Midbrain Mutiny: The Picoeconomics and Neuroeconomics of Disordered Gambling

Economic Theory and Cognitive Science

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Note to Readers about *Economic Theory and Cognitive Science*

This book is a case study application of a highly abstract thesis about the relationship between microeconomic theory and related cognitive and behavioral sciences defended in a 2005 book, *Economic Theory and Cognitive Science: Microexplanation*, by one of the present authors, Don Ross.

Despite this relationship between the present book and Ross's earlier one, we don't intend this volume to be merely, or even mainly, read for the sake of illustrating by example a philosophical view on economics and neighboring sciences. This is a book about disordered (problem and pathological) gambling, and about the significance of this subject to our general scientific understanding of phenomena thought of as "addictions." We intend it to be of interest not only to theoretical psychologists and other behavioral scientists with mainly research interests, but also to clinicians and policy makers concerned with gambling and addiction problems. We don't want to address these readers in a way that first *requires* them to master the conceptual foundations of microeconomics (though we *encourage* everyone to do that).

On the other hand, Ross's perspective on the relationships among behavioral sciences is, in its 2005 presentation, crucially incomplete in the absence of an extended application. The present book is thus meant to flesh out the account of microexplanation, in advance of the continuation of Ross's project extending it to explanation of social-behavioral phenomena by macroeconomics and neighboring social sciences. So we also intend that some readers of the 2005 book whose main interest is in the foundations of economic theory, rather than in gambling or addiction per se, will be motivated to read this one.

Is it not eccentric of us to have written two books, with two orthogonal purposes, in one? Perhaps. Let us then add just a bit more here

by way of explanation. Two of us (Ross and Spurrett) were trained (though not exclusively) as philosophers of science. We hold the metaphilosophical opinion, defended at length elsewhere (Ladyman and Ross 2007), that there is no such thing as a justifiable *purely* philosophical conclusion about any empirical phenomenon (and there are no such things as "non-empirical phenomena"). Therefore, anyone who wants to defend a philosophical thesis had better be prepared to defend it as, in large part, a scientific proposition based on scientific evidence. Once one gets to that point, though, surely one should try to make the science in question independently interesting *as* science, even (indeed, especially) to people whose tastes don't run to philosophy. Ross 2005 is mainly a project in applied philosophy of science. Thus, by our intellectual rules just described, it must underwrite some science that a person needn't be a philosopher, or be particularly interested in philosophy, to appreciate. Both sets of readers for whom this book is intended will, in their different ways, be the judges of whether this test is passed here.

We conclude this note with a bare summary of the main conclusions defended in *Economic Theory and Cognitive Science: Microexplanation*.

(1) There is a thesis commonly taken to be central to mainstream (neoclassical) economics that is in no way part of or implied by the mathematics of that framework. This is that the paradigmatic model of an economic agent is an individual human being. In fact, the *empirical* paradigm cases of economic agency are simple, consistent pursuers of low-dimensional goals; insects and neurons are examples. Whole human beings *approximate* economic agency, usefully enough for many practical modeling purposes, in the same way that countries and corporations do.

(2) The way in which whole humans, countries, and corporations approximate economic agency is made theoretically precise by *picoeconomics*, a branch of behavioral economics. A country's approximate economic agency is a consequence of strategic interactions among its citizens, who are compelled by exogenous pressures and their own aims to try to coordinate their behavior (up to a point). A country's approximate economic agency, to whatever extent it holds in a given case at a given time, is thus a dynamic equilibrium in a dynamic *n*-person game among its citizens. Similarly, a person's economic agency, to whatever extent it holds in a given case at a given time, is a dynamic equilibrium in a dynamic game among *n subpersonal interests.*

(3) The subpersonal interests above are *virtual* objects—that is, they are theoretically inferred from the economic model of personal behavior. They describe what psychologists call *molar-scale* patterns in behavior, not anatomical or functional *parts* of people's brains.

(4) At the same time, the view of *neuroeconomists* that neurons and groups of neurons fit the model of economic agency is true. These agents influence a person's behavior on what psychologists call the *molecular* scale. (This does not refer to literal chemical molecules; it merely means "small *and* isolable from context.") Molar-scale descriptions don't reduce to and aren't entailed by molecular-scale ones, because molar-scale accounts index behavioral patterns to environmental contexts and molecular-scale accounts don't.

(5) Therefore, there are *two* non-identical kinds of subpersonal economic agents: picoeconomic interests and neurons. An account of a given person's two subpersonal economies at a given time must be *compatible* (in the sense of non-contradictory), and should ideally be *complementary* (in the sense of informing one another), but molecular-scale accounts don't generally render the molar-scale accounts redundant (except in cases of occasional "local reductions" that are empirical discoveries and can't be predicted by philosophical speculation).

(6) All of the varieties of models described above are built using the resources of standard postwar neoclassical microeconomic theory. These models can be used to explain and predict the many ways in which individual human behavior systematically differs from the behavior of true economic agents. Therefore, claims by behavioral economists that observed systematic "irrationality" in human behavior "refutes" standard neoclassical theory should be rejected. (Claims that "predictions of game theory" are refuted by observations of human behavior should be dismissed out of hand. Game theory is a body of mathematics; it thus makes no empirical predictions, and so cannot be "refuted" by observation of anything.)

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