A Model of Spontaneous Remission From Addiction

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ABSTRACT

This article develops a formal model of spontaneous recovery from pathological addiction. It regards addiction as a progressive susceptibility to stochastic environmental cues and introduce a cognitive appraisal process in individual decision making depending on past addiction experiences and on their future expected consequences. This process affects consumption choices in two ways. The reward from use decreases with age. At the same time, cognitive incentives emerge that reduce the probability of making mistakes. In addition to modeling the role of cue-triggered mistakes in individual decision making, the analysis highlights the role of other factors such as subjective self-evaluation and cognitive control. The implications for social policy and for the treatment of drug and alcohol dependence are discussed.

KEYWORDS

Addiction, Cognitive Policy, Individual Decision Making, Natural Recovery

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1. INTRODUCTION

Addiction is defined as the consequence of repeated use of psychoactive drugs. It is characterized by a loss of control over drug seeking with harmful effects on the individual and a high probability of relapse even months or years after cessation of drug taking (Volkow & Fowler 2000; Fertig et al. 2004; Koob et al. 2004). The main problem is to understand how the individual, substance and environment-related factors involved can trigger the start, sustain recurrence or generate relapse.

Economists have developed theories to model addiction, their interest stemming from the social costs and externalities generated by the consumption of addictive substances. These theories can be loosely classified as generalizations of the rational addiction model (Becker & Murphy 1988). Generalizations allow for the presence of random cues that increase the marginal utility of consumption (Laibson 2001); “projection bias” (Loewenstein et al 2003); present-biased preferences and sophisticated or naive expectations (Gruber and Koszegi 2001); “temptation” (Gul & Pesendorfer 2001) where preferences are defined both over chosen actions and over actions not chosen. Bernheim and Rangel (2004) in an attempt to harmonize economic theory with evidence from psychology, the neuroscience and clinical practice, regard addiction as a progressive susceptibility to stochastic environmental cues that can trigger mistaken usage¹, thus explaining the relationship between behavior and the characteristics of the user, of the substance and of the environment. Neuroscience and clinical practice have shown that addictive substances systematically interfere with the proper operation of a process used by the brain to forecast near term hedonic rewards and lead to strong impulses to consume that may interfere with higher cognitive control. Therefore consumption choices are sometimes driven by a rational decision making process, sometimes by strong impulses leading to mistakes, i.e. divergences between preferences and choices.

These theories explain several patterns of addictive behavior, but one aspect left unexplained is spontaneous remission also known as natural recovery. Although addiction is defined as a chronic and persistent disease by the scientific community (see e.g. the American Psychological Association’s Diagnostic and Statistical Manual of Mental Disorders, known as the DSM-V), recent studies have called into question whether this is an accurate representation (Slutzke 2006; Breidenbach & Tse 2016). Clinical practice shows that natural recovery characterizes a substantial fraction of individuals with a history of pathological addiction and that this is not an infrequent pattern of behavior in long term addicts. However the reasons for it are still to be understood.

This paper offers two contributions. First, it tries to solve the interesting puzzle of natural recovery by identifying some of its determinants and its dynamics. Second, it highlights the role of cognitive processes to explain natural recovery even in individuals with an important addiction history.

Building on the work of Mocenni et al. (2011), we extend Bernheim and Rangel (2004) addiction theory by introducing a “cognitive appraisal” function depending on
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