EFFECTS OF ALCOHOL ON AGGRESSION IN FEMALE SOCIAL DRINKERS: A BALANCED PLACEBO STUDY

THESIS

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

By

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Denton, Texas
December, 1982
Walker, Ann, L., Effects of Alcohol on Aggression in Female Social Drinkers. Master of Science (Experimental Psychology), December, 1982, 44 pp., 6 tables, references, 38 titles.

Forty-eight female undergraduate psychology students were randomly assigned to one of four groups in a 2 X 2 factorial design, with subject expectancy of alcohol consumption and actual alcohol consumption. Subject aggression was measured using a modified Buss procedure. Subjects responded more aggressively when they consumed alcohol regardless of their expectancy. This study, along with past research in this area, indicates clear gender differences in behavioral response to alcohol. Theoretical implications of this are discussed and areas for further research explored.
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A relationship between alcohol and aggression has long been assumed. It is a widely accepted cultural belief that the pharmacological effects of alcohol increase aggressive behavior. There is a large body of correlational support for this assumption, particularly in the association between crime and alcohol (Goodwin, 1973; Medina, 1970; Shupe, 1954; Wolfgang & Strohm, 1956). Wolfgang and Strohm (1956) found alcohol was involved in 64% of 588 murders committed, a figure supported by others (Goodwin, 1973; Medina, 1970). An even greater number of people convicted of assault, about 80%, were found to have high blood alcohol concentrations (greater than .10%) (Shupe, 1954). The majority of these investigations focused on men, but those that included women (Wolfgang & Strohm, 1956) found alcohol only slightly less frequently involved (60% of the homicides, compared to 65% for men).

Despite widespread cultural stereotypes that alcohol acts directly to increase aggression, recent evidence suggests that this is not accurate. In order to examine the nature of the relationship between alcohol and aggression, major theories of this relationship, along with critical research, were examined. Two previously prominent theories
of the effects of alcohol, the disinhibition and energizing theories, were based on the belief that alcohol increases aggression based on its pharmacological effects. However, research based on these theories has failed to support them. There is more support for the recent expectancy theory which attributes increases in aggression to expectancy effects rather than to the direct effect of alcohol. This model has never been examined in women. Since gender differences in response to alcohol are commonly seen, independent assessment of the relationship between alcohol and aggression in women is needed. On the basis of this review, a study was proposed to elucidate the aggression-alcohol relationship to women.

**Disinhibition and Unergizing Theories**

Three major theoretical explanations of the mechanisms by which alcohol increases aggression have been proposed: the disinhibition, energizing, and expectancy theories. The disinhibition theory has been by far the most popular (Carpenter & Armenti, 1972; McClelland, Davis, Kalin, & Wanner, 1972; Medina, 1970). This model assumes that people are all aggressively motivated, but aggressive action is checked by internal inhibition mechanisms. Alcohol increases aggression by releasing behavior from this internal inhibition. Similar to this model is the energizing theory which proposes that alcohol enhances aggression through the physiological effects of the drug alone.
Most research in the last two decades has focused on testing these two theories. In all, evidence has not supported either model.

Bennett, Buss, and Carpenter (1966) found alcohol did not effect the aggressiveness of subjects who were asked to deliver electric shocks at any of several levels of intensities to a confederate. Subjects were told that the experiment was a study of discriminant learning and the effects of punishment. The confederate was, of course, not shocked, but subjects were given every reason to believe that he was. This aggression eliciting procedure was developed by Buss (1961) and although this procedure has been widely used, it has been criticized on several points. Taylor and his associates (Shuntich & Taylor, 1972; Taylor, 1967; Taylor & Epstein, 1967; Taylor & Gammon, 1975; Taylor, Gammon, & Capasso, 1976) suggest that subjects will not react aggressively unless they perceive that the confederate is capable of aggressing against them. Recently, the Buss procedure was successfully used in a modified form in which the confederate provoked the subject prior to the bogus learning task (Lang, Goeckner, Adesso, & Marlatt, 1975).

Taylor and his associates have developed an alternate procedure for eliciting and measuring aggression. In this, subjects compete with an aggressive confederate on a perceptual motor task. In this task, subjects are allowed to select shock intensity levels to deliver to their opponent,
and are led to believe that their opponent also selects shock intensity levels to deliver to them. During the competition the opponent can initiate aggressive responses and can retaliate against the subject. Again, the confederate is not actually shocked and shocks delivered to the subject are prearranged. Taylor and Gammon (1975) and Taylor and his associates (1976) found that subjects who had a higher blood alcohol concentration (BAC) were more aggressive. In addition, when the opponent was clearly nonaggressive (e.g. the confederate stated he didn't want to shock the subject and was afraid of hurting him), neither the intoxicated or nonintoxicated subjects behaved aggressively. Expectancy was not assessed. Zeichner and Phil (1979) using a similar procedure also found that subjects who had high BAC were more aggressive and less cognizant of the consequences of that aggression.

This research points to three major failings of the energizing and disinhibition theories. First, this research does not indicate that alcohol increases aggressive behavior through its pharmacological effects alone. The necessity of using a properly provocative confederate implies that some cognitive control of aggression is operating. Secondly, alcohol alone does not appear to energize aggressive behavior. In fact, the arousal of an aggressive and retaliatory opponent appears necessary before subjects respond aggressively. Finally, and perhaps most devastating for these models,
the energizing and disinhibition theories can not adequately account for expectancy effects.

Expectancy effect is the influence of cognitive set and preconceptions about the drug which mediate subsequent behaviors. Recent investigations (Boyatzis, 1974; Lang et al., 1975) have indicated that expectancy effects predominate over alcohol's pharmacological effects on aggressive behavior.

Boyatzis (1974), in an unusual study in a naturalistic setting, demonstrated that expectancy exerts a potent but subtle influence on aggressive behavior. He videotaped 163 men at simulated "parties" who were either served beer, distilled liquor and mixers, or mixers alone. Judges rated the verbal and physical aggression the subjects exhibited in the course of the four hour "parties." The men were given the opportunity to engage in competitive sports like darts and pool, or talk, and BAC was measured several times during the evening. Boyatzis found the men in the alcohol conditions were significantly more aggressive 15 minutes after the "parties" began, far too soon for alcohol to have had any effect. Moreover, the men in the liquor condition were significantly more aggressive than the men in the beer condition although their BAC levels were equivalent.

**Expectancy Model**

Boyatzis' (1974) findings indicate that the effect of alcohol on aggressive behavior is cognitively mediated to a greater extent than the disinhibition or energizing theories
would postulate. Boyatzis' findings are consistent with a third model of the effect of alcohol on aggression, the Expectancy Model. The Expectancy Model predicts that one's preconceptions of the effects of drinking control aggressive behavior rather than the pharmacological effects of alcohol.

The Balanced Placebo Design

New methodology has been required to examine expectancy effects on aggressive behavior. This makes use of placebos which, in alcohol research, are drinks made to smell and taste like alcohol, but which contain no alcohol. Placebos enable one to examine the expectancy independently of alcohol. Placebos have been long used in research, but only recently applied to alcohol research (Marlatt & Rohsenow, 1980). Early drug research used a two-group double-blind procedure (Carpenter, 1968). The drug group was given the drug while the placebo group received the placebo. Both groups were, however, instructed that they were receiving the drug. The double-blind procedure controlled for experimenter bias, but did not completely control for subject expectancies. The balanced placebo design is able to control for subject expectancies by adding two groups. In one, called the antiplacebo group, the subject was told he would not receive the drug but was, in reality, given it. The fourth group was an untreated control group in which subjects were told they would not be given the drug and did not receive it. This design was first used in the early 1960's.
(Ross, Drugman, Lyerly & Clyde, 1962; Lyerly, Ross, Drugman, & Clyde, 1964), but was not widely used in alcohol research until the 1970's.

**Investigations of Alcohol and Expectancy**

To date, only one published study has examined the effects of alcohol on aggression using the balance placebo design. Lang and his associates (1975) used male subjects and a modified Buss procedure to elicit aggression. Subjects in the drug and antiplacebo conditions were given vodka and tonic to a .10% BAC. Those in the placebo and untreated groups were given tonic alone. Regardless of the actual alcohol content, subjects who believed that they consumed alcohol were more aggressive than those who believed they had consumed tonic alone. Reaction time was also measured and this was affected by alcohol alone.

The expectancy theory has received additional support in studies of the effects of alcohol on other behaviors. In general, expectancy effects operate on behaviors for which there are existing sociocultural beliefs about the effects of alcohol. These include social anxiety (Abrams & Wilson, 1979; Polivy, Schueneman, & Carlson, 1976; Wilson & Abrams, 1977) and sexual arousal (Briddel, Rimm, Caddy, Krawitz, Sholes, & Wunderlin, 1978; Briddle & Wilson, 1976, Wilson & Lawson, 1976a & b; Wilson, Lawson, & Abrams, 1978). In these areas, support for an expectancy effect strongly disputes the notion that alcohol disinhibits or energizes aggression on the basis of its pharmacological properties alone.
Other behaviors affected by alcohol do appear to be primarily mediated by the pharmacological effects of the drug. These included mood changes (Conner & Maisto, 1978; McCollom, Burish, Maisto, & Sobell, 1978) changes in acuity of memory and related cognitive processes (Maisto, Lauerman, & Adesso, 1977; Miller, Adesso, Fleming, Gino, & Lauerman, 1977; Williams, Goldman & Williams, 1978), and ability to brake and steer an automobile (Rimm, Sininger, Faherty, Whitley, & Perl, 1982).

Gender Differences

Gender differences have been consistently found in behaviors which appear to be mediated by expectancy effects rather than the pharmacological effects of alcohol. In a balanced placebo design, Abrams and Wilson (1979) found that women's social anxiety increased when they believed they had consumed alcohol regardless of actual alcohol content, while men's anxiety had been previously shown to decrease under similar conditions (Wilson & Abrams, 1977). Wilson and Lawson (1978) found women's physiological sexual arousal decreased in the two alcohol conditions only, while men's arousal was previously demonstrated to be effected by expectancy alone (Wilson & Lawson, 1976). A methodological flaw present in both of these studies on women is the failure to select female subjects with approximately equivalent drinking histories as their male counterparts.
One interpretation of this association of gender differences with expectancy effects is that they are caused by differences in culturally sanctioned drinking behaviors for each sex. Drinking by males is viewed as an acceptable stimulus for reducing aggressive or sexual inhibitions. However, such behavior is not sanctioned in women, even when responsibility for the behavior can be displaced to the alcohol.

The effect of alcohol on aggression in women has never been examined. Since women respond differently from men in the other behavioral areas where expectancy effects are seen, it is quite likely that they will also respond differently in this area. Moreover, since previous studies on women's reactions to alcohol (Abrams & Wilson, 1979; Wilson & Lawson, 1978) have not consistently supported either an expectancy or pharmacological interpretation, it is important to study women's reactions further.

The present study examined the effects of alcohol and expectancy on aggressive behavior in women. A double blind placebo design was used. In order to facilitate comparison with studies on the relationship between male aggression and alcohol (Lang et al., 1975), a similar procedure was used. This consisted of a modified Buss procedure in which subjects were provoked by the confederate. A pilot was conducted to insure the efficacy of this procedure in eliciting aggression. Finally, a female confederate was selected. Thus, there was
two independent variables in a 2 X 2 factorial design. These were alcohol expectancy and actual alcohol consumed.

Only subjects with at least a moderate amount of experience with alcohol were selected. This was to insure valid comparison to studies with men, and also to facilitate generalization.

Five dependent measures were used. There were the intensity of shock delivered to the confederate, the Eysenck Personality Inventory, the Fear of Negative Evaluation Scale (Watson & Friend, 1969), Rotter's Internal-External Scale, and the Personal Attributes Questionnaire (Spence & Helmrick, 1978). The psychological tests were selected to examine any potential mediating effects of certain personality factors on the alcohol-aggression relationship. There were administered while the subject was consuming her drinks to prevent her from introspecting on the content of the drinks.

The study permits the evaluation of the two major competing theories of the relationship between alcohol and female aggression.

1. If the pharmacological effects of alcohol are primarily involved in facilitating aggression, then the two groups administered alcohol (the drug and antiplacebo groups) should have higher aggression scores than the groups that did not receive alcohol.

2. If expectancy effects of alcohol are primarily involved, then the groups who believed they consumed alcohol
(the drug and placebo groups) should have higher aggression scores than the group that believed they were not given alcohol.

**Method**

**Subjects**

The subjects were 48 NTSU female students enrolled in undergraduate psychology courses who agreed to participate in the study in exchange for course credit. Their ages ranged from 19 to 27 years, and their average age was 21 years old. Subjects were rejected from the study for any of the following reasons: familiarity with the Buss apparatus, lack of experience with drinking alcohol, objections to drinking alcohol, and intoxication at the time of the experiment. Two subjects were rejected who stated they were familiar with the Buss apparatus at the time they were shown this experiment.

Subjects were recruited by telephoning those who expressed an interest in participating in the experiment. They were told the experiment involved a study of the effects of alcohol on personality, learning, and various other behaviors, and were asked to abstain from food and drugs of any kind for a period of four hours prior to their scheduled appointment.

**Design**

Two independent variables were manipulated in this experiment. They were a) expectancy—subjects were led to
believe they consumed alcohol or no alcohol; b) beverage—subjects were given drinks which either contained alcohol or did not. Subjects were provoked by a female confederate against whom they were later given the opportunity to aggress. A 2 X 2 factorial design was used with 12 subjects per call. Subjects were randomly assigned to an expectancy and alcohol condition prior to the experiment.

Procedure

A female confederate (posing as another subject) joined the actual subject in a waiting room where they were met by a female experimenter. The experimenter explained that the experiment was investigating the effects of alcohol on learning, personality, and various behaviors. It was also pointed out that as part of the procedure, some subjects could become intoxicated and some might receive moderate electric shocks. Subjects were informed of any possible consequences of the experiment prior to participation, and gave voluntary consent. Before asking for signatures of the consent forms, the experimenter made it clear that subjects were absolutely free to discontinue the experiment any time they wished.

Following a brief outline of the procedure, the subject and confederate were escorted to separate rooms. After seating the subject, the experimenter left and another individual wearing a white laboratory coat entered and introduced himself as the experimenter's assistant. He
stated that in order to keep the experimenter blind as to whether or not particular pairs of subjects had been given alcohol, he would be administering the drinks to all subjects. He also stated that regardless of whether or not the subject was a member of a pair receiving alcohol, he would be following the same administration procedure for all subjects. It was further explained that this precise uniformity of treatment, including the consumption of comparable volumes of beverages, was necessary to ensure that it was the alcohol and not some other difference in the experimental procedure that accounted for any observed variation in behavior and performance.

After this introduction, each subject was weighed in order to determine the volume of beverage to be administered. An intoxilizer test (utilizing ALERT Model JBAC with digital display, Alcohol Countermeasure Systems, Inc.) was then given to detect any blood alcohol content.

**Expectancy Manipulation**

Each subject in the expect-alcohol condition was told that she and her partner would be receiving several vodka and tonic drinks. In the expect-tonic condition, each subject was told that she and her partner were part of a control group and would be drinking only tonic water.

At this point, the assistant consulted a previously prepared table to determine what volume of one part 100 proof vodka to five parts tonic would be required for an
individual of the subject's weight to reach a .10% blood alcohol concentrate within approximately one hour. The ratio of 1:5 of vodka-to-tonic used in drinks containing alcohol was chosen on the basis of the previously reported findings (Marlatt, Demming, & Reed, 1973) that subjects tasting this mixture could not detect the presence or absence of vodka at a better than chance rate. A .10% blood alcohol concentration was selected because it represents the lower limit of the range of BAC that most authorities define as constituting a state of legal intoxication (American Medical Association, 1959).

Once the assistant had determined the volume of liquid appropriate for a particular subject, he proceeded to prepare the drinks at the bar while the subject observed. In the expect-alcohol conditions, the assistant poured about one-sixth the total volume required from the vodka bottle into a graduated beaker, appearing to measure it carefully. Then the liquid was distributed equally into three large tumblers. This procedure was then repeated using five times the volume from the chilled tonic bottles. A squirt of lime juice was added to each tumbler. In the expect-tonic conditions, the procedure was the same except that the total volume of liquid was taken from the tonic bottles only. In order to enhance the credibility of the deception conditions, all of the beverages used were premixed and placed into legitimate bottles prior to the subject's arrival. Thus, if
a subject was actually to receive alcohol, all of the bottles she saw contained a mixture of vodka and tonic. For the subjects in the tonic conditions, both the vodka and tonic bottles contained only tonic. Tonic used in the vodka bottle had been previously decarbonated so that it would appear to be vodka.

After the assistant prepared the drinks and gave them to the subject, he told the subject that 30 minutes would be allowed to consume the drinks. The assistant then removed the bottles from the room, stating that he was going to go and prepare the drinks for the other subject. The assistant returned in a few minutes and administered the battery of psychological tests to the subject, while she continued to drink. These included Eysenck's Personality Inventory (Eysenck & Eysenck, 1968), the Fear of Negative Evaluation Scale (Watson & Friend, 1969), Rotter's Internal-External Scale (Rotter, 1966) and the Personal Attributes Questionnaire (Spencer & Helmreich, 1978). These were designed to measure any possible mediating effects of personality factors, and were given at this time to distract the subject from attending to internal cues as he consumed the beverages. Order of administration of the test was randomized.

Provocation

At the end of this 30 minute period, the experimenter reentered the room. He escorted the subject and the confederate to another room. Here the confederate was seated
at a table containing two mirror-tracing apparatuses. The subject was informed that few errors on this task indicated good motor coordination and superior intelligence. The task was made more difficult because the figure was obscured from direct view and visible only through a mirror placed vertically behind the figure. The subject and confederate were given 90 seconds to work on the task and then were told to place their figures on the table between them in full view. The experimenter then left the room, explaining that he was going to help the assistant prepare for the next part of the experiment.

While the experimenter was gone, the confederate provoked the subject. The confederate's figure drawing was excellent, and in a sarcastic and condescending manner, the confederate asked if the subject's attempt had been serious. She questioned the subject's intelligence, asked if she had to cheat to stay in school.

Assessment of Aggression

The experimenter then returned and measured the subject's blood alcohol level on the intoxilizer test. All subjects had blood alcohol levels of .095 to .105%. The experimenter then introduced the final phase of the experiment as a "study of the effect of alcohol on learning under stress." A coin was flipped to determine who would be teacher and learner, but it was actually rigged so that subject was always the teacher. As learner, the confederate was taken to another room.
The "teacher" was informed that the learner was to try to solve a code while under threat of stress and he would receive instructions and have shock electrodes attached in the other room. The teacher was then seated before a control panel. This consisted of 3 buttons corresponding to the three consonants in the code, a green and a red light, and ten numbered black buttons. The teacher was told to give the learner the code by pushing the three buttons in the correct order. If the green light came on, it indicated the learner had responded correctly and the teacher was to give the next code. If the red light came on, the teacher was to administer a shock. She was informed that the shock intensity increased from low to high from buttons .40 to 2.0. She was instructed to select the intensity of shock to deliver to the confederate following each failure, but to deliver the shock as quickly as possible.

Over 30 trials, a prearranged schedule of 15 failures was presented to the subject by the assistant seated in an adjoining room. The confederate had a panel wired to the subject's panel.

After this task, the subject was given another intoxilizer test and asked to estimate how much alcohol she had consumed. She was also asked a series of questions, designed to determine if she had been aware of the deception. Specifically the subject was asked, "How was your drink?", "How did your drink taste?", or "How strong did
did you think it was?" (in the alcohol conditions), and
"What do you think was in it?" Subjects were also asked,
"What did you think of the learning task?", "How did you
feel about it?", and "What did you think about delivering
shocks?"

The experimenter then explained the true nature of the
experiment and the subject's actual treatment. Subjects who
had received alcohol were given coffee and the assistant
remained with them until the intoxilizer indicated they
were well below the legal limit of intoxication. They were
then asked not to discuss the results with anyone, given
course credit for the participation, and thanked.

Results

Experience with Alcohol

Subjects selected for the study had moderate experience
with alcohol to facilitate comparison with previous research
and provide subject homogeneity. Subjects were ommitted
whose average consumption was less than a drink a week. The
mean number of drinks consumed a week by subjects was found
to be 1.6 with a range from 1 to 5 drinks. There were non-
significant differences between the experimental and control
groups on the weekly average consumption of alcohol ($F = 1.10,$
p > .10).

Debriefing

Debriefing interviews were conducted to explain the pur-
pose of the experiment and to determine whether subjects had
detected the deceptions. All subjects were initially asked, "How was your drink." Subjects in expect-alcohol conditions were then asked, "How strong did you think it was?" Subjects in the expect-tonic conditions were asked, "How did your drink taste?" All subjects were finally asked, "What did you think was in it?" All subjects in the expect-alcohol conditions stated that they believed their drinks had contained alcohol. Twenty of the 24 expect-alcohol subjects showed behavioral signs of alcohol intoxications, such as giddiness and slurred speech. In addition, all subjects in the expect-tonic conditions reported they believed their drinks contained tonic. None showed behavioral signs of intoxication.

The second deception in this study involved the Buss aggression apparatus, and none of the subjects who completed the study reported detecting this deception. In fact, most expressed considerable surprise upon learning that they had not actually delivered shocks. Two subjects who discovered this deception were discontinued from the study.

Comparison of Aggressiveness of Alcohol and Expectancy Groups

Before aggressiveness was measured, subjects were evaluated with the intoxilizer to insure BAC of .10% in subjects in the alcohol conditions. Subjects who received alcohol had BAC of .095 to .105%.

The drug, control, placebo, and anti-placebo groups were compared on the average intensity of shock they delivered to the confederate during the learning task. Shock
intensity was utilized to measure aggression. Results of the 2 x 2 ANOVA showed a significant effect for the beverage factor (F 3, 28 = 6.72, p < .05; Table 1). Pairwise post-hoc comparisons between groups were conducted utilizing Duncan's test. Subjects in the anti-placebo group (those who received alcohol and did not expect alcohol) delivered significantly (p < .05) more intense levels of shock (x̄ = 13.5) than either of those in the placebo group (subjects who did not receive alcohol and expected alcohol; x̄ = 7.4) or in the control group (subjects who did not receive alcohol and did not expect alcohol; x̄ = 6.5). There was a trend for subjects in the drug group (x̄ = 10.5) to also respond more aggressively than the groups who did not receive alcohol (p < .10). These data are presented in Table 2.

Table 1

ANOVA for Comparison of Aggressiveness of Alcohol vs. Expectancy Groups

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>MS</th>
<th>df</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1 (beverage)</td>
<td>210.125</td>
<td>210.125</td>
<td>1</td>
<td>6.718*</td>
</tr>
<tr>
<td>Factor 2 (expectancy)</td>
<td>8</td>
<td>8</td>
<td>1</td>
<td>.2558</td>
</tr>
<tr>
<td>Interaction</td>
<td>28.125</td>
<td>28.125</td>
<td>1</td>
<td>.899</td>
</tr>
<tr>
<td>Within Cells</td>
<td>875.80</td>
<td>31.279</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significance at p < .05.
Table 2
Pairwise Post-Hoc Comparison of Groups on the Intensity of Shock Delivered to the Confederate

<table>
<thead>
<tr>
<th>Alcohol</th>
<th>Expected Alcohol</th>
<th>Expected No Alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1 (Drug Group)</td>
<td>Group 2 (Anti Placebo)</td>
</tr>
<tr>
<td></td>
<td>$\bar{x} = 10.6$</td>
<td>$\bar{x} = 13.5$</td>
</tr>
<tr>
<td>No Alcohol</td>
<td>Group 3 (Placebo)</td>
<td>Group 4 (Control)</td>
</tr>
<tr>
<td></td>
<td>$\bar{x} = 7.4$</td>
<td>$\bar{x} = 6.5$</td>
</tr>
</tbody>
</table>

Duncan's Post-Hoc Comparison by Groups For Aggressiveness Ratings

<table>
<thead>
<tr>
<th>Comparison Groups</th>
<th>Difference Between Means</th>
<th>Ranks Spanned</th>
<th>Duncan's Shortest Significant Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 vs Group 2</td>
<td>2.875</td>
<td>2</td>
<td>4.438 $\alpha .10$</td>
</tr>
<tr>
<td>Group 1 vs Group 3</td>
<td>2.89</td>
<td>2</td>
<td>4.438 $\alpha .10$</td>
</tr>
<tr>
<td>Group 1 vs Group 4</td>
<td>4.725</td>
<td>3</td>
<td>4.68 $=.10$</td>
</tr>
<tr>
<td>Group 2 vs Group 3</td>
<td>5.765*</td>
<td>3</td>
<td>5.61 $=.05$</td>
</tr>
<tr>
<td>Group 2 vs Group 4</td>
<td>7.000*</td>
<td>4</td>
<td>4.79 $=.05$</td>
</tr>
<tr>
<td>Group 3 vs Group 4</td>
<td>1.235</td>
<td>2</td>
<td>4.438 $=.10$</td>
</tr>
</tbody>
</table>

*Indicates significant at $p \leq .05$.

The subjects delivered shocks of relatively low intensity even in the most aggressive groups. It was possible on each trial to deliver a shock intensity from .40 to 2.0. The mean level of shock delivered by the subjects was .63 per trial. Subjects in the drug group gave a mean shock of
.71 per trial, in the anti-placebo group of .90, in the placebo group of .49, and in the control group of .43. These numbers are based on the group means reported above, divided by 15.

Variations of shock intensity over 15 trials were also analyzed to determine if aggressiveness differed significantly over time during the "learning" task. Each block of five trials was compared across groups. No significant differences were found using a one-way ANOVA collapsed across alcohol and expectancy conditions (F = .162, p > .10).

Correlation Between Dependent Measures

None of the four psychological tests administered correlated significantly with the appropriate ratings as measured by shock intensity. For this reason, multiple regression procedures were not used in the analysis of differences between groups on the aggression scores. The groups were also compared on these four instruments, and they differed significantly only on the extroversion scale of the Eysenck Personality Questionnaire (EPQ). Finally, subjects' scores were compared with normative data on these instruments and they deviated from the norms on only the psychoticism scale of the EPQ. On this scale, subjects were one standard deviation above the average population scale.

Fear of Negative Evaluation Scale

The groups differed insignificantly in their sensitivity to social evaluation as measured on the Watson and
Friend (1969) Fear of Negative Evaluation Scale \( (F = .148, \ p > 10) \). Subjects mean score on this scale was 12.75, placing them within the normal range for women (Table 3).

Table 3

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Average FNE</th>
<th>Average Rotter Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>13.625</td>
<td>20.00</td>
</tr>
<tr>
<td>Expect alcohol, received alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td>14.856</td>
<td>21.14</td>
</tr>
<tr>
<td>Expect no alcohol, receive alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3</td>
<td>13.00</td>
<td>21.40</td>
</tr>
<tr>
<td>Expect alcohol, receive no alcohol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 4</td>
<td>11.12</td>
<td>20.38</td>
</tr>
<tr>
<td>Expect no alcohol, receive no alcohol</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. No differences were significant.

Rotter's Internal-External Scale

Significant differences across the four groups in their scores on Rotter's Internal-External Locus of Control scale were not observed. The mean score on this was 20.6 and the data are also presented in Table 3.

Personal Attributes Questionnaire

The groups did not differ significantly in feminine identification as indicated on Spence and Helmreich's (1978)
Personal Attributes Questionnaire ($F = 1.724$, $p > .10$), or in masculine identification ($F = 1.00$, $p > .10$), or in androgynous identification ($F = 1.558$, $p > .10$). Mean scores on the Masculinity scale were 28.18; on the Femininity scale 32.80; and on the Androgeny scale 27.09. The data from post-hoc comparisons on these scales utilizing Duncan's test are presented in Table 4.

**Table 4**

Comparison Across Groups on the Personal Attributes Questionnaire

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Average Score on Masculinity Scale</th>
<th>Average Score on Femininity Scale</th>
<th>Average Score on Androgeny Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>28.75</td>
<td>31.625</td>
<td>28.50</td>
</tr>
<tr>
<td>Group 2</td>
<td>26.714</td>
<td>31.256</td>
<td>25.714</td>
</tr>
<tr>
<td>Group 3</td>
<td>28.00</td>
<td>34.80</td>
<td>27.40</td>
</tr>
<tr>
<td>Group 4</td>
<td>29.25</td>
<td>33.50</td>
<td>26.75</td>
</tr>
</tbody>
</table>

*Note.* No differences were significant.

**Eysenck Personality Questionnaire**

Significant effects were found on the extroversion scale of the EPQ ($F = 2.997$, $p > .05$) (Table 5), but subject groups did not differ on the lie scale ($F = .463$, $p > .10$), the neuroticism scale ($F = 1.886$, $p > .10$), or the psychoticism scale ($F = .392$, $p > .10$). The drug group was significantly more extroverted ($\bar{x} = 14.6$) than the placebo group.
(\bar{x} = 11.0). Subjects' average scores on the extroversion scale (\bar{x} = 12.94), on the lie scale (\bar{x} = 7.54), and on the neuroticism scale (\bar{x} = 11.46) were within the normal range (Eysenck & Eysenck, 1976). The mean scores on the psychotic scale were 7.16, which was one standard deviation above the mean. The data for the EPQ by group membership are presented in Table 6 (Appendix D).

Table 5

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>MS</th>
<th>df</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>83.221</td>
<td>27.740</td>
<td>3</td>
<td>2.997*</td>
</tr>
<tr>
<td>Within Groups</td>
<td>259.165</td>
<td>9.256</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significance at p \leq 0.05.

Discussion

Women were shown to be more aggressive following alcohol intoxication regardless of expectancy. They were found to be most aggressive when they received alcohol and did not expect it. In contrast, Lang and his associates (1975) observed that men were more aggressive when they believed they were given alcohol even without alcohol consumption. The two studies utilized identical design, procedures, and experimental instruments. The only difference between the studies was the gender of the subjects.
Therefore, the varied findings were likely related to sex differences.

These gender differences in behavioral response to alcohol have also been demonstrated in past research exploring the effects of alcohol on sexual arousal and social anxiety. Using a balanced placebo, Wilson and Lawson (1976; 1978) examined sexual arousal and found men became more aroused on the basis of expectancy and women became less aroused on the basis of alcohol consumption. Abrams and Wilson (1979) and Wilson and Abrams (1977) in their investigation of the effect of alcohol and expectancy on social anxiety found that men and women both responded to the expectancy factor alone. Men became less anxious and women became more anxious when they thought they had consumed alcohol regardless of actual alcohol consumption. Overall, these studies provided evidence that social anxiety, sexual arousal, and aggressive responses to alcohol are gender-specific.

These findings of gender differences in drug and alcohol effects on sexual arousal, social anxiety, and aggressive behaviors were consistent with a modified form of expectancy theory. This theory proposed that strongly perceived social prescriptions dominate over drug effects in influencing conflictual behaviors. Conflictual behaviors are those which are typically followed with immediate positive reinforcement and delayed social censure (Marlatt &
When social expectancies are ambiguous or the behaviors are not conflictual, pharmacological drug effects would be predicted to have a dominant effect on behavior. Aggressive and sexual responses in men and social anxiety responses in both men and women may be conjectured to have clear social prescriptions for accepted behavior (Frieze, Parsons, Johnson, Ruble, & Zellman, 1978).

Expectancy effects were found when these behaviors were studied. In contrast, aggressive and sexual responses in women have ambiguous social sanctions (Frieze et al., 1978) and drug effects were dominant when these behaviors were investigated.

Other expectancy research provides indirect support for this theory. This research investigated non-social behaviors and failed to find expectancy effects (Lang et al., 1975; Rimm, Briddell, Zimmerman, & Caddy, 1981, Rimm et al., 1982). Lang and his associates found reductions in reaction time varied with alcohol consumption and not in the subjects expectations. Rimm and his colleagues (1981; 1982) investigated alcohol and expectancy effects in two unusual behaviors: fear of snakes, and the ability to drive an automobile. They found that self-reported snake fear was reduced in intoxicated subjects, but alcohol did not alter their ability to approach the snake. Expectancy did not influence these behaviors. In a second study, these researchers found that the ability to brake and steer a
car, as indicated on a simulated driving test, was reduced following alcohol consumption. These behaviors also did not vary with expectancy. The dominance of drug effects for these non-social behaviors is consistent with the expectancy theory.

A further test of the expectancy theory would assess subject's perceptions of social sanctions for conflictual behaviors. Following this, alcohol and expectancy effects would be examined in these same behaviors. In this manner, subjects perceptions of social sanctions could be compared with alcohol and expectancy effects in the same behaviors. This study would utilize a balanced placebo design, manipulating expectancy in the same manner as the present study. A pool of subjects would be pretested to determine their perceptions of social sanctions for the target behavior, as well as their beliefs concerning alterations of that behavior during intoxication. A questionnaire would be used to assess this, with the questions imbedded in the context of an assessment of relevant personality dimensions. Two groups of subjects would then be selected from this pool: those who perceived strong social expectancies and those who did not discern any sanctions for the target behavior. Changes in the target behavior would then be investigated utilizing a procedure that facilitated comparisons with prior research. Hence a 2 x 2 x 2 factorial design would be used
with three independent variables: alcohol—subjects would either receive alcohol or a placebo; expectancy—subjects would either be told they were given alcohol or the placebo; and perceived social prescriptions—subjects would either ascribe to strong social sanctions or no sanctions for the target behavior. The expectancy theory would predict subjects who perceived strong social sanctions who would alter their behavior according to their expectancies. Those who did not perceive sanctions would be predicted to be influenced by drug effects rather than expectancy. Hence, this study would more fully assess the expectancy theory.

The present study also showed that aggression did not significantly vary along examined personality dimensions. These included sex role identification, locus of control, sensitivity to social evaluation, defensiveness, neuroticism, psychotocism, and extroversion. Previous research (Lang et al., 1975) using the same instruments, excluding the sex role identification scale, also failed to find correlations between aggressive responding and these dimension. Rapaporte (1972) examined the relationship between sex role identification and aggressiveness. She found that individuals with a strong feminine identification were less aggressive than those with a strong masculine identification. Aggressiveness was measured utilizing a different procedure: performance on a scrambled sentences test and on a mood-attitude checklist. Moreover, a different scale
for assessing sex role identification, the Gough Fe test was used. It is likely that the deviations in instruments and procedures between the present study and Rapaporte accounted for the divergent results.

The generalizability of this study was restricted by the analogue design, the type of aggression investigated, and the inclusion of undergraduates as subjects. First, an experimental setting was used to measure aggression. While attempts were made to keep the setting as naturalistic as feasible, the present design was used to maximize experimental control and comparison with prior research. A second limitation was the measurement of an analogue form of aggression (Rimm & Masters, 1979). Aggression can be measured using naturalistic, behavioral, psychophysiological, projective, clinical, historical, and paper and pencil indices. The present study explored only one of these indices. Moreover, only one facet of aggression, response magnitude was assessed. Other aspects such as decision to aggress or duration of the response were not investigated. A third limitation was the use of undergraduates, who clearly do not represent the population of American women as a whole.

This study could be done in a naturalistic setting using realistic measures of aggression and a more representative pool of subjects. For example, it might be replicated in a cocktail lounge setting, measuring
aggression verbally or in degree of competiveness in electronic videogames. This design would also entail the measurement of additional forms of aggression. For instance, intensity of aggression as well as the decision to aggress would be examined. Consequently, aggression would be more completely assessed. The progression from well-controlled experimentation to naturalistic studies would be most desirable manner to build and extend knowledge in this area.

In summary, the results of this study indicated that women increased aggressive responding when they consumed alcohol. These findings, along with those of past research on gender differences, were discussed as support for a modified form of the expectancy theory. Limitations in this investigation included the analogue design, restrictions in the measurement instruments, and the use of female undergraduates. Replication in a naturalistic study was explored as a means to extend generalization of these findings. The findings of the present study indicated that aggressive behavior in women was mediated by drug effect rather than expectancy. Further research was discussed to examine the role of expectancy on social behaviors.
Appendix A

Informed Consent Form

North Texas State University
Psychology Department
Clinical Research Lab Questionnaire

Project Name: Alcohol and Behavior

Investigator(s): A. Walker and assistants

Date: ________________

This is to certify that I, ________________, hereby agree to participate as a volunteer in a scientific investigation as part of the educational and research program of North Texas State University, under the supervision of Dr. D. C. Rimm.

The investigation and my part in it have been described and explained to me, and I understand the explanation. Further, I understand that I may be given alcohol as part of this experiment and agree to this procedure.

I have been given an opportunity to ask questions and all such questions have been answered to my satisfaction.

I understand that any data or answers to questions will remain confidential with regard to my identity.

I further understand that I am free to withdraw my consent and terminate my participation at any time, without penalty.

I have been informed that I have the right to contact the Psychology Department Committee for the Protection of
Appendix A--Continued

Human Subjects and/or the University Committee should I wish to express any opinions regarding the conduct of this study.

Signature: __________________________

Date of Birth: __________________________
Appendix B

Use of Human Subjects
Informed Consent

Name of Subject: ____________________________________________

1. I hereby give consent to A. Walker and assistants to perform or supervise the following investigational procedure or treatment:

   Give me an alcoholic beverage and request me to speak to another person.

______________________________________________________________

2. I have (seen, heard) a clear explanation and understand the nature and purpose of the procedure or treatment; possible appropriate alternative procedures that would be advantageous to me (him, her); and the attendant discomforts or risks involved and the possibility of complications which might arise. I have (seen, heard) a clear explanation and understand the benefits to be expected. I understand that the procedure or treatment to be performed is investigational and that I may withdraw my consent for my (his, her) status. With my understanding of this, having received this information and satisfactory answers to the questions I have asked, I voluntarily consent to the procedure or treatment designated in Paragraph 1 above.

   Date: ____________________________

   Signed: ________________________   Signed: ________________________

   Witness                          Subject

   or

   Signed: ________________________   Signed: ________________________

   Witness                          Person Responsible

   ________________________________

   Relationship

Instructions to person authorized to sign:

If the subject is not competent, the person responsible shall be the legally appointed guardian or legally authorized representative.
Appendix B--Continued

If the subject is a minor under 18 years of age, the person responsible is the mother or father or legally appointed guardian.

If the subject is unable to write his name, the following is legally acceptable: John H. (His X mark) Doe and two (2) witnesses.
Appendix C

Medical Intake Questionnaire

Project: __________________________ Name: __________________________

Date: __________________________ Age: ________ Sex: ________

Interviewer: ________________________________________________________

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>
| 1.  | ___ | Major medical condition, disability or illness during last 6 months to a year.
| 2.  | ___ | Ulcers.
| 3.  | ___ | Liver or kidney disease (urinary infection Ok).
| 4.  | ___ | Epilepsy or other convulsive disorder suffered in adulthood.
| 5.  | ___ | High blood pressure: On medication and advised not to drink alcoholic beverages.
| 6.  | ___ | Heart condition.
| 7.  | ___ | Hospitalized for psychiatric or psychological problems.
| 8.  | ___ | Currently using: Heroin, morphine, barbituates, amphetamines.
| 9.  | ___ | Currently using medication prescribed by a doctor. List: __________________________
| 10. | ___ | Currently under medical treatment. For what: __________________________
| 11. | ___ | Currently under psychiatric or psychological care? Describe: __________________________
| 12. | ___ | Have you ever been advised not to drink for medical reasons? When? __________________________
| 13. | ___ | Is there reason to believe that advise is still current and valid? __________________________
Appendix C--Continued

"Drink" is defined as 1 jigger (about 1½ oz) 86 proof whiskey with or without mix; one 12-oz can 5.6 beer; or one 6-8 oz glass wine.

About how many drinks might you have in an average week? ____
Appendix D

Table 6
Comparison Between Groups on Eysenck's Personality Questionnaire

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Average Score on Extraversion Scale</th>
<th>Average Score on Lie Scale</th>
<th>Average Score on Neuroticism Scale</th>
<th>Average Score on Psychoticism Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>14.625*</td>
<td>7.25</td>
<td>11.25</td>
<td>7.50</td>
</tr>
<tr>
<td>Group 2</td>
<td>11.00*</td>
<td>9.00</td>
<td>10.857</td>
<td>6.571</td>
</tr>
<tr>
<td>Group 3</td>
<td>12.40</td>
<td>6.40</td>
<td>12.60</td>
<td>7.40</td>
</tr>
<tr>
<td>Group 4</td>
<td>13.75</td>
<td>7.50</td>
<td>11.125</td>
<td>7.25</td>
</tr>
</tbody>
</table>

*Differences between these two groups significant, p ≤ .05.
References


