schultz W. Dopamine signals for reward value and risk: basic and recent data. *Behav Brain Funct* 2010, 6:24, 2010. (<http://www.behavioralandbrainfunctions.com/content/6/1/24>)
108. Kobayashi S, Schultz W, Sakagami M. Operant conditioning of primate prefrontal neurons. *J Neurophysiol* 103: 1843-1855, 2010. PMID: 20107129.
107. Bermudez MA, Schultz W. Responses of amygdala neurons to positive reward predicting stimuli depend on background reward (contingency) rather than stimulus-reward pairing (contiguity). *J Neurophysiol* 103: 1158-1170, 2010. PMID: 20032233.
106. Kobayashi S, Pinto de Carvalho O, Schultz W. Adaptation of reward sensitivity in orbitofrontal neurons. *J Neurosci* 30: 534-544, 2010. PMID: 20071516.

105. Christopoulos GI, Tobler PN, Bossaerts P, Dolan RJ, Schultz W. Neural correlates of value, risk, and risk aversion contributing to decision making under risk. *J Neurosci.* 29: 12574-12583, 2009. PMID: 19812332.
104. Tobler PN, Christopoulos GI, O'Doherty JP, Dolan RJ, Schultz W. Risk-dependent reward value signal in human prefrontal cortex. *Proc Natl Acad Sci (USA)* 106: 7185-7190, 2009. PMID: 19369207.
103. Gregorios-Pippas L, Tobler PN, Schultz W. Short term temporal discounting of reward value in human ventral striatum. *J Neurophysiol* 101: 1507-1523, 2009. PMID: 19164109.
102. Tobler PN, Christopoulos GI, O'Doherty JO, Dolan RJ, Schultz W. Neuronal distortions of reward probability without choice. *J Neurosci* 28: 11703-11711, 2008. PMID: 18987206.
101. Schultz W, Preuschoff K, Camerer C, Hsu M, Fiorillo CD, Tobler PN, Bossaerts P. Explicit neural signals reflecting reward uncertainty. *Phil Trans RoySoc B* 363: 3801-3811, 2008. PMID: 18829433.
100. Fiorillo CD, Newsome WT, Schultz W. The temporal precision of reward prediction in dopamine neurons. *Nat Neurosci* 11: 966-973, 2008. PMID: 18660807.
99. Kobayashi S, Schultz W. Influence of reward delays on responses of dopamine neurons. *J Neurosci* 28: 7837-7846, 2008. PMID: 18667616.
98. Hare TA, O'Doherty J, Camerer CF, Schultz W, Rangel A. Dissociating the role of the orbitofrontal cortex and the striatum in the computation of goal values and prediction errors. *J Neurosci* 28: 5623-5630, 2008.
97. Schultz W. Multiple dopamine functions at different time courses. *Ann Rev Neurosci* 30: 259-288, 2007.
96. Schultz W. Behavioral dopamine signals. *Trends Neurosci* 30: 203-210, 2007
95. Tobler PN, Fletcher PC, Bullmore ET, Schultz W. Learning-related human brain activations reflecting individual finances. *Neuron* 54: 167-175, 2007.
94. Tobler PN, O'Doherty JP, Dolan R, Schultz W. Reward value coding distinct from risk attitude-related uncertainty coding in human reward systems. *J Neurophysiol* 97: 1621-1632, 2007. PMID: 17122317.
93. Kobayashi S, Nomoto K, Watanabe M, Hikosaka O, Schultz W, Sakagami M. Influences of rewarding and aversive outcomes on activity in macaque lateral prefrontal cortex. *Neuron* 51: 861-870, 2006. PMID: 16982429.
92. Tobler PN, O'Doherty JP, Dolan, R, Schultz W. Human neural learning depends on reward prediction errors in the blocking paradigm. *J Neurophysiol* 95: 301-310, 2006. PMID: 16192329.
91. Schultz W. Behavioral theories and the neurophysiology of reward. *Ann Rev Psychol* 57: 87-115, 2006. (Identified as New Hot Paper by Essential Science Indicators of Thomson Scientific for May 2007 at <http://esi-topics.com>; <http://esi-topics.com/nhp/2007/may-07-WolframSchultz.html>. Podcast at <http://www.in-cites.com/media/index.html>).
90. Blatter K, Schultz W. Rewarding properties of visual stimuli. *Exp Brain Res* 168: 541-546, 2006.
89. Fiorillo CD, Tobler PN, Schultz W. Evidence that the delay-period activity of dopamine neurons corresponds to reward uncertainty rather than backpropagating TD errors. *Behav Brain Funct* 1: 7, 2005. PMID: 15958162.
88. Cromwell HC, Hassani OK, Schultz W. Relative reward processing in primate striatum. *Exp Brain Res* 162: 520-525, 2005.
87. Tobler PN, Fiorillo CD, Schultz W. Adaptive coding of reward value by dopamine neurons. *Science* 307: 1642-1645, 2005. PMID: 15761155.
86. Schultz W. Neural coding of basic reward terms of animal learning theory, microeconomics and behavioural ecology. *Curr Op Neurobiol* 14: 139-147, 2004.
85. Tobler PN, Dickinson A, Schultz W. Coding of predicted reward omission by dopamine neurons in a conditioned inhibition paradigm. *J Neurosci* 23: 10402-10410, 2003.

84. Martin-Soelch C, Missimer J, Leenders KL, Schultz W. Neural activity related to the processing of increasing monetary reward in smokers and nonsmokers. *Eur J Neurosci* 18: 680-688, 2003.
83. Schultz W, Tremblay L, Hollerman JR. Changes in behavior-related neuronal activity in the striatum during learning. *Trends Neurosci* 26: 321-328, 2003. PMID: 12798602.
82. Cromwell HC, Schultz W. Effects of expectations for different reward magnitudes on neuronal activity in primate striatum. *J. Neurophysiol.* 89: 2823-2838, 2003. PMID: 12611937.
81. Fiorillo CD, Tobler PN, Schultz W. Discrete coding of reward probability and uncertainty by dopamine neurons. *Science* 299: 1898-1902, 2003. PMID: 12649484. (Perspectives: Gambling on Dopamine, by Peter Shizgal & Andreas Arvanitogiannis *Science* 299: 1856-1858) (Gambling on dopamine, by Rachel Jones *Nature Rev Neurosci* 4: 332, 2003) (selected as 'exceptional' factor 9.7 in Faculty of 1000 June 2, 2003)
80. Schultz W. Getting formal with dopamine and reward. *Neuron* 36: 241-263, 2002.
79. Martin-Soelch C, Leenders KL, Chevalley AF, Missimer J, Kunig G, Magyar S, Mino A, Schultz W. Reward mechanisms in the brain and their role in dependence: evidence from neurophysiological and neuroimaging studies. *Brain Res Rev* 36: 139-149, 2001.
78. Martin-Soelch C, Chevalley A-F, Künig G, Missimer J, Magyar S, Mino A, Schultz W, Leenders KL. Changes in reward-induced brain activation in opiate addicts. *Eur J Neurosci* 14: 1360-1368, 2001.
77. Watanabe M, Cromwell HC, Tremblay L, Hollerman, JR, Hikosaka K, Schultz W. Behavioral reactions reflecting differential reward expectations in monkeys. *Exp Brain Res* 140: 511-518, 2001. PMID: 11685405.
76. Martin-Soelch C, Magyar S, Künig GC, Missimer J, Schultz W, Leenders KL. Changes in brain activation associated with reward processing in smokers and nonsmokers. A positron emission tomography study. *Exp Brain Res* 139: 278-286, 2001.
75. Schultz W. Reward signaling by dopamine neurons. *The Neuroscientist* 7: 293-302, 2001.
74. Waelti P, Dickinson A, Schultz, W. Dopamine responses comply with basic assumptions of formal learning theory. *Nature* 412: 43-48, 2001. PMID: 11452299. (selected top ten in Faculty of 1000 Jan 10, 2002)
73. Hassani OK, Cromwell HC, Schultz W. Influence of expectation of different rewards on behavior-related neuronal activity in the striatum. *J Neurophysiol* 85: 2477-2489, 2001. PMID: 11387394.
72. Suri R, Schultz, W. Temporal difference model reproduces anticipatory neural activity. *Neur Comput* 13: 841-862, 2001.
71. Hollerman JR, Tremblay L, Schultz W. Involvement of basal ganglia and orbitofrontal cortex in goal-directed behavior. *Prog Brain Res* 126: 193-215, 2000. PMID: 11105648.
70. Künig G, Leenders KL, Martin-Sölch C, Missimer J, Magyar S, Schultz W. Reduced reward processing in the brains of Parkinsonian patients. *Neuroreport* 11: 3681-3687, 2000.
69. Schultz W. Multiple reward systems in the brain. *Nat Rev Neurosci* 1: 199-207, 2000. PMID: 11257908
68. Tremblay L, Schultz W. Modifications of reward expectation-related neuronal activity during learning in primate orbitofrontal cortex. *J Neurophysiol* 83: 1877-1885, 2000. PMID: 10758099. (7th most read paper *J Neurophysiol* Feb 22, 2009)
67. Tremblay L, Schultz W. Reward-related neuronal activity during go-nogo task performance in primate orbitofrontal cortex. *J Neurophysiol* 83: 1864-1876, 2000. PMID: 10758098.
66. Schultz W, Dickinson A. Neuronal coding of prediction errors. *Ann Rev Neurosci* 23: 473-500, 2000.
65. Schultz W, Tremblay L, Hollerman JR. Reward processing in primate orbitofrontal cortex and basal ganglia. *Cereb Cortex* 10: 272-283, 2000. PMID: 10731222.

64. Schultz W. The reward signal of midbrain dopamine neurons. *News Physiol. Sci.* 14: 249-255, 1999.
63. Schultz W. The primate basal ganglia and the voluntary control of behaviour. *J Consciousness Studies* 6-8: 31-45, 1999. (also in: *The Volitional Brain* (Eds. B. Libet, A. Freeman and K. Sutherland) Imprint Academic, Thorverton, UK pp 31-45, 1999)
62. Contreras-Vidal JL, Schultz W. A predictive reinforcement model of dopamine neurons for learning approach behavior. *J Comput Neurosci* 6: 191-214, 1999.
61. Suri R, Schultz W. A neural network with dopamine-like reinforcement signal that learns a spatial delayed response task. *Neuroscience* 91: 871-890, 1999.
60. Tremblay L, Schultz W. Relative reward preference in primate orbitofrontal cortex. *Nature* 398: 704-708, 1999. PMID: 10227292. (News & Views by Masataka Watanabe pp 661-663)
59. Suri RE, Schultz W. Learning of sequential movements by neural network model with dopamine-like reinforcement signal. *Exp Brain Res* 121: 350-354, 1998.
58. Tremblay L, Hollerman JR, Schultz W. Modifications of reward expectation-related neuronal activity during learning in primate striatum. *J Neurophysiol* 80: 964-977, 1998. PMID: 9705482.
57. Hollerman JR, Tremblay L, Schultz W. Influence of reward expectation on behavior-related neuronal activity in primate striatum. *J Neurophysiol* 80: 947-963, 1998.
56. Hollerman JR, Schultz W. Dopamine neurons report an error in the temporal prediction of reward during learning. *Nat Neurosci* 1: 304-309, 1998. PMID: 9705481. (News & Views by Kalyani Narasimhan p 265)
55. Schultz W. Predictive reward signal of dopamine neurons. *J Neurophysiol* 80: 1-27, 1998. PMID: 9658025. (2nd most cited and 14th most read paper in *J Neurophysiol* Feb 22, 2009)
54. Schultz W, Tremblay L, Hollerman JL. Reward prediction in primate basal ganglia and frontal cortex. *Neuropharmacology* 37: 421-429, 1998. PMID: 9704983.
53. Thut G, Schultz W, Roelcke U, Nienhusmeier M, Missimer J, Maguire RP, Leenders KL. Monetary reward activates human prefrontal cortex. *Neuroreport* 8: 1225-1228, 1997.
52. Schultz W. Dopamine neurons and their role in reward mechanisms. *Curr Op Neurobiol* 7: 191-197, 1997.
51. Schultz W, Dayan P, Montague RR. A neural substrate of prediction and reward. *Science* 275: 1593-1599, 1997. PMID: 9054347.
50. Mirenowicz J, Schultz W. Preferential activation of midbrain dopamine neurons by appetitive rather than aversive stimuli. *Nature* 379: 449-451, 1996.
49. Guigon E, Dorizzi B, Burnod, Y, Schultz W. Neural correlates of learning in the prefrontal cortex of monkeys: a predictive model. *Cereb Cortex* 5: 135-147, 1995.
48. Mirenowicz J, Schultz W. Importance of unpredictability for reward responses in primate dopamine neurons. *J Neurophysiol* 72: 1024-1027, 1994. PMID: 7983508.
47. Schultz W, Apicella P, Ljungberg T, Romo R, Scarnati E. Reward-related activity in monkey striatum and substantia nigra. *Progr Brain Res* 99: 227-235, 1993. PMID: 8108550.
46. Galbraith GC, Schultz W. Perceptual adaptation in the vestibulo-ocular system: EEG correlates of spatial and temporal rearrangement. *Percept Mot Skills* 77: 595-608, 1993.
45. Schultz W, Apicella P, Ljungberg T. Responses of monkey dopamine neurons to reward and conditioned stimuli during successive steps of learning a delayed response task. *J Neurosci* 13: 900-913, 1993.
44. Schultz W. Activity of dopamine neurons in the behaving primate. *Seminars Neurosci.* 4: 129-138, 1992.
43. Schultz W, Apicella P, Scarnati E, Ljungberg T. Neuronal activity in monkey ventral striatum related to the expectation of reward. *J Neurosci* 12: 4595-4610, 1992.
42. Romo R, Schultz W. Role of primate basal ganglia and frontal cortex in the internal generation of movements: III. Neuronal activity in the supplementary motor area. *Exp Brain Res* 91: 396-407, 1992. PMID: 1483514.

41. Romo R, Scarnati E, Schultz W. Role of primate basal ganglia and frontal cortex in the internal generation of movements: II. Movement-related activity in the anterior striatum. *Exp Brain Res* 91: 385-395, 1992. PMID: 1483513.
40. Schultz W, Romo R. Role of primate basal ganglia and frontal cortex in the internal generation of movements: I. Preparatory activity in the anterior striatum. *Exp Brain Res* 91: 363-384, 1992. PMID: 1483512.
39. Apicella P, Scarnati E, Ljungberg T, Schultz W. Neuronal activity in monkey striatum related to the expectation of predictable environmental events. *J Neurophysiol* 68: 945-960, 1992. PMID: 1432059.
38. Ljungberg T, Apicella P, Schultz W. Responses of monkey dopamine neurons during learning of behavioral reactions. *J Neurophysiol* 67: 145-163, 1992. PMID: 1552316.
37. Ljungberg T, Apicella P, Schultz W. Responses of monkey dopamine neurons during delayed alternation performance. *Brain Res* 567: 337-341, 1991.
36. Apicella P, Ljungberg T, Scarnati E, Schultz W. Responses to reward in monkey dorsal and ventral striatum. *Exp Brain Res* 85: 491-500, 1991.
35. Apicella P, Scarnati E, Schultz W. Tonicly discharging neurons of monkey striatum respond to preparatory and rewarding stimuli. *Exp Brain Res* 84: 672-675, 1991.
34. Schultz W, Romo R. Dopamine neurons of the monkey midbrain: Contingencies of responses to stimuli eliciting immediate behavioral reactions. *J Neurophysiol* 63: 607-624, 1990. PMID: 2329364.
33. Romo R, Schultz W. Dopamine neurons of the monkey midbrain: Contingencies of responses to active touch during self-initiated arm movements. *J Neurophysiol* 63: 592-606, 1990. PMID: 2329363.
32. Romo R, Schultz W. Somatosensory input to dopamine neurons of the monkey midbrain: responses to pain pinch under anesthesia and to active touch in behavioral context. *Progr Brain Res* 80: 473-478, 1989. PMID: 2634283.
31. Schultz W, Romo R, Scarnati E, Sundström E, Jonsson G, Studer A. Saccadic reaction times, eye-arm coordination and spontaneous eye movements in normal and MPTP-treated monkeys. *Exp Brain Res* 78: 253-267, 1989. PMID: 2599036.
30. Schultz W, Scarnati E, Sundström E, Romo R. Protection against MPTP-induced Parkinsonism by the catecholamine uptake inhibitor nomifensine: Behavioral analysis in monkeys with partial striatal dopamine depletion. *Neuroscience* 31: 219-230, 1989.
29. Schultz W, Studer A, Romo R, Sundström E, Jonsson G, Scarnati E. Deficits in reaction times and movement times as correlates of hypokinesia in monkeys with MPTP-induced striatal dopamine depletion. *J Neurophysiol* 61: 651-668, 1989. PMID: 2785168.
28. Studer A, Sundström E, Jonsson G, Schultz W. Acute electrophysiological and neurochemical effects of administration of MPTP in mice. *Neuropharmacology* 27: 923-931, 1988.
27. Schultz W, Romo R. Neuronal activity in the monkey striatum during the initiation of movements. *Exp Brain Res* 71: 431-436, 1988. PMID: 3169174.
26. Schultz W. MPTP-induced parkinsonism in monkeys: Mechanism of action, selectivity and pathophysiology. *Gen Pharmacol* 19: 153-161, 1988.
25. Studer A, Schultz W. The catecholamine uptake inhibitor nomifensine depresses impulse activity of dopamine neurons in mouse substantia nigra. *Neurosci Lett* 80: 207-212, 1987.
24. Romo R, Schultz W. Neuronal activity preceding self-initiated or externally timed arm movements in area 6 of monkey cortex. *Exp Brain Res* 67: 656-662, 1987. PMID: 3653323.
23. Schultz W, Romo R. Responses of nigrostriatal dopamine neurons to high intensity somatosensory stimulation in the anesthetized monkey. *J Neurophysiol* 57: 201-217, 1987. PMID: 3559672.
22. Schultz W. Responses of midbrain dopamine neurons to behavioral trigger stimuli in the monkey. *J Neurophysiol* 56: 1439-1462, 1986. PMID: 3794777.

21. Schultz W, Scarnati E, Sundström E, Tsutsumi T, Jonsson G. The catecholamine uptake blocker nomifensine protects against MPTP-induced parkinsonism in monkeys. *Exp Brain Res* 63: 216-220, 1986.
20. Schultz W. Activity of pars reticulata neurons of monkey substantia nigra in relation to motor, sensory and complex events. *J Neurophysiol* 55: 660-677, 1986. PMID: 3701399.
19. Romo R, Schultz W. Prolonged changes in dopaminergic terminal excitability and short changes in dopaminergic discharge rate after short peripheral stimulation in monkey. *Neurosci Lett* 62: 335-340, 1985.
18. Schultz W, Studer A, Jonsson G, Sundström E, Mefford I. Deficits in behavioral initiation and execution processes in monkeys with 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine-induced parkinsonism. *Neurosci Lett* 59: 225-232, 1985.
17. Toan DL, Schultz W. Responses of rat pallidum cells to cortex stimulation and effects of altered dopaminergic activity. *Neuroscience* 15: 683-694, 1985.
16. Aebischer P, Schultz W. The activity of pars compacta neurons of the monkey substantia nigra is depressed by apomorphine. *Neurosci Lett* 50: 25-29, 1984.
15. Schultz W. Minireview: Recent physiological and pathophysiological aspects of Parkinsonian movement disorders. *Life Sci* 34: 2213-2223, 1984.
14. Schultz W, Ruffieux A, Aebischer P. The activity of pars compacta neurons of the monkey substantia nigra in relation to motor activation. *Exp Brain Res* 51: 377-387, 1983.
13. Schultz W. Depletion of dopamine in the striatum as experimental model of parkinsonism: Direct effects and adaptive mechanisms. *Prog Neurobiol* 18: 121-166, 1982.
12. Schultz W, Wiesendanger R, Hess B, Ruffieux A, Wiesendanger M. The somatotopy of the gracile nucleus in cats with agenesis of a hindfoot. *Exp Brain Res* 43: 413-418, 1981.
11. Ruffieux A, Schultz W. Influence de la dopamine sur les neurones de la pars reticulata de la substance noire. *J Physiol (Paris)* 77: 63-69, 1981.
10. Ruffieux A, Schultz W. Dopaminergic activation of reticulata neurones in the substantia nigra. *Nature* 285: 240-241, 1980.
9. Schultz W, Montgomery EG, Marini R. Proximal limb movements in response to microstimulation of primate dentate and interpositus nuclei mediated by brainstem structures. *Brain* 102: 127-146, 1979.
8. Schultz W, Ungerstedt U. Short-term increase and long-term reversion of striatal cell activity after degeneration of the nigrostriatal dopamine system. *Exp Brain Res* 33: 159-171, 1978.
7. Zangger P, Schultz W. The activity of cells of nucleus reticularis tegmenti pontis during spontaneous locomotion in decorticate cats. *Neurosci Lett* 7: 95-99, 1978.
6. Schultz W, Ungerstedt U. Striatal cell supersensitivity to apomorphine in dopamine lesioned rats correlated to behaviour. *Neuropharmacology* 17: 349-353, 1978.
5. Schultz W, Ungerstedt U. A method to detect and record from striatal cells of low spontaneous activity by stimulating the corticostriatal pathway. *Brain Res* 142: 357-362, 1978.
4. Allen GI, Gilbert PFC, Marini R, Schultz W, Yin TCT. Integration of cerebral and peripheral inputs by interpositus neurons in monkey. *Exp Brain Res* 27: 81-99, 1977.
3. Hellweg FC, Schultz W, Creutzfeldt OD. Extracellular and intracellular recordings from cat's cortical whisker projection area: Thalamocortical response transformation. *J Neurophysiol* 40: 463-479, 1977. PMID: 874525.
2. Schultz W, Montgomery EB, Marini R. Stereotyped flexion of forelimb and hindlimb to microstimulation of dentate nucleus in cebus monkeys. *Brain Res* 107: 151-155, 1976.
1. Schultz W, Galbraith GC, Gottschaldt KM, Creutzfeldt OD. A comparison of primary afferent and cortical neurone activity coding sinus hair movements in the cat. *Exp Brain Res* 24: 365-381, 1976.