

Economics in relation to brain science, addiction and drugs

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Definition The fundamental economics perspective contribution to the understanding of addiction is based on *choice*: opportunities, motivations and consequences. The implications can usefully be organised in terms of individuals vs. groups/organisations and demand and supply.

Developments Perhaps the most basic results concern individual rational drug consumption choices - so-called 'economics of addiction.' Drugs and other addictive choices challenge the notion of rational choice (picking the best affordable option) because consumption (or even choice) changes individual preferences. The microeconomics literature offers at least four general responses. 'Rational addicts'ⁱ foresee and take account of induced changes in preference. Game theoretic modelsⁱⁱ see drug use as a strategic game between the user/addict, other people and – critically - their future selves. 'Limited rationality'ⁱⁱⁱ subjects individual choice to constraints on memory, foresight, or complexity. 'Learning models'^{iv} deal with the effects of learning on both individuals and groups. There are also modifications to the standard approach reflecting specific aspects of drug impact. In time inconsistency and risky behaviour models, specifics of how drugs act on the choosing mind are reflected. Ultimately, such theoretical and empirical approaches indicate how individuals evaluate and respond to prices and policies and thus to evaluate a range of policies.

A second line of relevant economics concerns behaviour under risk (health, legal, violence, mental, etc.) The standard approach (using objective utilities, quantifiable uncertainty and separable evaluations of risk and consequence) sheds light on how individuals 'rationally' process information and even how experimentation can lead to polydrug abuse. This has been extended by the joint work of game theorists and mathematical psychologists to encompass subjective rescaling of risks (especially near-impossibilities or near-certainties), 'reference position' effects (how risk-taking is affected by the framing of choice – and thus by informational policy and societal pressure) and failures of independence and other standard assumptions (e.g. the inability to separate consequence from likelihood or to separate process from consequence). These theories preserve the tractability of rational choice into the domain of irrational but rationalisable behaviour, and shed light on responses to health and related information and experience.

A third and recent line of development concerns networked: goods (complements whose use defines user groups); interactions (especially the evolution of conventions) and coevolution of connections and behaviour. This is relevant to drug initiation and habituation: the effects of social pressure on individual use; persistence of even inefficient conventions; and the interrelation of behaviour and societal connections. At a deeper level, it also addresses shared or socially-defined identity. This approach produces robust evolutionary and epidemiological models showing how e.g. addictive potential and legal status lead to cycles, discontinuous jumps and local irreversibility (hysteresis).

On the supply side, the relevant literatures are the economics of drug markets (where the psychological characteristics of different drugs find sometimes surprising expression^v. The profit motive influences the sort of drugs made available (especially drugs like crack or ice (smokeable methamphetamine or 4-methyl-aminorex)), the way they are marketed and the life careers of drug users^{vi}. There are also related literatures on the links between drugs and property and violent crime (in both cases, causality is decidedly two-way), and to the economics of health (esp. in terms of the costs of drug abuse and addiction. A related

literature deals with the social costs of drug use: one interesting set of results deals with the very different societal costs of different addictive substances^{vii}.

A further set of insights come from labour economics. In addition to the studies of the impact of drug use on labour productivity, recent work has begun to examine the impact of work pressures on ‘performance-enhancing’ drug use and the ‘knock-on’ impact on human and social capital. These effects are particularly marked in the knowledge-intensive sectors of the ‘new economy.’ To the extent that drug use affects (positively or negatively) labour productivity, employers are increasingly requiring drug testing – even in circumstances where there is no demonstrable ‘nexus’ between drug use (or at least positive test results) and performance. Whether this mitigates the harm done by performance-impairing drugs, and whether this results in harmful displacement to other drugs or temporal patterns is as yet unresolved, but it is reasonable to expect that increasing evidence will eventually show up in forensic economics.

Prospects Looking towards the future, the increasing sophistication of game-theoretic modelling, the emergence of economic psychology as a discipline in its own right and the increasing sophistication of econometric tools, combined with the growing body of numerical and other evidence, seem certain to complement the brain science, psychology and sociological perspectives. In particular, microeconomic methods (including those described above) can connect the internal view of personal activity with observable activity and to formalise the external, economic influences on behaviour in a way that bridges the gaps among the electrical and physiological effects of drugs, the perceptual and psychological influences on and consequences of drug use and the observable behaviours and external impacts with which policy is rightly concerned. Looking further, the economics of hedonic consumption and deeper understanding of social capital can increase the application of existing tools and illuminate the uncomfortable current policy choice between higher prices (with consequent increases in property crime and contamination) or higher levels of use and thus enhance the scope for the demand-side policy that is the only way to avoid this choice^{viii}.

ⁱ Becker, Stigler, Chaloupka, Murphy

ⁱⁱ Schelling, Peleg/Yaari

ⁱⁱⁱ Simon, Neymann

^{iv} In the addiction context, Orphanides and Zeros, Carrillo, Kuehn and Wambach

^v For instance, the fact that demand for physically-addictive drugs is not as price inelastic (and does not necessarily lead to high prices) as was conventionally supposed.

^{vi} Reuter and Genwood

^{vii} In the legal realm, for instance, smokers are net contributors to social funds (since they tend to lead productive working lives and die shortly after retirement. By contrast, drinkers either die young (depriving society of their work, financial and personal contributions) or survive into relatively long (and medically expensive) retirement. (Ware and Keeler).

^{viii} Implicitly, this points out that much of policy analysis, and specifically cost-benefit and cost-effectiveness analysis, has its roots in economics.