

## Social Contingencies and the Effects of Punishment in Alcoholics and Nonalcoholics

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Okulich and Marlatt (1972) have argued that alcoholics show a differential tolerance for punishment relative to nonalcoholics. However, the studies purporting to support this assertion failed to control for the effects of social factors on alcoholics' tolerance of punishment. The present study compared alcoholics' and nonalcoholics' tolerance for punishment under two conditions. In the private condition, subjects were led to believe that no one would know how they responded to a task involving punishment.

In the public condition, it was made clear that the subjects' responses would be known to the experimenter. In the public condition, alcoholic subjects made more punished responses than nonalcoholic subjects. In the private condition, neither group responded in the presence of punishment.

A prominent characteristic of alcoholics is their persistent drinking despite often severe aversive consequences. In describing the symptoms of alcohol dependence, DSM-III-R states that "with heavy and prolonged substance [alcohol] use, a variety of social, psychological, and physical problems occur, and are exacerbated by continued use of the substance [alcohol]. Despite having one or more of these problems (and recognizing that use of the substance [alcohol] causes or exacerbates them), the person continues to use the substance [alcohol]" (American Psychiatric Association, 1987).

In view of this characteristic of alcohol dependence, Okulich and Marlatt (1972), Vogel-Sprott (1967), and Vogel-Sprott and Banks (1965) hypothesized that punishment would suppress previously reinforced responding less effectively in alcoholics than in nonalcoholics. In these experiments, groups of al-

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TABLE 1  
 DEMOGRAPHICS OF CASAA CLIENT POPULATION AND NONALCOHOLIC SUBJECTS,  
 BMASST AND DSM-III-R SCORES FOR ALL SUBJECTS

Variable	CASAA population	Nonalcoholic subjects
Mean age	27.9	27.1
Mean years education	11.5	12.6
Mean annual income \$	<14,000	11,500
Ethnicity		
Hispanic	57.1%	64.3%
Anglo	42.9%	35.7%
Mean BMASST score	18.2	1.1
Mean DSM-III-R score	6.8	1.1

coholic and nonalcoholic subjects participated in operant button-pressing tasks wherein a particular (goal) response was reinforced during the beginning of the experiment, but later resulted in punishment (electric shock). The results of these studies showed that alcoholics did, in fact, persist significantly longer than nonalcoholics in making the goal response, despite the fact that the response was punished with shock. The authors concluded that alcoholics may be less sensitive to punishment than nonalcoholics.

While the authors' conclusions seem reasonable, the experimental procedures of these studies suggest at least one alternative explanation of the results. The alcoholics' behavior may have been differentially controlled by whatever social consequences might result from tolerating more shocks. For example, they may have continued to respond in the face of aversive stimulation in an effort to please or impress the experimenter. In fact, postexperimental data from the Okulitch and Marlatt (1972) study indicated that alcoholics felt that during the experiment, "... their 'nerves' were being tested." Furthermore, in a review of the pertinent literature, O'Leary, O'Leary, and Donovan (1976) state that there is some evidence to suggest that alcoholics may be especially sensitive to perceived evaluation by others (see also Miller, Hersen, Eisler, & Hillsman, 1974).

The present study specifically addresses the issue of whether social factors play a role in alcoholics' apparently greater tolerance for punishment. To do this, a public-private manipulation (e.g., Hayes & Wolf, 1984) was added to the general procedures used in the studies by Okulitch and Marlatt (1972), Vogel-Sprott (1967), and Vogel-Sprott and Banks (1965). Specifically, alcoholic subjects participated in a learning task wherein responses were reinforced during the beginning of the task and punished during the remainder of the task. Half the subjects were told that they would be observed during the experiment and that their performance would be compared with other subjects (public). The other half were told they would not be observed and that only they would know how they responded during the experiment (private). The public condition was intended to allow for the influence of whatever social factors might

have affected the subjects' behavior in the studies by Okulitch and Marlatt (1972), Vogel-Sprott (1967), and Vogel-Sprott and Banks (1965). The private condition, on the other hand, was intended to remove these factors.

If social consequences in fact account for why alcoholics continue to respond despite aversive consequences, alcoholic subjects should show greater responding than nonalcoholics in the presence of aversive stimulation only in the public condition. In the private condition, neither group should respond in the presence of aversive stimulation. Thus, the specific hypothesis was that in the public condition, alcoholic subjects would make more punished responses than nonalcoholic subjects. In the private condition, there should be no difference in the number of punished responses made by alcoholic and nonalcoholic subjects.

## Method

### Subjects

Alcoholic subjects were 14 male outpatients recruited at the University of New Mexico Center for Alcoholism, Substance Abuse, and Addictions (CASAA). Fourteen patients out of 36 volunteered to participate in the study. All alcoholic subjects had been treated for alcoholism at least once prior to their present treatment. Nonalcoholic subjects were 14 male custodians at the University of New Mexico. Both groups of subjects are described in Table 1.

Subjects were recruited for the study via a flyer which briefly described the study. The task was described as "a perceptual motor skill problem solving task," which "involves mild electric shock." Subjects were screened using the Brief Michigan Alcoholism Screening Test, (Brief MAST; Pokorny, Miller, & Kaplan, 1972) and the DSM-III-R diagnostic criteria for Alcohol Dependence Syndrome (American Psychiatric Association, 1987) in questionnaire form. To be classified as alcoholic, subjects had to obtain both a score of 5 or greater on the Brief MAST, and four out of nine positive symptoms on the DSM-III-R criteria. To be assigned to the nonalcoholic group, subjects had to score below the above cutoff scores on the two measures. Subjects completed the screening measures as part of an application to participate in the study at the time of recruitment. Mean scores for these measures are shown in Table 1. Those who met the screening criteria were contacted by the experimenter within one week to schedule a time for their participation. The nonalcoholic subjects were recruited and participated in the experiment approximately 10 months after the alcoholic subjects.

Subjects were paid \$10 for completing the experiment, and all signed statements of informed consent which emphasized that they were free to discontinue their participation at any time.

### Materials and Apparatus

A Tandy 1000 SX computer (IBM compatible) with a 25-cm diagonal monitor was used to conduct the experiment and collect the data. Also used was a three-button response panel similar to that described by Okulitch and Marlatt (1972), a data-acquisition board (MED Associates), a variable-amperage shock

generator (Lafayette Instrument Company, model 82404) with an electrode that could be strapped to the subjects' forearms, and a universal feeder modified to dispense coins to the subjects through a 1.25-inch PVC pipe.

#### Setting

Subjects were run in a small experiment room (10 ft  $\times$  8 ft) with a two-way mirror on the right wall which could be covered with a curtain. A small table was located against the back wall of the room with the computer monitor and response panel on it. Under the computer monitor was a red, doorbell-like button which could be pressed by the subjects to signal to the experimenter that the subject wished to terminate the experiment. All other equipment was located in an adjacent room.

#### Design

A two-by-two factorial design was used. The independent variables were group (alcoholic/nonalcoholic) and experimental condition (public/private). The dependent variable was number of punished responses made by subjects before terminating the experiment.

#### Procedure

All procedures employed in this experiment were approved by the Human Subjects Committees of the Department of Psychology and the College of Arts and Science at the University of New Mexico.

One experimenter recruited all subjects and conducted all experiment sessions. The experimenter was not involved in the treatment of the alcoholic subjects, and was not acquainted with any of the subjects prior to their inclusion in the study. Assignment of subjects to either the private or public condition was random. From each group, 7 subjects were assigned to the private condition and 7 subjects were assigned to the public condition.

Subjects were seated in the experiment room facing the computer monitor and response panel, then given the statement of informed consent to read. After subjects had read the statement of informed consent, the experimenter explained it once more to insure that subjects understood it.

Before signing the statement of informed consent, the shock electrode was attached to the subject's interior right forearm, and subjects were given one to three sample shock(s) to determine their level of acceptable shock. Subjects were told that the shock should feel uncomfortable but not painful. A sample shock of 2.0 mA was given first. The experimenter then asked the subject, "Is this level of shock too uncomfortable for you?" If the subject found the shock too strong, a second sample shock was given at 1.5 mA. Again, the subject was asked if the shock was too uncomfortable. If the subject found the 1.5 mA shock too strong, a third sample shock was given at 1.0 mA. No subjects found the 1.0 mA test shock too unpleasant. Thus, all subjects chose their own level of shock to be used throughout the experiment.

After the subject received the sample shock(s) and signed the statement of informed consent, the experimenter read one of two standardized sets of in-

structions, depending on the experimental condition to which the subject was assigned. All subjects were told that the experiment was a "test of perceptual motor skill," and that, during the experiment, they "... might experience a slight electric shock at the same intensity as the sample shock." The purpose of the shock was not explained during the instructions. Subjects were informed that each time they pressed the three buttons in front of them in the correct order when a white block appeared on the monitor, the computer would indicate a correct response and they would receive a reward of 50 cents, delivered through the tube on their right. Subjects were further instructed that, following the third button press, they had to wait for the white block to reappear before responding again. The experimenter then briefly demonstrated the experimental task.

Subjects were told to practice the task for as long as they wished; they also were told that during the practice session they could still earn money and might experience the electric shock. Unknown to the subjects, the "practice task" was the actual experiment during which all data were recorded. The experimenter stressed to the subjects that they should treat the "practice session" as the real experiment.

The instructions presented to subjects about the experiment defined the public/private manipulation. Subjects in the private condition were told that during the practice session no data would be recorded; that they would not be observed; and that the experimenter would be in his office, reading. Subjects in the private condition were further instructed to press the red button under the monitor, which would end the practice session, when they wished to terminate the practice session. The experimenter then called up a menu on the computer monitor which displayed several options, including "Practice task: Do not record data," and selected this option. Following this, the experimenter closed the curtain covering the two-way mirror, left the room, and began the experiment.

Subjects in the public condition were told that the number of correct responses made, the number of shocks received, and other information obtained during the practice session would be recorded. In addition, the experimenter told the subjects in this condition that he would observe them through a two-way mirror during the session and evaluate their performance. Subjects in the public condition were also told that they should press the red button under the monitor when they wished to terminate the practice session. The experimenter then called up a menu on the computer monitor which displayed several options, including "Practice task: Record data," and selected this option. The experimenter then left the room and began the experiment.

The task itself began with the presentation of a white block on the subject's monitor. The third different response sequence selected by the subject was arbitrarily chosen as the goal response. After 17 rewarded goal responses (not necessarily in succession), a 200-ms shock was delivered to the subject, without reward, whenever the subject completed the goal response, and no other response was rewarded. If the subject failed to complete a response sequence within 30 seconds after the presentation of the white block, the trial was con-

sidered as a refusal to respond, and the screen cleared for 15 seconds before the next trial began. The experiment ended when the subject pressed the button to terminate the "practice task."

Following the experiment, all the subjects were asked about their perceptions of the purpose of the experiment, their reasons for stopping when they did, and their perceptions of the reasons the shocks were delivered. Subjects were informed of the true purpose of the experiment, were fully debriefed, and were told to contact the experimenter if they were adversely affected by the experiment.

## Results

A two-way ANOVA with shock level as dependent variable was conducted to determine whether any differences existed which might have influenced the number of punished responses completed by subjects. No significant differences were detected, with all  $p$  values  $> .4$ .

Means and standard deviations for number of punished responses are shown in Table 2. A two-way ANOVA revealed a significant interaction effect for number of punished responses,  $F(1, 24) = 5.11, p < .05$ . As conservative follow-up tests of this interaction, post hoc comparisons of the effect of subject group within each experimental condition were conducted using Tukey's WSD without assuming homogeneity of variance (Maxwell & Delaney, 1990, p. 185). These tests revealed that in the public condition, alcoholics made more punished responses than nonalcoholic subjects,  $F(1, 6.51) = 8.47, p < .05$ ; in contrast, in the private condition there was no difference between groups,  $F(1, 6.48) = 0.618, p > .5$ .

The questions asked of subjects during debriefing were intended to shed light on the factors controlling subject's behavior during the experiment. However, the subjects' responses were quite vague (e.g., the modal response was "I don't know"), and did not suggest any specific factors responsible for their behavior during the experiment.

## Discussion

The major hypothesis of the present study was that in the public condition alcoholic subjects would make more punished responses than nonalcoholic subjects, while in the private condition there would be no difference between alcoholic and nonalcoholic subjects. The results of this experiment support the hypothesis and offer an alternative explanation of the findings of Okulich and Marlatt (1972), Vogel-Sprott (1967), and Vogel-Sprott and Banks (1965): specifically, that the observed differences between alcoholics and nonalcoholics may have been due to social factors (e.g., perceived evaluation by others) and not due to an insensitivity to punishment on the part of alcoholics. Exactly what social factors were operating cannot be ascertained by the present study. One possibility is that the alcoholics tolerated more punishment in an effort to impress the experimenter. Further research is necessary to discover the specific

TABLE 2  
MEANS, STANDARD DEVIATIONS, AND RANGES FOR NUMBER OF PUNISHED RESPONSES

Group/Condition	M	SD	Range
Alcoholic			
Public	5.71	3.82	1-11
Private	1.71	1.89	1-6
Nonalcoholic			
Public	1.43	0.79	1-3
Private	1.14	0.38	1-2

social factors that are responsible for alcoholics' persistent responding despite punishment.

These findings may also help explain the resistance to change of alcoholic drinking patterns in spite of their often severe consequences (e.g., job loss, divorce, criminal convictions). Such consequences might be ineffective in reducing drinking due to the presence of social contingencies which attenuate the effects of punishment. For example, the social reinforcement for drinking from peers or companions may sufficiently override the punitive consequences of drinking. The specific relation between alcoholics' greater sensitivity to social evaluation and their drinking clearly needs additional investigation.

The results of the present study may also have implications for treatment and relapse prevention. Given that alcoholics may be especially sensitive to social rewards (O'Leary, O'Leary, & Donovan, 1976), treatment programs may benefit from the arrangement of social contingencies which actively discourage drinking (e.g., the client should take up rewarding social activities that do not involve the use of alcohol). In addition, other social contingencies may have to be removed if they counteract the effects of punishment resulting from alcohol abuse (e.g., a change in peer group may be necessary if the client's friends socially reward abusive drinking). The same may be true for relapse prevention programs (e.g., Marlatt & Gordon, 1985). Such programs could take into account the possibility that social rewards might reduce or eliminate the effects of aversive consequences which initially cause a person to stop drinking. In this context, it is interesting to note that a comprehensive treatment and follow-up program for alcoholism already exists which, as its central feature, uses social consequences to modify drinking: the Community Reinforcement Approach developed by Azrin and his colleagues (e.g., Hunt & Azrin, 1973; Mallams, Godley, Hall, & Meyers, 1982).

Finally, there are several methodological limitations to the present study which might affect its internal and external validity. In regard to the internal validity of the study, potential biases were introduced because the experimenter knew which subjects were alcoholic and which were nonalcoholic, and the nonalcoholic subjects were run 10 months after the alcoholic subjects. These conditions may have caused biases in the results of this experiment. This is unlikely, however, because the experiment was controlled by a computer (thus

reducing demand characteristics related to the experimenter's knowledge of group assignment), and the immediate experimental context was the same for both alcoholic and nonalcoholic subjects.

In regard to the external validity of this study, the small sample size and the fact that only men were included as subjects suggest caution in generalizing the present results to the general population of alcoholics. Only future research can tell whether the special sensitivity to social contingencies demonstrated by our alcoholic subjects is a more generalizable characteristic of individuals with alcohol disorders and whether it is a characteristic specific to alcoholics or one which appears in patients with other kinds of psychopathology. Finally, because the alcoholic subjects were drawn from a patient population while the nonalcoholic subjects were not in treatment of any type, there may have been other differences (e.g., response to authority figures by those within the system) between the groups which affected the results of this experiment. Therefore, subsequent experiments of this type should include a sample of outpatients who are not alcoholic.

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