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The Economics of Alcohol Addiction

Jonathan Boymal

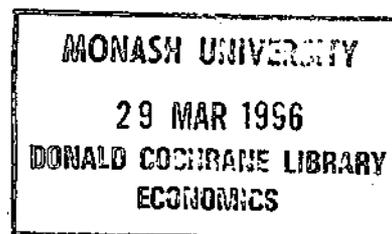
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The Economics of Alcohol Addiction

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Abstract

This paper considers issues relating to alcohol addiction from an economic perspective. While alcohol consumption may be associated with dependency, it is not clear how addiction should be interpreted in the framework of consumer theory. The paper presents several economic models of addictive behaviour and identifies their deficiencies in explaining addiction to alcohol. The degree of a person's involvement in heavy alcohol consumption is shown to have multiple interacting determinants. Behaviour which is viewed as optimal at one stage of the lifecycle may change the households future production possibilities in terms of costs and human capital stocks in a way that does make an individual better off by following an addictive consumption path, given these constraints. However, at the same time, the same person may regret past choices. This paper represents the first step in developing an economic model of alcohol consumption that can help explain drinking behaviour over the lifecycle as an accumulation of choices, subject to constraints.

1. INTRODUCTION

The public health literature tends to classify the adverse effects of alcohol consumption on health according to the following three general types:

1. Problems of regular consumption, for example, liver cirrhosis and cognitive impairment.
2. Problems of dependence, for example, withdrawal symptoms and impairment of control.
3. Problems of intoxication, where a single heavy drinking session can result in harm. Drink driving, accidental alcohol related industrial or other injury, suicide, homicide, domestic violence and other alcohol related crimes are all examples of situations where alcohol is a contributing factor to premature mortality or morbidity¹.

There has been a significant focus on the latter category of alcohol problems in the economics literature in terms of estimating the external costs of excessive alcohol consumption. This paper is a first step to address the issues related to addiction and regular harmful consumption of alcohol, which not have received adequate attention.

The paper is organised as follows: Section two sets out general issues related to heavy alcohol consumption in consumer theory. Section three surveys the current state of play regarding models of harmful addiction, presents several economic models of addictive behaviour and critiques the relevance of the "rational addiction" model to alcohol consumption. Section four examines some key concepts to be integrated into a future economic model of alcohol addiction and abuse. Section five concludes the paper with a brief overview of the issues for future research.

2. HEAVY ALCOHOL CONSUMPTION AND CONSUMER THEORY

2.1 Standard Economic Model

The traditional economic model of consumer behaviour posits that consumers act rationally to maximise utility subject to constraints. Under this approach, heterogeneity in tastes is a major contributor to differences in alcohol consumption levels between people². For example, there are differences in the degree to which heavy alcohol consumption is regarded as a pleasurable activity. Similarly, some drinkers may be more willing to engage in heavy alcohol consumption than others because they have a different tradeoff between the expected health costs and the

¹ See Pels and Hawks (1992), p. 16

² See Viscusi (1992) for discussion regarding cigarette consumption.

benefits derived from heavy alcohol consumption. A third contributor to the difference in the propensity to drink is the character of individual risk perceptions. Individuals with a lower assessment of drinking risk will be more attracted to drinking because the expected cost will be perceived as being lower.

Thus, while health is certainly valued, it is reasonable in an economic sense for people to exchange health for other things. People make choices concerning diet, exercise and drinking behaviour in light of their preferences and knowledge, in order to maximise their expected utility³. As constraints and preferences shift, individual behaviour relating to heavy alcohol consumption will change. From an ex ante perspective, the public-health concept of "premature death" is policy irrelevant. Individuals "choose" their expected lifetimes, as one aspect of rational personal conduct within market processes. There is no welfare loss from mortality or morbidity unless their death affects others⁴. Heavy alcohol consumption can therefore be treated like any other activity in which individuals voluntarily assume risks, such as skiing. Private costs do not justify government intervention, since consumers rationally take these costs into account when making their decisions.

Any potential adverse health consequences of heavy drinking are incorporated into the willingness of drinkers to purchase alcohol. The cost of drinking includes both the price that people must pay for alcoholic beverages and the indirect cost they anticipate in terms of diminished health. Someone who chooses to drink, then, judges that the benefit that he or she derives from drinking exceeds the private costs of consumption. That the consumer derives utility from drinking alcohol is revealed by the fact that the individual does consume the commodity⁵.

2.2 Is Alcohol "Special"?

The standard consumer choice model, assuming full information and rational, utility maximising behaviour on the part of consumers, may not adequately characterise the alcohol consumption decisions of some people. There is reason to ask whether alcoholic beverages are "different" or "special" in any policy relevant sense. Alcohol consumption may be associated with lack of risk-awareness and dependency, and it is not clear how dependency should be interpreted in the framework of consumer theory⁶.

If an alcoholic derives no benefit at all from drinking, then his consumption choices are clearly distorted. Indeed, an alternative view to that presented above is that heavy alcohol consumption is a disease. Although persons may knowingly make

³ See Tollison and Wagner (1991), pp. 195-8

⁴ See Richardson and Crowley (1994), p. 75

⁵ Leu (1983), pp. 13-14

⁶ Leu (1983), p. 24

decisions that risk a disease, disease itself is not welfare enhancing. If alcoholism is a disease, alcoholics derive no benefit from drinking alcohol, but rather gain from eliminating the disease, which requires a sharp reduction in, if not complete abstention from, alcohol consumption⁷. A heavy drinker may be viewed as having lost the power to choose whether or not to indulge his habit, in which case the addict's behaviour would not be accounted for by any theory of choice⁸, including economic theory. Dependent or heavy drinkers may over-consume in the sense that consumer surplus from their marginal consumption is negative. How appropriate this approach is depends on how one interprets heavy alcohol use in terms of consumer theory. Heavy alcohol use is a much broader concept than chronic alcoholism and the assumption that there is no benefit from heavy drinking is probably not very realistic⁹.

For some, the explanation of excessive drinking as a form of drug addiction, as an altered physiological and biological response to the ingested substance, is sufficient. This approach, however, cannot explain non-drug addictions, such as excessive gambling¹⁰. Furthermore, studies have shown that while there may be a genetic predisposition to alcoholism, such predisposition is neither a necessary nor sufficient condition for excessive alcohol use¹¹.

Yet one can still question the assumption that individuals maximise the value of their expected utility when making decisions regarding their drinking behaviour, and that in doing this their internal costs will be taken into account. When drinking commences the capacity to calculate and adjust to the internal costs net of transfers through social security is impaired¹². Indeed, the issue is not only whether individuals understand the potential risks posed by their excessive consumption decisions, but whether, if they do understand these risks, do they take them into account when deciding whether they will drink. Relatedly, whether costs from excessive alcohol are currently internalised reflects institutions and practices in a number of areas such as: health-care finance; insurance; labour market; laws and law enforcement. Often the costs of heavy alcohol consumption are not borne by the individuals whose behaviour has given rise to these costs.

⁷ See Pogue and Sgontz (1989), p. 237

⁸ See Herrnstein and Prelec (1992), p. 332

⁹ See Leu (1983), p. 25. It would also be a mistake to assume that the incidence of heavy drinking and consumption by heavy drinkers are not sensitive to price. See for example Coate and Grossman (1988) and Cook and Tauchen (1982). The latter US study finds that the State excise tax rate on distilled spirits has a negative and significant effect on the cirrhosis death rate (a reliable proxy for excessive alcohol consumption).

¹⁰ See Orford (1985) for a discussion of various drug and non-drug examples of compulsive behaviour.

¹¹ See Pols and Hawks (1991)

¹² See Richardson and Crowley (1994), p. 75

Yet most importantly, an ex ante welfare based approach may have weaknesses in the case of life and death decisions from which there is no error learning¹³. An individual may be unable to accurately assess the consequences of his drinking behaviour. Public health is typically concerned with realised health and welfare. This paper is a first step in considering whether or not fully informed individuals who "choose" to engage in heavy alcohol consumption impose policy relevant costs, besides those narrowly defined as "external". As will be discussed below, an ex ante perspective does not take into account notions of regret.

3. ECONOMIC MODELS OF ADDICTION

The economic representation of harmful addiction involves several aspects of the relationship between the consumer and the addictive commodity. First, a consumer's future choices and utility are adversely affected by current consumption of an addictive commodity. Second, people get "hooked" on addictive commodities as use and age changes their relative shadow prices. Third, it is often difficult to discontinue or regulate one's consumption of an addictive commodity¹⁴.

Economic theory can deal with addictive behaviour in four distinct ways. Studies of harmful addiction by psychologists usually have identified, (1) loss of control, (2) tolerance, (3) withdrawal and (4) reinforcement as central features of addictive behaviour.

3.1 Lack of self control.

Addiction can be characterised as an internal battle for self-control. This approach assumes consumers have stable but inconsistent short-run and long-run preferences. At any one point in time the individual is both a far sighted planner (concerned with lifetime utility) and a myopic "doer"¹⁵.

It is generally accepted that alcohol intoxication causes *alcohol myopia*¹⁶, a state of shortsightedness in which superficially understood, immediate aspects of experience have a disproportionate influence on behaviour and emotion, and where attention to future consequences of behaviour are reduced. A drinker's tastes for alcohol can be viewed as endogenous during a single drinking episode if the demand for alcohol depends on the quantity of alcohol already consumed. Drinkers

¹³ Ibid

¹⁴ See Winston (1980)

¹⁵ See Thaler and Shefrin (1981), p. 394

¹⁶ See Steele and Josephs (1990). Alcohol's impairment of perceptual and cognitive functioning clearly increases with dosage.

might appear to reveal a systematic change in their tastes while they drink so that they consume more alcohol than they initially intend¹⁷.

Upon reflection, this distortion is recognised, but, while drinking, distorted tastes prevail¹⁸. The individual may wish to follow undistorted preferences, which are his preferences before drinking begins. An individual who anticipates future conflict of this sort may precommit himself to a given strategy or rule that would induce or compel a certain pattern of behaviour.

An individual may choose to explicitly alter his incentives by increasing the cost of heavy alcohol consumption¹⁹. Harmfully addictive commodities tend to give rise to institutions, such as Alcoholics Anonymous, to help consumers limit their consumption. Monitoring by others seems to act as a tax on excessive alcohol consumption. Similarly, products such as Antabus are available for alcoholics which interact with alcohol to produce extreme nausea²⁰. If monitoring is too costly, or if consumers cannot exercise the self-control required to act optimally, drinkers may support laws or regulations made in the political sphere that limit their set of choices. The existence of laws against serving intoxicated patrons²¹ is one such rule.

Black (1991) notes that a rule of total abstinence from alcohol consumption may also be a rational response to more severe distortions to demand. The more severe the distortion, the greater the difference between intended consumption, based on undistorted demand, and actual consumption, based on distorted demand. The distortions to demand cause the price paid for the last drink to be greater than the undistorted marginal benefit of the drink. If the consumer surplus is less than the consumer loss from overconsumption, reflecting a net welfare loss from drinking, the abstinence rule may be chosen.

There are legitimate questions to be asked regarding the effectiveness of such voluntary foreclosure of consumption choices. For example, it is possible that preferences, say for risky behaviour, not realised through heavy alcohol consumption, may manifest themselves in other, equally "harmful" ways. Depending upon the magnitude of cross price elasticities, prohibition of drugs may not significantly reduce externalities because it simply results in a substitution towards consumption of other goods that also create externalities²². Because of this possibility, precommitment devices or strategies are most appropriate when

¹⁷ See Black (1991), p. 458

¹⁸ Ibid, p. 461

¹⁹ See Thaler and Shefrin (1981), p. 397

²⁰ See Schelling (1984), p. 3

²¹ Thaler and Shefrin (1981), p. 395

²² However, alcohol and illicit drugs may be complements. For example, a number of studies have identified an association between smoking and the use of marijuana, and between the use of marijuana and other illicit drugs. See Department of Health (1992)

they ensure that the distorted preference does not become formed, or become strong, in the first place²³. As preferences for heavy drinking may be determined by the very act of consumption, the abstinence approach may be an effective tool against compulsive consumption behaviour.

The above model assumes distortions are episodic in nature and may not be adequate in explaining long-term addiction. The next several models focus on explanations of longer term addictive behaviour. As far as possible, we will assume that everyone has the same stable underlying preferences but that households differ in the constraints they face.

3.2 Tolerance

Stigler and Becker (1977) argue that a legacy of cumulative consumption, a kind of "capital effect", characterises all addictive behaviour. Past participation creates a stock, or "history", which adds positively or negatively to the utility of current or future consumption.

This approach uses the concept of household production function as developed by Becker (1965). It assumes the household obtains utility from some underlying commodities that cannot be bought in the market but are instead produced in the household from inputs of market goods, time and human capital.

Assume that the individual maximises an n-period utility function

$$V = \sum_{t=1}^n \beta^{t-1} U(Y_t, R_t)$$

where Y_t is the consumption of a non-addictive good and R_t is "relaxation", a good that cannot be purchased directly but is produced with the input of the addictive good, alcohol, and the "addictive stock", reflecting past consumption of alcohol. Relaxation can be interpreted as the psychological and physiological benefits of alcohol consumption. Demand for alcoholic beverages should therefore be viewed as a derived demand. β is the time discount factor, $\beta = 1/(1+r)$, where r is the rate of time preference for the present²⁴.

Suppose the production function for relaxation is

$$R_t = R(C_t, S_t)$$

²³ See Sunstein (1986) regarding the issue of endogenous preferences and paternalistic laws.

²⁴ See Grossman (1993)

where C_t is current consumption of alcohol and S_t is the stock of the addictive good at time t . The shadow, or full price of the addictive good equals the sum of its market price and the value of changes in future utility and earnings as a consequence of current consumption. The addictive stock is not itself a factor of production but instead influences the production of relaxation by altering the effective quantities of the direct inputs. It therefore affects the efficiency with which the production of relaxation occurs.

From this, a derived utility function is obtained

$$U_t = U(C_t, S_t, Y_t)$$

The stock depreciates at a constant rate δ , but is replenished by current consumption of the addictive good. δ therefore measures the disappearance of the physical and mental effects of past consumption of alcohol. Thus

$$\dot{S}_t = C_t - \delta S_t,$$

where \dot{S}_t is the rate of change over time in the (physical or psychological) stock.

To capture the notion of tolerance, we assume that while increased current alcohol consumption has a positive effect on the production of relaxation, greater past consumption has a negative effect. Ever-higher levels of alcohol consumption are required to sustain a specified level of utility, as the individual builds tolerance to the addictive good²⁵. Tolerance means that given levels of consumption are less satisfying when past consumption has been greater. The relationship between the stock and current alcohol consumption can be represented by

$$\frac{\partial^2 U}{\partial C \partial S} = U_{\alpha} < 0$$

An increase in the consumption of current relaxation will tend to increase the cost of producing relaxation in the future, thereby reducing future consumption of relaxation. If we interpret C_t as a vector of alternatives that can be used to produce relaxation, and allow maximising behaviour to control choice within this vector, alcohol would no longer be addictive.

²⁵ See Barthold and Hochman (1988), p. 97

3.3 Withdrawal

When combined with withdrawal costs, however, decreasing subjective benefits over time may result in addiction.

Withdrawal refers to the negative physical reactions and other losses in satisfaction as consumption of an addictive good is reduced or terminated. Two features of withdrawal effects stand out. First, the effects are asymmetric and only occur when consumption falls below its previous level. Second, after some period, the heavy drinker would like to cease consuming the addictive good as total consumption costs (including adverse health consequences) exceed subjective benefits, but does not stop because the withdrawal cost is too great. If the substance provides pleasure for a long enough period, withdrawal costs will rise sufficiently so that they will exceed at every moment in time the negative net present value of continuing to consume²⁶. A person will continue to consume the addictive good not because of the pleasure of consumption but because of the costs of nonconsumption (ie. to avoid incurring withdrawal costs).

If individuals are fully aware of the potential risks of heavy alcohol consumption at the time when they begin their drinking decisions, and if they fully anticipate the costs of changing this behaviour, market outcomes will be efficient. In contrast, the costs associated with altering one's consumption behaviour are more important if there is a change in one's optimal consumption decision over time. One prominent source of change is individual learning²⁷. If individuals are poorly informed about the risks of heavy drinking and subsequently recognise that their drinking behaviour has adverse consequences on their health and accumulation of human capital, they may be discouraged from altering their consumption behaviour by the transactions costs of change. Much addictive behaviour starts in adolescence or early adulthood, at a time when individuals are not well informed and may not appreciate the consequences of their actions.

There is even greater concern if there are powerful asymmetries in available information and market power on the part of the seller, allowing the seller to manipulate the consumption behaviour of the buyer. Indeed, a concern about prohibition is that it creates profit opportunities for illicit suppliers²⁸. In illicit markets consumers are susceptible to pricing strategies that create demand. For example, producers may attempt to charge a lower price to a first time consumer of the addictive product.

Addictive behaviour is sometimes viewed as a trap into which one is lured, because the costs of addiction are initially hidden. This approach suggests that market

²⁶ See Schwartz (1989), p. 520

²⁷ See Viscusi (1992), p. 128

²⁸ Barthold and Hochman (1988), p. 102

failure may exist in the provision of information regarding alcohol and other potentially addictive substances.

Yet one might question the relevance of hidden costs in the case of alcohol. There are considerable sources of information that drinkers can and do use to form their judgements regarding the potential adverse consequences of heavy consumption²⁹. One source is general societal knowledge. A second source of information is the direct experience of the drinker and the observation of experiences of other drinkers. Many of the health effects of alcohol abuse are apparent, particularly in terms of morbidity.

Similarly, the presence of costs of altering behaviour is not limited to alcohol addiction. Costs of change are present in other economic contexts, such as changing one job. The question is whether the consumption of alcohol is in some way unique.

3.4 Reinforcement.

Here, as in the tolerance model, "relaxation" is produced by alcohol and the addictive stock. To capture reinforcement effects in consumption, the marginal productivity of alcohol consumption in the production of relaxation is assumed larger, the greater is the level of addictive stock³⁰.

Becker and Murphy (1988), in their model of rational addiction, assume that consumers maximise a lifetime utility function of the form

$$V = \sum_{t=1}^{\infty} \beta^{t-1} U(Y_t, C_t, S_t)$$

where Y_t is consumption of the nonaddictive good, C_t is consumption of the addictive good, and S_t is the stock of the addictive good.

According to their model, a good is addictive if an increase in past consumption of the good leads to an increase in current consumption. Such reinforcement requires that an increase in past consumption raises the marginal utility of current consumption³¹:

$$\frac{\partial^2 U}{\partial C \partial S} = U_{CS} > 0$$

²⁹ See Viscusi (1992)

³⁰ See Chaloupka (1991) p. 726

³¹ See Becker and Murphy (1988), p. 683

According to Becker and Murphy (1988), past consumption of alcohol affects current utility through a process of "learning by doing"³².

This model follows other models of habit formation by assuming past consumption affects current consumption through an accumulated psychological stock of habits. In those models, tastes are affected by previous consumption experience. The net result is that of a "distributed lag"; current behaviour depends on all past values of the predetermined variables, though more on recent values than on very remote ones. Most empirical applications of myopic habit formation are based on Houthakker and Taylor (1970). They argue that the stock of a nondurable commodity should have a positive impact on its current consumption in the presence of habit formation.

A positive value of U_{cc} is a sufficient condition for addiction for fully myopic consumers who do not consider the future consequences of their actions, or if the depreciation rate on the addictive stock equals one. However, it is not a sufficient condition for addiction in the case of rational consumers and where the depreciation rate is smaller than one³³. Rational utility maximisers consider the future harmful consequences of their current behaviour and how greater current consumption affects their utility and earnings in the future. Unlike myopic consumers, rational consumers will take account of future effects of current consumption when they determine the optimal quantity of an addictive good in the present period. Reinforcement for them requires that the positive effect of an increase in stock at time t on the marginal utility of current consumption exceeds the negative effect of a higher stock on the future harm from greater current consumption. The total cost of addictive goods to consumers equals the sum of the good's price and the money value of the future adverse effects, such as the negative effects on earnings and health of heavy drinking³⁴.

Therefore, a positive value of U_{cc} is necessary but not sufficient for reinforcement³⁵. Potential addiction will also depend on variables such as time preference and rate of depreciation of past consumption. An increase in the rate of preference for the present and in the depreciation rate on addictive capital raises the demand for harmful goods because the bigger are these discount rates, the smaller are the effects on future utility of greater present consumption³⁶.

³² Ibid, p. 677

³³ See Grossman (1993), p. 94

³⁴ See Becker, Grossman and Murphy (1991), p. 237

³⁵ Ibid

³⁶ See Becker (1992), p. 239

This process of addiction is viewed in terms of habit formation which has an unstable long-run equilibrium between two stable long-run equilibria³⁷. This leads to a polarisation in behaviour and habit state: when the initial consumption is above the unstable equilibrium or "threshold" value, the habit formation process induces a rise towards a stable equilibrium of relatively high consumption. On the other hand, when the initial consumption is below the unstable equilibrium value, the habit formation process causes consumption to fall towards a stable equilibrium of close to zero. Becker and Murphy (1988) argue that with two steady states, relatively few persons consistently consume small quantities of addictive goods.

Due to the significant complementarity between present and future consumption, strong addictions end only with a cold turkey, abrupt cessation of consumption³⁸. When current consumption ends the marginal utility of future consumption approaches zero. Conversely, temporary stressful events such as unemployment or divorce can permanently "hook" a rational person to addictive goods if the increase in the stock of addictive capital is sufficiently large.

3.4.1 Weaknesses in the Model

There are a number of deficiencies in the Becker/Murphy rational addiction model with respect to its applicability to alcohol consumption.

First, many people consume relatively small quantities of alcohol. The distribution of alcohol consumption is more continuous than the bimodal distribution that Becker and Murphy (1988) show is likely to characterise consumption of an addictive good.

Second, the rational addiction model requires that strong addictions end with a cold turkey quit. Yet it is clear that many people who at one time engaged in very heavy consumption of alcohol become moderate drinkers. An adequate economic model of alcohol abuse and addiction needs to recognise the multiple interactions between the potentially addictive good and the consumer. Indeed, the adverse health consequences and addictive potential of alcohol varies depending on the age of the drinker, the time and place of consumption, and how many drinks have been consumed already.

Third, Becker and Murphy do not adequately describe what drives the reinforcement process, where current consumption increases the marginal utility of future consumption. Any "learning by doing" effect would dissipate quickly³⁹,

³⁷ See Becker and Murphy (1988), p. 694

³⁸ Ibid p. 692

³⁹ See Schwartz (1988) p. 531

especially in the context of sustained heavy alcohol consumption, where tolerance and withdrawal are characteristic.

4. BROADENING THE FOCUS

The degree of a person's involvement in heavy alcohol consumption has multiple interacting determinants. These include preferences for risk and the process of habit formation, but one of the strongest determinants is the social environment. An economic model can focus on the wide range of determinants, including biological and social forces, that operate to restrain excessive consumption, offer disincentives to compulsive behaviour and that result in changes in patterns of alcohol consumption over the lifecycle. The clinical or disease model has tended to focus more narrowly upon those aspects of individual personality which were thought to promote compulsive behaviour. What is needed is a focus on anti-complementarity between heavy alcohol consumption and other commodities rather than the intertemporal complementarity approach of Becker and Murphy to deal with alcohol addiction. One would expect that the effect of past alcohol consumption influences the ability to produce other valued commodities far more than the ability to produce relaxation in the current period. By adversely affecting market and nonmarket productivity, past heavy alcohol consumption can alter the relative prices of commodities. The "addictive stock" would be expected to alter the household's demand for commodities other than relaxation, and derived demand for inputs other than alcohol⁴⁰.

4.1 Consumption over the course of the lifecycle.

One of the primary factors at work in decisions regarding alcohol consumption is age. There are two forces at work, which combine to provide ambiguous theoretical conclusions.

1. The cost of consumption clearly depends on the expected number of years remaining in life. Health can be viewed as an investment commodity, as it determines the total amount of time available for market and nonmarket activities. An increase in the stock of health reduces the time lost from these activities over time, and the monetary value of this reduction is an index of the return to health as an investment⁴¹. Older people are rationally less concerned about future consequences of harmful levels of alcohol consumption as the probability of death increases. This factor causes consumption to rise with age, so that if an individual lives to be old enough his consumption rate will approach what it would have been

⁴⁰ This is analogous to the analysis on the effect of human capital on nonmarket productivity by Michael (1973).

⁴¹ See Grossman's (1972) model of the demand for health.

if there had been no adverse health consequences associated with consumption⁴², increasing the likelihood of addiction.

Furthermore, a history of past consumption may limit the responsiveness of drinking behaviour to a change in perceived costs, or as a response to new information. Alcohol consumption has a cumulative, degenerative effect on the body. The development of cirrhosis of the liver, throat cancer and cancer of the mouth is clearly not instantaneous. Those who have been consuming an excessive amount of alcohol know that they have already triggered the development of, say, cancer in the next several years. Since their chance of dying in these years is therefore higher than otherwise, the cost of heavy alcohol consumption is less than if they had never previously engaged in hazardous consumption. This factor may cause these individuals to engage in more heavy alcohol consumption than otherwise⁴³.

2. Health is also demanded as a consumption commodity, and sick days are a source of disutility. Individuals inherit an initial stock of health that depreciates over time, at an increasing rate at least after some stage in the lifecycle. As Grossman (1972) noted, a rise in the rate of depreciation on a person's stock of health is one manifestation of the biological process of aging. If adolescents and young adults can physiologically tolerate the destructive effects of heavy alcohol consumption more effectively than the elderly, the harmful effects of heavy alcohol consumption will increase with age⁴⁴. An individual's threshold for alcohol consumption, in terms of both addiction and mortality, will depend on factors which vary substantially over life. If present and future health were relatively poor substitutes, individuals would have an incentive to offset part of the reduction in health caused by the process of aging⁴⁵ by increasing healthy behaviour, not reducing it. Therefore one may expect heavy alcohol consumption to decline after a certain age.

This could explain why very heavy binge drinking (12 or more drinks in an session) peaks among 20-24 year old males where one-third of drinkers, thirty percent of the age group, exhibit this pattern of drinking behaviour⁴⁶. Indeed, episodic binge drinking, in contrast to steady consumption of equivalent alcohol dosages, allows for recovery during abstinence⁴⁷. Therefore it appears many young males rationally avoid potential addiction to alcohol and other associated long term health consequences by having periods of compensating low consumption.

⁴² See Ippolito (1981), p. 554.

⁴³ Ibid

⁴⁴ See Winston (1980), p. 313

⁴⁵ See Grossman (1972)

⁴⁶ Department of Health (1993), p. 18

⁴⁷ Pols and Hawks (1991), p. 12

If children underestimate the damaging role of addiction in reducing human capital, they may be induced to consume alcohol heavily, simply because they think the price is low. As they age, the perceived shadow price of heavy alcohol consumption will rise, encouraging a movement away from addiction - the maturing out pattern seen also in regards to marijuana use⁴⁸. The opportunity cost of heavy alcohol consumption increases with age within some range. While adults derive most of their income from labour, young people receive much of theirs as endowment. If, through absenteeism or diminished stocks of human capital, heavy consumption of alcohol is anti-complementary with labor supply and earnings, its shadow price is higher for adults. It is also higher if alcohol abuse is anti-complementary with family responsibilities⁴⁹.

Similarly, because of life experiences such as career-oriented employment and marriage, the discount rate declines quickly after the teenage years⁵⁰, making people more responsive to changes in the perceived or actual harmful consequences that take place in the future.

4.2 Response of Others

As noted by Sen (1982), identical commodity choices will involve quite different welfare levels depending on the reaction of others. While societal constraints on drinking and other potentially private activities may be difficult to enforce, it is possible that guilt may act as an additional cost to restrain heavy consumption. As consumption at home is not a good substitute for social drinking, one may expect a lower overall level of alcohol-related problems in societies where alcohol abuse is stigmatised.

On the other hand, societal influences may increase the costs of nonconsumption of a good subject to peer pressure. One would therefore expect to see a link between cultural attitudes and alcohol consumption. For example, rules of "shouting" may be conducive to rapid and excessive drinking, leading to greater alcohol consumption than an individual might wish.

4.3 The Link Between Current and Future Abuse.

The major need for research is to understand why individuals manifesting symptoms of alcoholism in youth or in early adulthood are relatively more likely to have symptoms as adults. Alcohol abuse in adolescence appears to be associated

⁴⁸ See Winston (1980), p. 313.

⁴⁹ See Barthold and Hochman (1988), p. 102

⁵⁰ Douglas and Hariharan (1994), p. 218.

with alcohol abuse in adult life. There are also indications that underaged drinkers are at higher risk of subsequent addiction to, or problems with, alcohol⁵¹.

What is required then is a model that incorporates anti-complementarity but simultaneously emphasises the cumulative effects of choices regarding alcohol consumption over the lifecycle. For example, problem drinking as a youth or young adult retards the accumulation of human capital. There are a number of mechanisms by which the drinking decision interacts with the schooling decision⁵². For example, heavy drinking may interfere with learning and classroom performance, thereby reducing the benefit (ie. the contribution to human capital) of an additional year of schooling and hence the incentive to continue.

Past heavy alcohol consumption will tend to raise the relative price of desirable commodities such as family life. An alcohol abuser will be a less attractive partner than an otherwise similar person who drinks moderately or abstains. Increasing the shadow price of commodities which cannot be bought in the market, but are instead produced by the household from inputs of human capital and time, makes abusive alcohol consumption and other compulsive behaviours more attractive⁵³.

The direction of causation between education and alcohol consumption is not clear. There may be other reasons why one may expect to see a relationship between schooling and drinking behaviour. Schooling may enable people to choose healthier lifestyles by improving their knowledge of the relationships between health behaviours and health outcomes and making them more receptive to new information. However, as Kenkel (1991) notes, any observed relationship may be instead be proxying for differences in tastes for alcohol, perhaps because of the different acceptability or stigma of the heavy drinking behaviour across social groups.

The direction of causation between marriage, unemployment, low socio-economic status and alcoholism is also uncertain. Many studies show a relationship between various measures of social position and morbidity and mortality. A number of psychosocial factors have been shown to be related to mortality and morbidity, among them: less sense of control over one's work; lower participation in social networks and activities; fewer social supports; and less sense of personal control over health⁵⁴. Stresses of economic insecurity or relative deprivation may cause people to drink heavily or to engage in other behaviours which are detrimental to health.

⁵¹ Department of Health (1993), p. 24

⁵² See Cook and Moore (1993)

⁵³ See Winston (1980), p. 311

⁵⁴ See Marmot (1994) for a discussion of the factors underlying the socioeconomic gradient in health.

Regardless of the direction of causation, choice regarding alcohol consumption is clearly a cumulative process. Yet, if a person's drinking behaviour today affect his well-being in the future, then his future interests will be defined in terms of the way they are *assessed today*. In general, there is no reason to presume that the future interests as assessed today will coincide with those interests as assessed in the future⁵⁵. Behaviour which is viewed as optimal at one stage of the lifecycle may change the households future production possibilities in terms of costs and human capital stocks in a way that does make an individual better off by following an addictive consumption path, *given these constraints*. However, the same person may regret past decisions, and given his present utility function and information regarding the adverse consequences of heavy drinking, he would have chosen a more moderate level of alcohol consumption at an earlier stage of the lifecycle.

It is true that error learning is an important way by which individuals can learn to assess likely outcomes. When faced with new choice situations, people remember their previous experiences and form expectations about the regret that the present alternatives might entail. They then take these expectations into account when making their decisions⁵⁶. This approach is most relevant if choices are repetitive. However, costs of heavy alcohol consumption and the associated regret, may occur a significant time after the choices are made. As a result, market failure may exist in the provision of information regarding regret. Similarly, alternatives may involve significantly altered costs and payoffs at different stages of the lifecycle. Neuroscientists point to "critical" or "sensitive" periods in development⁵⁷, where interconnections of brain cells are most efficiently made. For example, they note that to learn new languages as efficiently as young people, middle aged adults may have to invest more in terms of time and money. Furthermore, the benefits of new investments in human capital may fall as the probability of death increases.

5. CONCLUSION

Alcohol abuse should be viewed not only as an *indicator* of a complex set of endowments which may be reflected in a variety of consumption and investment decisions, but as a determinant of the choices and constraints facing the household⁵⁸. As I have shown, much can be gained by developing a model of alcohol consumption that incorporates anti-complementarity and recognises issues of regret involved in heavy drinking behaviour.

⁵⁵ See Sen (1982), p. 88

⁵⁶ See Loomes and Sugden (1983)

⁵⁷ See Hertzman (1994)

⁵⁸ See Kenkel and Ribar (1994)

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