

tenance of alcohol abuse and dependence has been studied, debated, questioned, accepted, and minimized for decades. Classical conditioning mechanisms, operant conditioning mechanisms, vicarious reinforcement and, most recently, social learning and cognitive social learning factors have all been identified as crucial factors, singly or jointly, in alcoholism. Despite the widespread conviction on the part of many, however, that these factors bulk large in alcohol abuse and dependence, empirical data supporting the central role of these factors in human alcohol abuse and dependence remain both scanty and equivocal. Most recently, researchers have begun to explore the role of learning factors in specific aspects of alcoholism rather than, as before and more broadly, in broader contexts. One of the most promising such programs of research of this kind investigates the role of learning factors, specifically, classical and operant mechanisms, in tolerance development. Tolerance may, in turn, play an important role both in the etiology of alcoholism and in its maintenance. Accordingly, it is possible that individuals whose tolerance for alcohol is or becomes high early in life may want or be able to drink more alcohol than others, in that way putting themselves at heightened risk to develop alcoholism. It is also likely that persons whose abusive drinking has led to heightened tolerance tend to drink more than others, in that way accelerating the alcoholic process. Broadly defined, tolerance is probably both an antecedent to, as well as a consequence of, the development of alcohol's reinforcing properties. In 1978, Siegel advanced a classical conditioning model of drug tolerance that accords environmental cues consistently present during prior drug exposure the power to elicit conditioned homeostatic responses that attenuate the systemic effect of the drug. In a series of animal experiments using both ethanol and morphine, Siegel and his colleagues demonstrated that rats who have developed tolerance will continue to display a high degree of tolerance only if tested under the same environmental conditions previously associated with drug administration. In 1986, Shapiro and Nathan reported on data to the effect that tolerance to alcohol in human beings also appears to be influenced by similar classically- and operantly-mediated learning factors. This paper will summarize the results of these studies, report on subsequent studies of learning factors in tolerance by Nathan and his colleagues, and speculate on the nature of the role of learning factors in alcohol abuse and dependence, all from the vantage point of the strong empirical support the line of research reviewed in this paper accords these factors.

#### THE MOTIVATIONAL INFLUENCE OF ALCOHOL EXPECTANCIES

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Both drinkers and nondrinkers have a network of beliefs about the effects of alcohol on behavior and affect. These beliefs have been assessed by various researchers. Light and heavy drinkers have been found to share the same expectancies of negative effects from alcohol, but heavy drinkers expect themselves to receive more positive effects from alcohol than do light drinkers, which will provide more motivation for the heavy drinkers to consume alcohol. Considerable research using the balanced-placebo design has shown that the beliefs heavy drinkers have about alcohol are a major determinant of social and emotional behavior after drinking, resulting in changes in anxiety, sexual responses,

aggression, etc. Attribution of responsibility has provided a parsimonious explanation for some of these results. In a series of studies provoking subjects to aggress, the belief that alcohol increases pleasure was a stronger determinant of behavior after consumption than the belief that alcohol increases aggression, so that heavy drinkers who thought they had consumed alcohol were less aggressive than those who thought they had consumed only tonic. This suggests that when drinkers are stressed, many may seek the pleasure enhancing effects of alcohol to counteract the aversive affect. A decision theory model of relapse shows how these expectancies interact to predict relapse and suggests areas of intervention.

#### HOW NONCHEMICAL INCENTIVES AFFECT THE MOTIVATION TO USE ALCOHOL

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Alcohol use is intertwined with people's incentive motivation and the affective changes that they experience as a result of the incentives in their lives. For example, the affect that people experience prior to imbibing alcohol, and which they expect to change by drinking, is likely to have arisen from their goal-striving activities and their success or lack of success in reaching their goals. In turn, drinking alcohol, especially in excessive quantities, changes people's affect, their incentive motivation, and their subsequent motivation to use or not to use additional alcohol. Thus, either directly or indirectly drinking alcohol influences, and is influenced by, the other incentives in people's lives. Convincing evidence has been gathered to indicate that alcoholics' nonchemical incentives influence their motivation to drink. For instance, studies comparing relapsed and nonrelapsed alcoholics have consistently found that alcoholics who do not relapse have more positive changes and fewer negative changes in their lives than alcoholics who do relapse. Frustration of goal-directed activities, moreover, appears to be a common reason why recovering alcoholics return to drinking. Thus, incentive motivational factors appear to play a crucial role in recovery from alcohol dependence. Accordingly, we have developed an intervention program for alcoholics that focuses on the nonchemical incentives in their lives, thus helping them to find sources of satisfaction and rid themselves of sources of frustration. The intervention has two major components. The first component involves carefully assessing patients' motivational structure (the goals that are the compelling forces in their life) in order to identify points for intervention. For this purpose, we have developed the Motivational Structure Questionnaire for Alcoholics, which combines idiographic and nomothetic assessment and which has been shown to be both reliable and valid. The second major component involves actual modification of the motivational structure and consists of 12 steps. We will present details of the assessment and counseling procedures and results that we have obtained with them.

#### SOCIOCULTURAL AND ENVIRONMENTAL INFLUENCES ON THE USE OF ALCOHOL

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It is generally accepted that sociocultural and environ-