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ABSTRACT

This research attempted to develop a profile of women's moods across the menstrual cycle and to determine alcohol's effects upon those moods. The Profile of Mood States was used to measure mood in 96 female college students who were heavy drinkers. Subjects were randomly assigned to the cells of the balanced placebo design with equal numbers in each of the three menstrual phases (ovulation, premenstruation, menstruation). The four conditions within the design were: expect alcohol/receive placebo; expect placebo/receive placebo; expect alcohol/receive alcohol; and expect placebo/receive alcohol. Subjects were found to differ on age and on Shipley Institute of Living Scale intelligence quotient scores. Prior to any manipulation, subjects in the three menstrual phases reported no mood differences, failing to support the notion of phase-related moods. Over the course of the experiment the only reliable mood changes that did occur were a reduction in tension-anxiety and, possibly, vigor. Alcohol, expectancies, or menstrual phase did not have reliable effects on mood over time. These findings support Social Learning Theory. (Author/NB)

Mood Effects of Alcohol and Expectancies

During the Menstrual Cycle

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Running head: MOOD EFFECTS

Abstract

This research aimed at developing a profile of women's moods across the menstrual cycle and determining alcohol's effects upon these moods. The Profile of Mood States was used to measure mood. The 96 volunteer, female, heavy drinkers were randomly assigned to the cells of the balanced placebo design with equal numbers in each of the three menstrual phases. Alcohol subjects received enough to raise their blood alcohol level to .07 mg%.

The subjects differed on age and Shipley Institute of Living Scale I.Q. scores. Prior to any manipulation subjects in the three menstrual phases reported no mood differences, failing to support the notion of phase-related moods. Over the course of the experiment the only reliable mood changes that did occur were a reduction in tension-anxiety and, possibly, vigor. Alcohol, expectancies or menstrual phase did not have reliable effects on mood over time. These findings support Social Learning Theory.

Moods Effects of Alcohol and Expectancies

During the Menstrual Cycle

This study focused on the effects of alcohol on the mood of women in the three phases of the menstrual cycle: ovulation, premenstruation and menstruation. The work of Moos (1985), Rouse (1978) and others has made it clear that there are cyclic differences in the moods experienced by women, such that no symptom or group of symptoms is particular to one phase of the menstrual cycle. Some of the factors that are known to influence cyclic differences are age, parity (number of offspring), and use of oral contraceptives. The first question this research addressed was, "Do women experience different moods in the three phases of the cycle?"

There is considerable anecdotal evidence to suggest that some women use alcohol to relieve menstrual distress. Most of the evidence comes from work with alcoholic women; however, it seems likely that nonalcoholic females may also use alcohol to relieve menstrual distress. Belfer, Shader, Carroll and Harmatz (1953) and Podolsky (1963) reported that female alcoholics related their drinking to their menstrual cycle, emphasizing premenstruum as the key time. Podolsky suggested that alcohol was used partly to relieve tension. Sutker, Libet, Allain and Randall (1983) found that normally cycling, nonalcoholic women reported drinking to reduce tension or to relieve negative affect and more solitary drinking during menstruation than at any other time in the menstrual cycle. Drinking at other times in the cycle was reportedly to enhance social functioning and positive feelings. Since these women increased their solitary drinking and drinking to relieve negative affect without increasing their overall alcohol consumption, the authors concluded that these women may expect and/or experience alcohol-induced changes in mood states during menses. Thus, it is not clear whether these changes are due to the direct pharmacological effects of alcohol or are mediated by the culturally-based expectancies of these women. There is a substantial body of literature (Adesso, 1985; Marlatt & Rohsenow, 1980) which suggests that many of alcohol's effects are due more to drinkers' cognitive expectancies than to alcohol's pharmacological actions. That is, these expectancies may become self-fulfilling prophesies which mediate drinkers' behavior when drinking. Thus, the second question which this research addressed was, "What are the relative contributions of alcohol and of expectancies to the mood states which women experience during the phases of the menstrual cycle?"

Method

To examine the differences in the mood reactions of women to alcohol across the three menstrual phases, 96 volunteer, female college students (mean age = 21.73, SD = 4.01) served as subjects. Subjects were heavy drinkers of alcohol with no contraindications to participation. They were screened to insure that they were normally cycling, not using oral contraceptives, were not pregnant, and had no children. Equal numbers were assigned to each of the three menstrual phases.

A methodological approach known as the balanced-placebo design was employed to help separate the effects of alcohol due to its pharmacologic . ctions from those due to the expectancies of the subjects. Half the subjects were led to believe they were receiving alcohol and half that they were not. Half of the subjects in each of these groups actually received alcohol and half received a placebo mixture. Subjects within each menstrual phase were randomly assigned to one of these four groups: expect alcohol/receive alcohol, expect alcohol/receive placebo; expect placebo/receive placebo; expect placebo/receive alcohol. Subjects who received alcohol were given a quantity of vodka and tonic sufficient to raise their blood alcohol level to .07 mg%. The placebo mixture was tonic water alone.

Before consuming alcohol, at the peak of intoxication, and during detoxification the Profile of Mood States (POMS; McNair, Lorr & Droppleman, 1971) was administered. All subjects also completed the Shipley Institute of Living Scale (Shipley, 1940). Blood alcohol concentration measures were taken every 15 minutes throughout the study until the subject was released. Subjects were released after they were debriefed and had achieved a blood alcohol concentration below .05 mg%.

Results

Preliminary Analysis

Preliminary analyses were done on age, weight and IQ to determine if the treatment groups were equal. IQ was measured by the three scales of the Shipley Institute of Living Scale:

Vocabulary scale, Abstraction scale and Total scale. Five 3 (Phase) X 2 (Expectancy) X 2 (Beverage) analyses of variance were computed for age, weight, and the three Shipley IQ scales. No significant differences were found between groups on weight. There were significant differences between groups on age, $F(1, 84) = 4.15$, $p = .045$, for the beverage factor. The mean age for the alcohol group was 20.90 ($SD = 2.79$) and the mean age for the tonic group was 22.56 ($SD = 4.83$). For the Shipley Vocabulary scale, a significant Phase X Expectancy X Beverage interaction was found, $F(2, 84) = 4.56$, $p = .013$. Subjects in the premenstrual ($M = 16.99$, $SD = 1.22$) and menstrual ($M = 17.02$, $SD = 1.24$) phases who expected alcohol scored slightly higher on the Shipley Vocabulary Scale than those subjects expecting tonic in the premenstrual ($M = 16.93$, $SD = 1.20$) and menstrual ($M = 16.99$, $SD = 1.11$) phases; and, those expecting alcohol ($M = 16.46$, $SD = 2.38$) in the ovulatory phase scored lower than those expecting tonic ($M = 16.74$, $SD = 1.32$). The subjects who actually received alcohol ($M = 16.68$, $SD = 1.89$) scored lower than those who received tonic ($M = 18.83$, $SD = 1.44$); however, a phasic difference was also noted. Among the subjects subjects who received alcohol, premenstrual subjects ($M = 16.49$, $SD = .93$) scored lower than menstrual subjects ($M = 16.66$, $SD = 1.04$); however, in the tonic group the premenstrual subjects ($M = 17.44$, $SD = 1.26$) scored higher than the menstrual subjects ($M = 17.34$, $SD = 1.20$). Post hoc comparisons among the cell sums were computed with analyses of simple effects (Keppel, 1982). The ovulatory subjects who expected and received alcohol (*M* = 15.51, *SD* = 2.96) had significantly lower Vocabulary scores than those subjects who expected alcohol and received tonic (*M* = 17.41, *SD* = 1.13) and those subjects who expected tonic and received alcohol (*M* = 17.16, *SD* = 1.52). There were significant main effects for the beverage factor on the Shipley Vocabulary Scale, $F(1, 84) = 6.33$, $p = .014$, the Shipley Abstraction Scale, $F(1, 84) = 15.95$, $p = .000$, and the Shipley Total Scale, $F(1, 84) = 17.60$, $p = .000$. Due to these significant differences among the beverage groups all subsequent analyses were done with age and IQ as covariates. Unless otherwise specified the Shipley Total Scale scores were used as the IQ covariate.

Manipulation Checks

Several checks on the effectiveness of the expectancy manipulation were computed. The effectiveness of the expectancy manipulation varied as a function of the beverage subjects expected and received and of the IQ of subjects. However, overall the manipulations seemed generally successful.

Menstrual Phase Mood Profile Analyses

The first hypothesis was that the reported symptoms would differ across the three phases at baseline. It was predicted that premenstrual subjects would report more negative symptoms than the subjects in the other two phases. It was also predicted that the ovulatory subjects would report more positive moods (e.g., vigor). In an attempt to determine if a different mood profile existed for each of the menstrual phases, a single factor

(Phase) multivariate analysis of variance (MANOVA; SPSS Inc., 1986) was performed on the baseline POMS scales scores. No significant differences were found. A single factor (Phase) multivariate analysis of covariance (SPSS Inc, 1986) with age and IQ controlled, also revealed no significant differences. Thus, the data failed to support Hypothesis 1.

Mood State Changes Analyes

The second hypothesis predicted changes in moods across Trials for the subjects who expected and received alcohol. It was predicted that the premenstrual and menstrual subjects would report a positive mood change. To control for age and IQ, a 3 (Phase) X 2 (Expectancy) X 2 (Beverage) multivariate analysis of covariance was attempted on the six scales of each (baseline, peak intoxication and detoxification) POMS administration separately. The addition of the two covariates led to violations of the assumptions of the multivariate analysis of variance and this analysis could not be validly computed.

An alternative strategy was to perform separate 3 (Phase) X 2 (Expectancy) X 2 (Beverage) X 3 (Trials) multivariate repeated measures analyses of variance on each of the six POMS scales. To correct for an inflation in Type I errors, an alpha level of .01 was used.

The analyses on the scales Depression, Confusion, and Fatigue revealed no main effects or interactions that were significant. The multivariate analysis of variance assumptions were violated for the analysis on the Anger-Hostility scale, therefore the analysis could not be validly computed. Significant main effects for trials were obtained on the Tension-Anxiety scale, $F(2, 83) = 14.89$, $p = .000$, and on the Vigor scale, $F(2,83) = 16.48$, $p = .000$. The first univariate analysis for the Tension-Anxiety Scale contrasted the mean scores at Trial 1 and Trial 3 and revealed significant differences between the two, $F(1, 84) = 18.24$, $p = .000$. The second univariate analysis contrasted mean scores at Trials 1 and 3 with the Trial 2 mean. This analysis also was significant, $F(1, 84) = 16.44$, $p = .000$. Tension-Anxiety scores were highest at baseline ($M = 3.19$, $SD = 4.90$) with a reduction at peak intoxication ($M = .69$, $SD = 4.11$) and a slight rise at detoxication ($M = .82$, $SD = 4.55$).

The first univariate statistic for the Vigor Scale revealed significant differences between the baseline and detoxification trials, $F(1, 84) = 32.32$, $p = .000$. The second univariate analysis contrasting Trial 1 and 3 means with the Trials 2 means was not significant. The Vigor scores were highest at baseline ($M = 16.92$, $SD = 6.44$) with a downward linear trend to detoxification ($M = 13.56$, SD 7.15).

In controlling for Age and IQ, separate 3 (Phase) X 2 (Expectancy) X 2 (Beverage) X 3 (Trials) multivariate repeated measures analyses of covariance (SPSS Inc, 1986) were computed on each of the six POMS scales. Due to functional peculiarities of the SPSS-X MANOVA subprogram when performing computations with covariates, this analysis was calculated with the Shipley Vocabulary and Shipley Abstraction scores rather than the Total score as the IQ covariate. An alpha level of .01 was used to control for Type I errors. The analyses on the Depression, Vigor, Confusion, and Fatigue scales revealed no significant differences. Due to violations in the assumptions of the multivariate analysis of variance, the analysis on the Anger-Hostility scale could not be validly computed. For the Tension-Anxiety scale, the main effect of trials was significant, $F(2,81) = 12.05$, $p = .000$. The first univariate analysis of the Tension-Anxiety Scale contrasted means at Trials 1 and 3 and revealed significant differences between the two, $F(1, 82) = 11.33$, $p = .000$. The second analysis also revealed significant differences for the contrast between means at Trials 1 and 3 with the mean at Trial 2, $F(1, 82) = 16.25$, $p = .000$. At baseline, the Tension-Anxiety scores were the highest ($M = 3.19$, $SD = 4.90$) with a reduction at peak intoxication ($M = .69$, $SD = 4.11$) and a slight increase at detoxification ($M = .82$, $SD = 4.55$).

The data partially support Hypothesis 2 in that there was a reduction in Tension-Anxiety over trials for those subjects who received alcohol. However, no other mood changes were found. The expectation of alcohol reception or the menstrual phase did not influence any reported mood changes.

Discussion

The most surprising finding of this study was the relative failure of alcohol and the menstrual cycle to reliably effect a change in mood for these women. The mood changes which did occur were related to trials, across time and suggested that the women became less anxious and, possibly, less vigorous over the course of the study. Since all women reported this change over time, it seems these changes were independent of both the beverage they received and/or expected and their menstrual phase.

The first hypothesis predicted a different mood profile for each of the menstrual phases. Moos (1985) in developing symptom profiles for each phase of the menstrual cycle, found that premenstruum was characterized mostly by negative affect, while menstruation was dominated by physical complaints. Moos (1985) and others reported that ovulation is characterized by feelings of well-being and positive affect. The present results do not substantiate the earlier findings. No phase related mood differences were obtained. Thus, hypothesis one was not supported.

Some factors such as age and parity may influence menstrual symptomatology making a clear-cut phasic profile difficult to determine. Moos found that younger women reported significantly more negative affect during menses, while Gough (1975) found that women over 30 reported significantly more anxiety premenstrually than during ovulation. These findings are substantiated by Rouse (1978) and others. In the present study the subject's ages ranged from 19 to 36 years. As age appears to influence the reporting of n 've affect in association with menstrual symptomatology, it possible that the age range in this study confounded the results.

Another possible reason for the present findings was the operational definition of the three phases. For example, as defined here, the ovulatory phase began 14 days prior to the onset of menses and continued to the premenstrual phase, which started four days prior to the start of menses. It is possible that the rigid demarcation of each phase used in this study did not coincide with the actual phases experienced by these women. Without obtaining information on their hormonal levels, however, it is impossible to determine if this was the case.

A third possible reason for the present results is that any phasic differences may have been masked by the high level of tension and anxiety that was reported by all subjects on the first administration of the POMS. The elevated tension level may have been associated with part ipation in an experiment. During scheduling and at the time of participation, some subjects appeared ap rehensive about the amount of alcohol they might receive.

The second hypothesis predicted mood changes after the expectation and/or the reception of alcohol. Specific predictions were made regarding mood changes as a function of menstrual phase. Neither the expectation of alcohol nor menstrual phase had an effect on mood changes across time.

The time factor seemed to effect the most change in mood;

however, it was a relatively meager change. Tension-anxiety decreased from baseline to detoxification overall; however, a slight rise from peak intoxication was noted at detoxification. A significant decrease in vigor also occurred across time; however, when age and IQ were controlled, the decrease in vigor was no longer significant.

One possible explanation for the lack of reported mood changes was that the subjects differed on age and Shipley IQ scores. These differences may have made other more subtle changes obscure. Another likely explanation is that the POMS is not sensitive enough to detect these types of changes. Some scales have reliabilities in .60 to .70 range; these low reliabilities undoubtedly confused the outcome.

Since no connections with the menstrual cycle were provided in the instructions given to subjects in the study, Social Learning Theory would have predicted the present failure to find an association between mood and the menstrual cycle. Therefore, subjects expectancies and learning histories need further study in this important area of research.

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