



A neuroeconomic theory of rational addiction and nonlinear time-perception

Taiki Takahashi

(Submitted on 2 Jul 2011)

Neuroeconomic conditions for "rational addiction" (Becker and Murphy, 1988) have been unknown. This paper derived the conditions for "rational addiction" by utilizing a nonlinear time-perception theory of "hyperbolic" discounting, which is mathematically equivalent to the q -exponential intertemporal choice model based on Tsallis' statistics. It is shown that (i) Arrow-Pratt measure for temporal cognition corresponds to the degree of irrationality (i.e., Prelec's "decreasing impatience" parameter of temporal discounting) and (ii) rationality in addicts is controlled by a nondimensionalization parameter of the logarithmic time-perception function. Furthermore, the present theory illustrates the possibility that addictive drugs increase impulsivity via dopaminergic neuroadaptation without increasing irrationality. Future directions in the application of the model to studies in neuroeconomics are discussed.

Comments: 13 pages

Subjects: **Biological Physics (physics.bio-ph)**

Journal reference: Neuro Endocrinol Lett. 2011;32(3):221-225

Cite as: [arXiv:1107.0362](#) [physics.bio-ph]
(or [arXiv:1107.0362v1](#) [physics.bio-ph] for this version)

Submission history

From: Taiki Takahashi [[view email](#)]

[v1] Sat, 2 Jul 2011 05:28:58 GMT (106kb)

[Which authors of this paper are endorsers?](#)

Link back to: [arXiv](#), [form interface](#), [contact](#).

Download:

- [PDF only](#)

Current browse context:

physics.bio-ph

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

Change to browse by:

[physics](#)

References & Citations

- [NASA ADS](#)

Bookmark ([what is this?](#))

