Mood Effects of Social Drinking in Reducers and Augmenters

by

Karen L. McCollom Campbell

Department of Psychology

University of Manitoba

A thesis submitted to the Faculty of Graduate Studies

in partial fulfillment of the requirements for the degree of

Master of Arts

September, 1985

MOOD EFFECTS OF SOCIAL DRINKING IN REDUCERS AND AUGMENTERS

BY

KAREN LOUISE McCOLLOM CAMPBELL

A thesis submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF ARTS

© 1985

Permission has been granted to the LIBRARY OF THE UNIVERSITY OF MANITOBA to lend or sell copies of this thesis, to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film, and UNIVERSITY MICROFILMS to publish an abstract of this thesis.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

I hereby declare that I am the sole author of this publication.

I authorize the University of Manitoba to lend this publication to other institutions or individuals for the purpose of scholarly research.

Karen L. McCollom Campbell

I further authorize the University of Manitoba to reproduce this publication by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

Karen L. McCollom Campbell

ABSTRACT

A literature review suggests some explanations for the inconsistencies in alcohol and mood research: an unnatural environment, individual differences (Eysenck, 1967; Petrie, 1967), and blood alcohol level variations. This study improves upon past research by including a natural barroom setting, the reducing-augmenting characteristic (Petrie, 1967; Vando, 1967), and three blood alcohol levels assessed by breathalyzer.

It was hypothesized that augmenters would report more "beneficial" mood changes (e.g., lower anxiety, depression, anger, fatigue and confusion, and more vigor) with high (depressant) blood alcohol levels than the stimulation-seeking reducers, who would report more "beneficial" mood effects (e.g., lower anxiety, depression, anger, fatigue and confusion, and more vigor) with low (stimulation) blood alcohol levels.

The experiment had a 2 x 3 x 2 factorial design. Data analysis included an analysis of variance upon two levels of personality (reducer and augmenter) by three levels of blood alcohol level (low, moderate and high), with repeated measures on the mood rating trials factor. Dependent variables were the six mood factors of the Profile of Mood

States scale: anger, depression, anxiety, confusion, fatigue, and vigor.

This sample of 67 male bar patrons was biased toward single, heavier-drinking, well-educated men. Significant Trial X R-A Level X B.A.L. effects and Trial X B.A.L. effects emerged for tension (both $p < 0.05$). Significant Trial X R-A Level X B.A.L. effects also emerged for confusion ($p < 0.01$). A significant R-A Level X B.A.L. effect emerged ($p < 0.05$) for depression, as predicted. In addition, significant Trial effects that were not predicted emerged for depression and anger. No other significant effects emerged.

The results generally support the hypotheses as predicted, with reducers reporting more "beneficial" mood changes than augmenters at low and moderate (stimulation) B.A.L.s, and augmenters reporting more "beneficial" mood changes than reducers at high (depressant) B.A.L.s.

ACKNOWLEDGEMENTS

I would like to thank my research advisor, Professor Gordon Barnes, and clinical advisor, Professor Morgan Wright, for their time, energy, support and patience throughout this project. Without our exchange of ideas, this project might never have been created. I also offer my thanks to committee members Professor Walter Driedger and Professor Ross Hartsough for their encouragement and valuable input from specialty areas.

Much gratitude is extended to the bar management and patrons whose interest provided a research site and data for this study.

Most of all, I thank my husband, Richard Campbell, and some very good friends for their faith in me.

TABLE OF CONTENTS

ABSTRACT iii

ACKNOWLEDGEMENTS v

page

MOOD EFFECTS OF SOCIAL DRINKING IN REDUCERS AND AUGMENTERS 1

Introduction 1
Alcohol and Mood States 2
Alcohol and Anxiety 3
Alcohol and Depression 7
Alcohol and Anger 9
Alcohol and Confusion 10
Alcohol and Positive Mood States 11
Blood Alcohol Level 12
Effects of Setting in Alcohol Research . . . 14
Alcohol Research in the Bar 17
Effects of Personality in Alcohol Research 20
Stimulus Intensity Modulation Theory . . . 21
Stimulus Intensity Modulation and Drug Effects 24
Stimulus Intensity Modulation and Drug Preference 29
Method 32
Subjects 32
Vando Reducer-Augmenter Scale 33
Breathalyzer Measurement of Blood Alcohol Content 36
Profile of Mood States Questionnaire . . . 37
Miscellaneous Measures 39
Experimental Design 39
Procedure 40
Analysis 41
Predictions 42
Results 44
Sample Demographics and Drinking History . . 44
Barroom Behavior 48
Correlations 50
Analysis of Variance 52
Tension 52
Confusion 54
Depression 62
Anger 64

Vigor 64
Fatigue 64
Summary 64
Discussion 67

REFERENCES 76

Appendix page

A. APPENDIX A: VANDO REDUCER-AUGMENTER SCALE . . . 101

B. APPENDIX B: PROFILE OF MOOD STATES QUESTIONNAIRE 107

LIST OF TABLES

Table		page
1.	Sample Demographic Characteristics & Comparisons	46
2.	Drinking History Demographics & Comparisons	47
3.	Barroom Behavior	49
4.	Correlations: Independent, Dependent, & Misc.Variables	51
5.	Analysis of Variance Table: Tension	53
6.	Analysis of Variance Table: Confusion	58
7.	Analysis of Variance Table: Depression	62
8.	Analysis of Variance Table: Anger	66

LIST OF FIGURES

Figure		page
1.	Reducer-augmenter Dimension and Arousal	23
2.	Depressant Drug Action (adapted from Eysenck, 1957)	27
3.	Tension: 3-Way Interaction	54
3.	Tension: 3-Way Interaction	55
3.	Tension: 3-Way Interaction	56
4.	Tension: B.A.L. X Trial Interaction	57
5.	Confusion: 3-Way Interaction	59
5.	Confusion: 3-Way Interaction	60
5.	Confusion: 3-Way Interaction	61
6.	Depression: R-A Level X B.A.L. Interaction	63
7.	Depression and Anger: Trial Effects	65

MOOD EFFECTS OF SOCIAL DRINKING IN REDUCERS AND AUGMENTERS

Introduction

This study was designed to investigate the relationship between the reducing-augmenting personality dimension, blood alcohol level, and mood states (anger, depression, hostility, fatigue, confusion and vigor). The primary hypotheses to be tested were:

1) that at low (mild stimulation) blood alcohol levels, reducers will report more "beneficial" mood states (less anxiety, depression, anger, fatigue, confusion and more vigor) than augmenters. This prediction is based upon Eysenck's (1967) and Petrie's (1967) theories of alcohol and personality interaction. With small amounts of alcohol (a biphasic, stimulant-depressant drug), reducers are in optimal stimulation range, while augmenters are not.

2) that at moderate (stimulant) blood alcohol levels, reducers are expected to report more "beneficial" mood (e.g., less anxiety, depression, anger, fatigue, confusion, and more vigor) than augmenters, who are expected to report less "beneficial" mood.

3) that at high (depressant) blood alcohol levels, augmenters are expected to report more beneficial mood than reducers. At depressant B.A.L.s, augmenters will be closer to their optimal stimulation point than reducers and thus will experience more beneficial mood change than reducers.

Alcohol and Mood States

Alcohol, a biphasic depressant, is the most popular mood-altering drug in Western society. Alcohol's effects upon mood, however, have never been clearly delineated. Individuals appear to consume alcohol for a variety of effects.

As with other depressant drugs, alcohol is associated with feelings of sedation or tension reduction. As Huxley (1957) writes: "The experience of self-transcedence and the release of tension...is so wonderful, so blessed and blissful, that men have found it quite natural to identify these drugs...with...their gods." Indeed, many people report drinking for tension relief (Horn and Wanberg, 1969; Deardorff, Melges, Hout and Savage, 1975; Grossman, 1965), and feelings of psychophysiological and psychological distress were major reasons for drinking (Grossman, 1965; Ludwig, 1972; Vaillant, Brighton and McArthur, 1970). Ninety-three percent (93%) of Wanberg's (1969) alcoholic sample believed that alcohol relaxed them.

However, alcohol is also associated with stimulation by some drinkers. These individuals describe imbibing for the invigorating effects of alcohol (Sher and Levenson, 1982; Grossman, 1965) or to enhance sociability (Sher and Levenson, 1982). Grossman found that sixty percent of the sampled college students drink for "social conviviality." For others, then, "wine gives a lift, strengthens, cheers and makes one happy" (Sadoun, Lolli, and Silverman, 1965).

The mood effects of alcohol, then, differ for individuals. Perhaps because of these differential effects upon individuals, the literature on mood effects shows few consistent relationships between alcohol consumption and self-reported mood states.

Alcohol and Anxiety. Alcohol is widely reputed to have tension-reduction effects. The proposed basis for these tension-reducing properties is simple: tension reduction occurs through the depressant and anesthetic effects of alcohol upon arousal mechanisms (Conger, 1956; Kingham, 1958). Despite its popular appeal, however, the theory of tension-reduction lacks substantial research support. A review by Cappell and Herman (1972), for example, found little evidence of physiological tension-reduction in humans following alcohol consumption. These conflicting findings suggest poor experimental methodology and uncontrolled influencing variables such as individual differences, setting, and/or blood alcohol levels.

A second difficulty arises because anxiety is a multidimensional construct (Wilson and Abrams, 1977; Abrams and Wilson, 1979) whose psychological and physiological dimensions often do not correlate (Lipscomb, Nathan, Wilson and Abrams, 1980). Depending upon the measurement instrument, then, different results can be obtained. For example, Lipscomb et al found post-alcohol anxiety reductions with physiological measures, but not with self-report or observational measures. Steffen, Nathan and Taylor (1974) found no significant relationship between post-drinking muscular tension and subjective distress, while McDonnell and Carpenter (1959) found an unanticipated nonlinear relationship between physiological and self-report measures. "Tension," then, must be defined physiologically or psychologically.

According to past literature, contradictory findings exist with regard to physiological tension-reduction in social drinkers (Cappell and Herman, 1972; Pohorecky, 1981; Polivy, Schueneman, and Carlson, 1976; Warren and Raynes, 1972; Nathan and Obrien, 1971; Smith, Parker and Noble, 1975). In part, the contradictory results are attributable to the variety of arousal measures used by these researchers. However, examination of just one arousal measure, skin conductance, still yields equivocal results. For example, alcohol reduced skin conductance in some studies (Carpenter, 1957; Greenberg and Carpenter, 1957),

but increased skin conductance in other studies (Levenson, Sher, Grossman, Newman, and Newlin, 1980).

In contrast, research with alcoholics indicates that they expect tension reduction from alcohol (Wanberg, 1969; Tamerin and Mendelson, 1969) and receive physiological tension reduction fairly consistently. Measures of skin conductance and galvanic skin response in problem drinkers show reductions after alcohol intake in several studies (Greenberg and Carpenter, 1957; Lienert and Traxel, 1959; Sher and Levenson, 1982). However, the alcoholics' physical addiction to alcohol renders this research non-generalizable to non-alcoholic populations.

According to past literature, contradictory findings also exist regarding self-reported anxiety-reduction in normal drinkers. Some researchers have found reductions in self-reported anxiety with alcohol ingestion (Brown and Cutter, 1977; Polivy et al, 1976; Warren and Raynes 1972; Robbins and Brotherton, 1980). In general, anxiety reductions have been found in a variety of settings and with a variety of measures, from a party-like setting with the Thematic Apperception Test (McClelland, Davis, Kalin and Wanner (1972), to experimental stress paradigms with mood checklists (Levenson et al, 1980). However, there are variations in these findings. Williams (1966), for example, found anxiety reduction to be dose-dependent, with subjects reporting anxiety-reduction with 4-6 ounces and increases

with over 8 ounces of alcohol. Unfortunately, some research with normal drinkers found no reduction in self-reported anxiety (Wilson, Abrams and Lipscomb, 1980; Smith et al, 1975), and even indicates anxiety increases (Logue, Gentry, Linnoila and Erwin, 1978). In short, results are equivocal, perhaps due to the multitude of measurement instruments in use or uncontrolled influencing variables such as dosage.

In contrast, most research with alcoholics found increases in self-reported anxiety following drinking (Nathan and Obrien, 1971; McNamee, Mello and Mendelson, 1968; Steffen, Nathan and Taylor, 1974; Van der Spuy, 1972; Mayfield, 1968b; Tamerin, Weiner and Mendelson, 1970; Tamerin and Mendelson, 1969; Martarano, 1974). Unfortunately, much of this research is plagued with methodological difficulties. Unnatural, anxiety-provoking settings, such as alcohol treatment centers, have been utilized, and although some researchers have attempted to convert the hospital wards and laboratories into live-in "natural" environments or "bars," the transparency is evident. Durations of these experiments are long: some last for hours or days. Understandably, then, as drinking progresses, so does anxiety (Alterman et al, 1975; Davis, 1971; McGuire, Stein and Mendelson, 1966; Mello and Mendelson, 1970; Mendelson and Mello, 1966; Nathan and O'brien, 1971). Small sample sizes are also a problem, with some studies utilizing only four subjects (Martarano, 1974;

Steffen et al, 1974). Thus, methodological difficulties make interpretation of these results difficult. A few studies comparing alcoholics with social-drinking control groups have found greater anxiety in the alcoholics following drinking episodes (Nathan and O'brien, 1971). Contradictory findings do exist, however. Williams (1966), for example, found that problem drinkers did not differ from nonproblem drinkers in reported anxiety in a party setting.

In summary, research involving social drinkers reveals contradictory findings with respect to both physiologically-measured and self-reported anxiety. Studies on alcoholics are more consistent, finding physiological tension-reduction, but greater self-reported anxiety after drinking. In contrast, Williams (1966) research found no differences in self-reported anxiety between problem drinkers and non-problem drinkers. However, methodological difficulties render most of the past research questionable.

Alcohol and Depression. In general, the literature indicates that social drinkers feel less depressed after alcohol intake (Goldberg, 1966; Nathan and O'Brien, 1971; Majczak, 1967). However, some contradictory studies exist. For example, Warren and Raynes (1972) found increases in depression among normal drinkers in a social setting.

Methodological inconsistencies between studies may account for these conflicting results. Sex and dosage, for

example, can influence depression. Robbins and Brotherton (1980) found that men became more depressed, and women less so, as blood alcohol levels increased. Williams (1966) found depression increased with doses over eight ounces, yet decreased with four to six ounces of alcohol. Control of these influencing variables across future studies may yield more consistent findings.

In contrast to social drinkers, alcoholics often drink to relieve depression (Nathan, Titler, Lowenstein, Solomon and Rossi, 1970; Tamerin, Weiner and Mendelson, 1970; Majczak, 1967), yet rarely experience the anticipated relief from dysphoria. Drinking alcoholics have shown increases in depression (Nathan and O'Brien, 1971; Majczak, 1967), sometimes in addition to other positive mood increases (Avery, Overall, Calil and Hollister, 1982). Researchers conducting long-duration studies report depression becoming evident or more prominent over time (Alterman et al, 1975; Davis, 1971; McGuire et al, 1966; Mello and Mendelson, 1970; Mendelson and Mello, 1966; Nathan, Zare, Ferneau and Lowenstein, 1970. Tamerin and Mendelson (1969), for example, observed an initial brief euphoria dissolving into guilt and depression as drinking continued. Several researchers report depression occurring consistently throughout the experimental session (Alterman et al, 1975; Mayfield, 1968; Tamerin et al, 1970; Martarano, 1974).

Many factors may account for the consistent depression found among drinking alcoholics. First, increased depression is associated with higher doses of alcohol (McNamee et al, 1968), and alcoholics predispose themselves to depression by consuming more alcohol than normal drinkers. Secondly, alcoholic research subjects in treatment (as many are) experience guilt and depression simply by taking a drink. Other alcoholics are clinically depressed, and little relief is afforded them by alcohol (Avery et al, 1982; Mayfield, 1968a & 1968b). Unfortunately, the alcoholic's feelings of depression, unhappiness and uselessness are often magnified with alcohol ingestion (Tamerin, Tolor, Holson and Neumann, 1974).

In summary, the literature regarding alcohol's effects on depression reveals a general reduction in depression for normal drinkers, and a maintenance of or increase in depression for alcoholics. Contradictory results exist, however.

Alcohol and Anger. The literature on alcohol and anger in normal drinkers is sparse. Warren and Raynes (1972) found that normal drinkers in social, isolated and intravenous conditions experienced increased anger at .05% blood alcohol level, but no significant changes in anger at .10% blood alcohol level. In contrast, Avery et al (1982) found increases in anger as dosage increased and time passed. Differential sex effects also exist, with men

increasing in anger with higher doses of alcohol and women decreasing in anger with higher doses of alcohol (Robbins and Brotherton, 1980). Thus, the literature is inconsistent with regard to alcohol and anger, in part due to influencing variables such as dosage and sex.

Research with alcoholics, however, reveals consistently greater aggression after drinking. Martarano's (1974) sample of alcoholics reported more aggression after social drinking in a live-in ward. Using the TAT, Kalin, McClelland and Kahn (1965) found an increase of physically aggressive thoughts to a maximum of three or four drinks in male social drinkers. During drinking, problem drinkers increased in anger, aggression and hostility in most studies (Avery et al, 1982; Williams, 1967; Nathan and O'brien, 1971; Nathan, Zare, Ferneau and Lowenstein, 1970). Lang, Goechner, Adesso and Marlatt (1975) noted that even administration of a placebo had alcoholics acting more aggressively.

In summary, although the literature with non-alcoholics is inconsistent, research with drinking alcoholics indicates a tendency toward greater anger and aggression.

Alcohol and Confusion. Little research is available on alcohol consumption and confusion. However, a small body of literature consistently describes an increase in confusion with increasing blood alcohol levels. More alcohol resulted

in lowered alertness (Pearson, 1968), less clear-thinking (Mayfield, 1968b), and more confusion (Robbins and Brotherton, 1980).

Alcohol and Positive Mood States. Many researchers have recorded positive mood increases in normal drinkers (Cahalan, 1970; Tamerin et al, 1970; Tamerin and Mendelson, 1969; Goldberg, 1966) and non-drinkers (Battig and Fisher, 1965). These mood changes were called "more energetic" (Mayfield, 1968a; Goldberg, 1966; Battig and Fischer, 1965) "higher cheerfulness" (Levenson et al, 1980), and "euphoria" (Majczak, 1967). For example, Hartocollis (1962) infused his subjects with alcohol and noted a change toward elation and excitement, followed by a downward trend. Kelly, Myrsten, and Goldberg (1971) observed positive mood peaks one hour after consumption, followed by a steady decline.

Alcoholics expected to become more sociable with intoxication, while nonalcoholics did not (McGuire et al, 1966; Tamerin et al, 1970). Some researchers did find increased friendliness among alcoholics (Martarano, 1974), elation and greater positive mood in problem drinkers than in normal drinkers (Cahalan, 1970; Tamerin and Mendelson, 1969). In contrast, however, some studies indicate that problem drinkers experience decreasing sociability with greater amounts of alcohol (Pearson, 1968), even in social settings (Williams, 1968).

In summary, while normal drinkers tend to have positive mood peaks which follow a physiological blood alcohol curve, studies of problem drinkers yield inconsistent results.

Blood Alcohol Level

An important consideration, then, in post-alcohol mood states is a subject's blood alcohol level. Many authors describe biphasic effects of alcohol, dependent upon blood alcohol level and following a blood alcohol curve (Jones, Parsons and Rundell, 1976; Maisto, Connors, Tucker, McCollam and Adesso, 1980). Stimulant effects occur within the absorptive phase, from 30-120 minutes following alcohol consumption (Maisto et al, 1980), and appear in humans as accelerated heart rate (Dengerink and Fagah, 1978; Levenson et al, 1980; and Naitoh, 1972) and increased skin conductance (Jones, Parsons and Rundell, 1976; Levenson et al, 1980). Depressant effects occur during the late absorptive phase and the post absorption phase, appearing in humans as decreased cardiac contractility (Child, Kovick, Levisman and Pearce, 1979; Knott and Beard, 1972), reduced forehead muscle tension (Steffen, Nathan and Taylor, 1974), longer pulse transmission time and heart rate variability (Levenson et al, 1980). In general, these stimulant and depressant effects of alcohol are related to dosage and time since ingestion (Hobi, Meist, Richter, Schwarz, Goldberg, Ladewig and Reggiani, 1976).

Mood changes may follow the physiological blood alcohol curve. Autonomic arousal and a mood of excitation occur thirty minutes to one hour after alcohol consumption, followed by a depression of the central nervous system (McCollam et al, 1980; Cameron, 1974; Kelly et al, 1970). Subjects in McCollam et al's study described the arousal sensations as a "surgency, elation, egotism, a central stimulation and warmth/ glow experiences." Similar reports by Maisto et al (1980) and Ekman et al (1963) indicate peaks of elation occur forty minutes after intake. Russell and Mehrabian (1975) found that moderate doses of alcohol increase pleasure and arousal, although large doses increase pleasure and lower arousal. Dosage of alcohol has been shown to correlate positively with happiness, the only of twelve moods to show such a relationship (Kastl, 1969). Further, anxiety and depression appear to coincide with the absorption phase, with normal moods returning during postabsorption (Hobi et al, 1976). In support of Hobi et al's research, Williams (1966) found anxiety and depression lessened with four to six ounces of alcohol, yet increased with eight ounces or more. Blood alcohol content and self-reported anxiety correlated positively in a study by Smith et al (1975).

However, the relationship between mood and blood alcohol level has not been unequivocally supported. For example, some studies report that only larger doses of alcohol

reduced anxiety (Russell and Mehrabian, 1975; Kalin et al, 1965). In contrast, Robbins and Brotherton (1980) and Wilson et al (1980) found that larger doses of alcohol resulted in progressively smaller increments of anxiety with physiological measures, while Logue et al (1978) found that anxiety increased with the amount of alcohol consumed. Failure to determine a relationship between B.A.L.s and mood variables is caused in part by methodological inconsistencies. Not only are blood alcohol levels different from study to study, but subjects, paradigms, setting, type of alcohol, mood scales and BAL measurement devices also differ. A review of mood literature shows the range of controlled blood alcohol levels from 20 to 380 mg/dl (Avery, Overall, Calil and Hollister, 1982). In addition, personality factors can play an important part in post-alcohol mood states. Clarification of the mood literature may result from control of influencing variables such as blood alcohol level.

Effects of Setting in Alcohol Research

Several methodological difficulties become apparent in a review of the literature on post-alcohol mood effects. First, the environment is an integral part of the study. In the clamor for the "true" effects of alcohol, researchers create unnatural and anxiety-producing settings which can confound their findings. A drug experience results from the interaction of the drug itself, the individual, and the

environment (Kalin et al, 1965; Eysenck, 1967; Lennard, Epstein, Bernstein and Ransom, 1971), and drug effects per se cannot be isolated. Research conducted in an isolation room cannot isolate a drug's effects, it can only provide situation-specific information on an individual's drug experience. The more unnatural the research environment, then, the less generalizable the results.

Second, the presence of intrusive research equipment can contaminate results in mood studies. For example, the attachment of electrodes, certainly a restriction upon spontaneity, may increase moods such as anxiety, anger and depression (Lipscomb, Nathan, Wilson and Abrams, 1980). Intravenous administration of alcohol, too, may be a sterile and highly controlled procedure, but may also be anxiety-provoking for participants (Hartocollis, 1962). Because these methods are not representative of natural alcohol consumption, the results of such studies are not generalizable to social drinkers. Unmonitored subjects in natural settings may report different mood reactions.

Third, the experimentally-flavored atmosphere-- a hospital room (Cutter, Maloof, Kurtz and Jones, 1976), an isolation room (Warren and Raynes, 1972), an alcohol treatment center (Alterman et al, 1975)-- may create demand characteristics that are less obvious in a natural setting.

In mood research, then, contrived settings can reveal a distorted picture of alcohol's effects. Lennard, Epstein, Bernstein and Ransom (1971) note that "...drugs do not trigger specific emotional states, but a more general pattern of physiological response which is interpreted by a person in the framework of his surroundings, and of those cognitions available to him." The contrived setting can create a generally stressful atmosphere, and can bias the individual's subjective drug experience. A laboratory study by Polivy, Schueneman and Carlson (1976), for example, demonstrated that while subjects drinking alcohol without their knowledge experienced reduced anxiety, subjects with the knowledge of drinking alcohol experienced increased anxiety. In addition, drinkers themselves report the inclination to consume alcohol in a pleasant setting, and little inclination to drink in an unpleasant setting (Russell and Bond, 1979). Happiness and elation were the predominant moods when subjects drank with familiar people in a comfortable room (Ekman, cited in Smith et al, 1975). Not surprisingly, then, Strickler, Dobbs and Maxwell (1979) found that students consumed more beer in a bar setting than in a lab setting. Thus, situational context greatly affects human reactions to drinking or perception of drinking as a negative experience or positive experience (Kilty, 1980).

Many authors (McClelland et al, 1972; Pliner and Cappell, 1974) have recognized the problem of setting in mood studies

(Freed, 1978; Williams, 1966: Smith et al, 1975; Lennard et al, 1971; Schwarz et al, 1982), and a few have researched alcohol-induced mood changes in natural settings. These environments range from nursing homes (Mishara et al, 1975) to live-in treatment centers for alcoholics (Alterman et al, 1975) to fraternity parties (Kalin et al, 1965; Williams, 1968). For example, McClelland, Davis, Kalin and Wanner (1972) staged a party, then found reduced anxiety in departing social drinkers given the Thematic Apperception Test. Williams' (1966) subjects, attending a staged "cocktail party," reported decreased anxiety and depression with up to six ounces of alcohol, and increased anxiety and depression with doses of eight ounces and more. Williams (1968) monitored subjects at a fraternity party and noted less "sociability" after four ounces of alcohol. These studies may have greater generalizability to social drinkers than other research because of the natural settings. To date, however, no mood studies have been conducted in a barroom setting, where approximately one third of total alcohol consumption occurs (Murray, 1978; Room, 1972).

Alcohol Research in the Bar. Two major reasons exist for conducting alcohol research in a barroom setting. The bar is one of the most popular places to consume alcohol. Room (1972) estimates that 30% of drinking is done in public drinking establishments. Approximately fifty-three (53) percent of male respondents in the Manitoba Health and

Drinking Survey (Murray, 1978) drink "often" or "sometimes" in beer parlors or cocktail lounges.

Secondly, a bar provides a natural environment with unique characteristics. Social interaction, in conjunction with alcohol, is an important part of tavern life. The pub is the preferred drinking place when friendship and socializing are important (Jupp, 1969; Popham, 1978; Gottlieb, 1957; Clinard, 1962; Mass Observation). However, as Clinard notes, the substitution of 'soft-drink' houses for pubs would not take the place of the pub adequately, for "social intoxication" is the essence of the tavern. In addition, taverns carry a loosened set of social norms (Burns, 1980; Cavan, 1965): "What might otherwise be treated as sanctionable breaches of the public order are, with the public drinking place, treated as proper and fitting forms of conduct" (Cavan, 1965). The bar, then, provides access to a large number of social drinkers rarely studied in this important setting.

As alcoholic, abstainer and student samples used in past research are recognized as restrictive, alcohol research will focus upon social-drinking populations. The tavern population, however, tends to be a heavier-drinking population. For example, Cahalan, Cisin and Crossley (1969) found that binge drinking and other drinking problems correlated with regular tavern attendance, r= approximately .20. Cahalan et al also noted that a greater proportion of

heavy drinkers visit pubs frequently. Clark (1977) found 31% of patrons in his study were heavy drinkers. Also, in a given individual, public drinking is heavier than private drinking (Harford, 1975; Gerstel et al, 1975).

Drinking in the tavern, then, is unlike drinking in the laboratory, the home, or even the party setting. Yet tavern-drinking is modal for our culture. This combination of uniqueness and cultural relevance makes the barroom an ideal site for alcohol research. Few experimental studies have been conducted on barroom premises, though (Kessler and Gomberg, 1974). As Room (1972) notes, "The information on drinking in taverns is altogether too skimpy." This paucity of research may be due to the trade-off between natural environment and variable control that field research requires. In the tavern, patrons exhibit natural behavior in a natural setting, but control of variables is difficult. Kessler and Gomberg (1974), for instance, note the difficulty in measuring alcohol consumption. However, in a study of mood, a natural setting may take priority. With a design controlling extraneous variables, proper measurement instruments and analyses, mood research in a barroom setting is possible.

Effects of Personality in Alcohol Research

Another important reason for inconsistent findings in alcohol research may be individual differences. If a drug experience results from the interaction of the drug itself, the environment and the individual (Kalin, McClelland and Kahn, 1965; Eysenck, 1967; Lennard, Epstein, Bernstein and Ransom, 1971), then consideration of the personality differences of social drinkers is warranted as another step toward understanding alcohol's effects.

Several researchers have suggested that personality variables mediate drug effects (Eysenck, 1967; Broadhurst, 1978; Petrie, 1967; Strelau, 1975; Tarter, Alterman and Edwards, 1985). When personality variables are defined as behavior patterns resulting from individual biological differences, the relationship between drug effects and personality becomes clearer. For example, Hans Eysenck, one of the first proponents of a biologically-based personality theory, explains individual differences as the result of differences in the ascending reticular activating system (ARAS) or attention and arousal mechanisms in the nervous system (Eysenck, 1967). These mechanisms regulate the amount of sensory input entering the brain, and therefore determine the amount of stimulation needed to remain at a comfortable arousal level. Because these physiological systems vary among individuals, perceptual and stimulation-seeking behaviors also vary among individuals (Eysenck, 1967).

The behavior of extraverts and introverts, for example, can be explained in terms of an optimal arousal level (Eysenck, 1967). For any given stimulus, extraverts respond with lower arousal levels than introverts. Correspondingly, extraverts behave in ways that will increase their arousal level to an optimal range. Introverts, however, experience greater arousal for the same stimulus. Similarly, introverts behave in ways that generally decrease arousal and maintain an optimal, less-aroused state. Changes in stimulation, externally by the environment or internally by drugs, can alter individuals' levels of arousal and result in differential behavior.

Stimulus Intensity Modulation Theory. Similar to Eysenck's (1967) personality theory in its biological basis, Stimulus Intensity Modulation theory has been explored as an explanation for differential drug reactions. The concept of stimulus intensity modulation (SIM) was begun by Asenath Petrie in 1967. Petrie's SIM characteristic correlates highly with pain tolerance, a variable related to the prefrontal cortex and associated with neurological mechanisms (Vando, 1969).

The Kinesthetic Figural Aftereffects (KFA) task is the original measure designed by Petrie to assess stimulus intensity modulation. Blind-folded subjects first have their fingers stimulated with wooden blocks, then estimate the width of a second block held between their fingers.

Some subjects consistently underestimate the size of the block, while others consistently overestimate block size. Still others do neither consistently, and thus fall into a moderate range. The underestimators Petrie calls "reducers," as they tend to perceptually reduce incoming stimuli. The overestimators Petrie calls "augmenters," as they tend to perceptually augment incoming stimuli. Those who neither diminish nor exaggerate size consistently Petrie classifies as "moderates."

Reducers and augmenters, therefore, exhibit characteristic behavioral responses. According to Petrie, these characteristic behaviors are based upon responses to incoming stimulation and are due to perceptual filtering differences. Augmenters tend to "augment" or magnify incoming stimulation, while reducers tend to "reduce" or diminish it. Given identical stimulation, augmenters will be more highly aroused than reducers because of a less "successful" perceptual filter and greater sensitivity. Reducers, with a stronger perceptual filter and less sensitivity, will be less aroused and thus seek stronger stimulation. These behavioral responses represent each type's attempts to maintain an optimal "comfort range" (see Figure 1).

The behavior of augmenters and reducers can also be explained by optimal stimulation theory (Vando, 1969). According to this theory, an individual maintains arousal

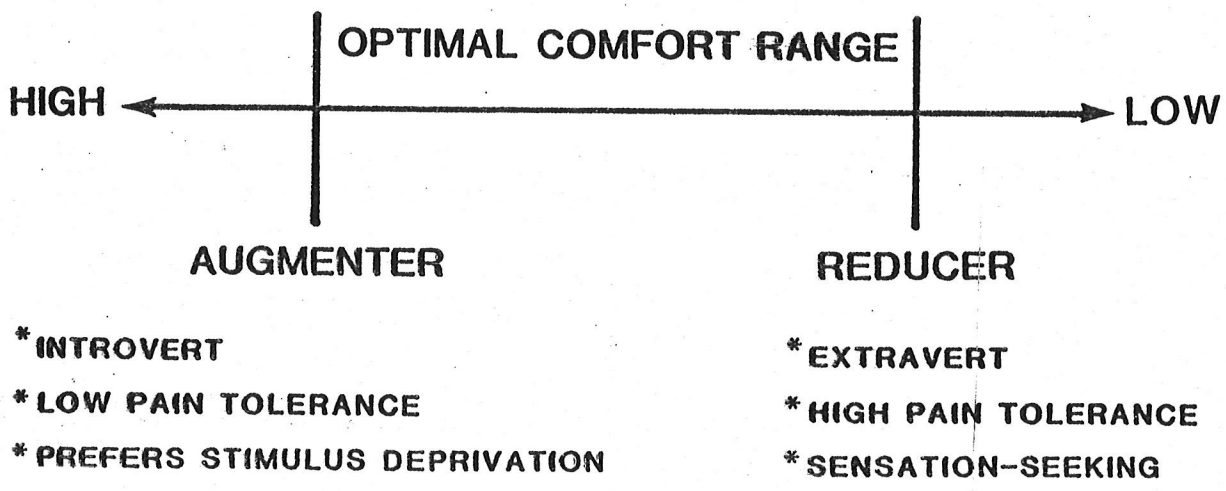

Figure 1: Reducer-augmenter Dimension and Arousal

level within a homeostatic range by increasing or decreasing stimulation (Epstein, 1972). The resultant behaviors are attempts to reach an optimal stimulation level. Thus, augmenters would be expected to prefer low-level or decreases in stimulation, while reducers would be expected to prefer increases in stimulation.

Individuals may be classified along the reducing-augmenting dimension by one of three methods: the Kinesthetic Figural Aftereffects (KFA) test (Petrie, 1967), the Average-Evoked Response (AER) method (Buchsbaum and Silverman, 1968), or the Vando Reducer-Augmenter (R-A) Scale (Vando, 1969). Partly because the Kinesthetic Figural Aftereffects (KFA) test has been found to have poor test-retest reliability (Baker, 1976; Barnes, 1976), and partly for convenience, alternate methods of measuring the SIM dimension were developed. The Average Evoked Response (AER) method (Buchsbaum and Silverman, 1968) utilizes neurologic readings of evoked response to visual or auditory stimulation. A simple paper-and-pencil measure of reducing and augmenting, the Vando Reducer-Augmenter Scale, was devised by Vando in 1969.

Stimulus Intensity Modulation and Drug Effects. Because of greater perceptual filtering, reducers would be expected to seek out higher levels of stimulation than augmenters. In a study by Sales (1971), reducers preferred complex Scottish tartan patterns, while augmenters preferred simple

patterns. A second observation by Sales (1971) found significantly higher activity levels in reducers while in a waiting room (r= .38). Further research found positive correlations between reducing and the characteristics of extraversion (Vando, 1969) and sensation-seeking (Sales, 1971).

In contrast, augmenters are expected to be more sensitive to pain due to lesser perceptual filtering and resulting enhancement of a given stimulus. Indeed, several researchers found that pain tolerance was significantly related to KFA task responses: reducers were high on pain tolerance, moderates in a medium range, and augmenters low on pain tolerance (Petrie, Collins, and Solomon, 1960; Petrie, 1967; Poser, 1960; Ryan and Foster, 1967; Sweeny, 1966; Dinnerstein et al, 1962; Blitz et al, 1966). On the other hand, augmenters are expected to have a higher tolerance for sensory deprivation environments (Petrie, 1967; Petrie, Collins and Solomon, 1960; Sales, 1971). Petrie studied patients in an iron lung and found tolerance for this environment low in reducers and high in augmenters selected by the KFA task. Thus, reducers tend to be stimulation-seekers who are high on pain tolerance, while augmenters are stimulation-avoiders who are low on pain tolerance.

Because personality typology may be based upon arousal and attention mechanisms in the brain, drug effects may vary

with personality type. Petrie (1967), Eysenck (1967) and others (Broadhurst, 1978) theorize an interaction between drug effects and personality because theoretically both are connected with arousal mechanisms. Drugs, by virtue of their stimulating or depressing effects on the nervous system, can raise or lower an individual's level of arousal and evoke reducing or augmenting effects. Nicotine (Vando, 1969; Hall, 1973) and caffeine (Haslam, 1967; Vando, 1969) have been shown to have augmenting effects, but elicit no significant changes of average evoked response slopes (Spilker and Callaway, 1969). In contrast, phenobarbitol produced reducing effects in Gupta's (1974) subjects.

Depending upon the individual's personality type and thus preference for stimulation, the drug can move an individual's arousal level to within or beyond a "comfort range." A depressant drug would hypothetically move the augmenter to a less aroused state and a more comfortable level, while the reducer would also become less aroused, but would move to an uncomfortable level of arousal (see Figure 2). Stimulant drugs would have an opposite effect. Alcohol, a biphasic drug, would have a stimulant effect at lower dosages and a depressant effect at higher dosages.

Similarly, Petrie (1967) hypothesized that stimulant, analgesic and depressant drugs would have differing effects, dependant upon the personality type of the individual. Petrie's early investigations (1967) explored the effects of

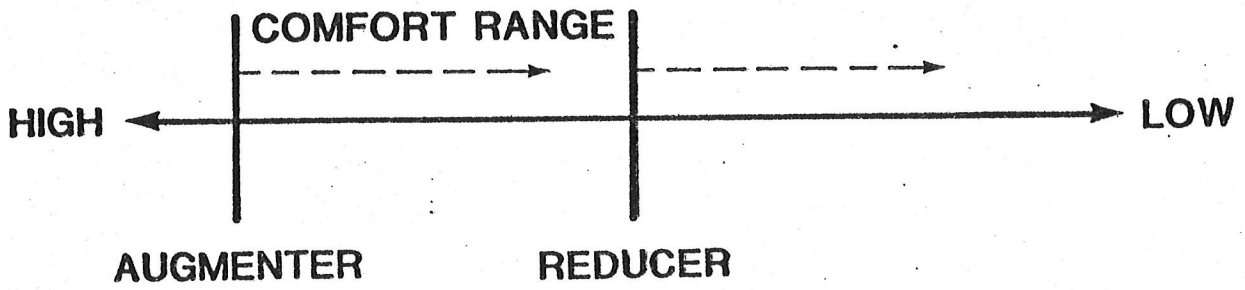

Figure 2: Depressant Drug Action (adapted from Eysenck, 1957)

analgesics upon KFA-selected reducers and augmenters. In support of her theory, Petrie found that two tablets of aspirin produced little perceptual change in reducers and moderates, but produced a shift toward perceptual reducing in augmenters.

However, Petrie's work with alcohol has generated the most interest in stimulus intensity modulation and drug effects. Her first investigations into pain and the reducing-augmenting revealed that alcohol moved augmenters toward perceptual reducing on the KFA task. Reducers, however, exhibited few changes and moderates showed none. Further support for Petrie's work comes from the study of alcohol's effects upon average evoked potential in non-alcoholics. Alcohol appears to reduce sensory, visual and auditory input via a reduction in evoked-potential amplitude (Salamy and Williams, 1973; Lewis, Dustman and Beck, 1970; Wolpaw and Penry, 1978; Fruhsorfer and Soveri, 1968; Spilker and Callaway, 1969; Gross et al, 1966; Rhodes et al, 1975). In addition, many studies have found significant pain threshold increases after alcohol intake (James, Duthie, Duffy and McKeag, 1978; Wolff, Hardy and Goodell, 1942; Brown and Cutter, 1977). This sensory reduction would appear to be differentially beneficial to individuals, with augmenters benefitting most.

Unfortunately, no research has been conducted on the mood effects of drugs in reducers and augmenters. But some

researchers agree that determinants of mood are based upon arousal (Schacter and Singer, 1962), and it appears to be a fruitful area of study. It is expected that more pleasant mood states would coincide with the arousal levels sought by reducers and augmenters, e.g., lower arousal for augmenters and higher arousal for reducers. Those beyond their optimal arousal levels and outside their comfort ranges may experience more unpleasant mood changes. However, research in this area has not yet been conducted.

Stimulus Intensity Modulation and Drug Preference. If certain personality types experience beneficial effects from certain drugs, then those individuals would be expected to prefer those drugs (Petrie, 1967). Barnes (1985) notes that reducer preference for stimulants has some research support. Reducers report greater amphetamine use (Kohn, Barnes and Hoffman, 1979; Deaux, 1976) and marijuana-smoking (Kohn, Fox, Barnes, Annis, Hoffman and Ejchental, 1979). In addition, reducers selected with the KFA report cigarette smoking more frequently than augmenters (Petrie, 1967). Vando's (1969) results support this hypothesis with a high correlation between number of cigarettes smoked and Vando R-A Scale scores. However, some differential sex and situational effects occur with smoking (Barnes and Fishlinsky, 1976).

Depressant drug preference among augmenters has some support (Barnes, 1984). Barbituate use in augmenters has

not been documented, and barbituate users were moderates in a study by Deaux (1976).

Augmenters also report a preference for drinking alcohol to smoking marijuana (Vando, 1969). If alcoholism indicates a preference for alcohol, then the number of alcoholics who are augmenters supports Petrie's drug preference predictions. Some researchers have noted a tendency for alcoholics to be augmenters on both the KFA and AER (Petrie, 1967; Coger, Dymond, Serafetinides, Lowenstam and Pearson, 1976; Barnes, 1977; Von Knorring, 1976). Using the KFA test, Petrie found six augmenters and six moderates out of a sample of twelve alcoholics, but no reducers. In a study by Von Knorring (1976) using the average-evoked response technique, twenty-two out of twenty-six alcoholics were augmenters. Buchsbaum and Ludwig (1978) also found tht a majority of their alcoholics were augmenters. However, Barnes (1977) found that statistical significance between alcoholism and augmentation on the Vando R-A Scale was lost when age was factored out. However, alcoholics, like augmenters, tend to show more beneficial effects from alcohol. Alcoholics have reported less pain than normals after consuming alcohol (Cutter, Maloof, Kurtz and Jones, 1976). Brown and Cutter (1977) observed that young problem drinkers achieved greater analgesic effects from alcohol than nonproblem drinkers.

As optimal stimulation theory suggests, an augmenter might use alcohol to reduce over-stimulation. Ludwig, Cain, Rolene and Wikler (1977) tested this hypothesis by "working" alcoholics, then offering them the opportunity to drink. The over-stimulation afforded by "work" would likely cause the augmenters to drink, while reducers would not be expected to drink. Ludwig et al found nine out of ten alcoholics who worked and drank were augmenters. Those who did not drink were reducers and moderates. As the authors explain, one cannot categorize all alcoholics as augmenters, but the augmenter-reducer dimension can predict certain responses to alcohol (Ludwig, 1977). In short, if augmenters are receiving more beneficial responses to alcohol, they would prefer alcohol as a drug of choice, and appear to be at risk for alcoholism.

Indeed, the literature suggests that the augmenting characteristic precedes alcoholism. If this is so, augmenters may indeed have a preference for alcohol. It may be argued that alcoholics present as augmenters due to alcohol's toxic effects or alcoholic neuropathy. However, Coger et al's (1976) research indicates that short-term (3-4 weeks) sobriety in the alcoholic does not eliminate augmentation on the visual AER measure. This finding, along with other research (Hennecke, 1984), suggests that augmentation is a pre-alcoholic characteristic. Hennecke compared the children of alcoholics with the children of

non-alcoholics, and found the children of alcoholics more likely to be augmenters on the KFA task. Assuming a genetic-familial component to alcoholism, Hennecke's research supports the view that "stimulus augmenting is premorbid to alcoholism" (p. 486). Thus, Petrie's theory of augmenter preference for alcohol appears to have some support.

In summary, the literature suggests that augmenters "prefer" alcohol over other drugs and receive beneficial effects from it (e.g., relief from overstimulation). Whether these beneficial effects extend to post-alcohol mood states in the augmenter has yet to be determined. Based upon theories of Eysenck (1967) and Petrie (1967), interactional effects are expected between the biphasic depressant alcohol and the augmenting-reducing personality characteristic.

Method

Subjects

Sixty-seven male patrons of a Winnipeg beverage room served subjects. Patrons were approached in the anteroom of the estblishment, and asked to participate in a survey requiring a total twenty minutes of time. Only first-time participants were used, and only males were surveyed since both the Vando Reducer-Augmenter Scale (Barnes, 1979; Petrie, 1967) and the Profile of Mood States questionnaire

(McNair, Lorr and Droppleman, 1971) reveal sex differences. Financial incentive introduces a selectivity bias, and was considered unnecessary in recruiting volunteers for this study.

The independent variables in this study are personality type (reducer-augmenter level), blood alcohol level, and mood trials.

Vando Reducer-Augmenter Scale. The personality variable is the reducer-augmenter dimension, as measured by the Vando Reducer-Augmenter Scale (Vando, 1969). This paper-and-pencil test was developed to measure the reducer-augmenter personality dimension without utilizing Petrie's complex and time-consuming KFA test. The Vando Reducer-Augmenter Scale was developed upon physical tests of pain sensitivity, threshold and tolerance (Vando, 1969). The Vando Reducer-Augmenter Scale is a 54-item, forced-choice test examining preference for low or high stimulation levels across sensory modalities. High scorers on the Vando Reducer-Augmenter Scale are reducers, while low scorers are augmenters. Mid-range scorers are classified as moderates.

In developing the R-A scale, Vando assumed that reducers are generally understimulated and will seek activities and environments providing more sensory input. Augmenters are generally overstimulated and will avoid overactivity and extreme sensory input. Sales' (1971) research found a high

correlation between the reducing characteristic as measured by the KFA and sensation-seeking. The Vando R-A Scale has been found to correlate positively with external, internal and general sensation-seeking measures (Kohn, Barnes and Hoffman, 1979; Barnes, 1985; Kohn, Fox et al, 1979; Barnes and Hoffman, 1975).

Although highly correlated with sensation-seeking, the Vando Reducing-Augmenting Scale was actually validated as a measure of pain sensitivity (Vando, 1969). The scale's items were selected from a larger item pool as best discriminating between people of high and low pain tolerance. Its purpose was to substitute for actual pain tolerance measures in determining which stimulation level a person generally prefers. The pain apparatus used by Vando in validating the scale was a combination of various researchers' methods, all with test-retest correlations ranging from .75 to .95 (Ryan and Foster, 1966; Ryan and Kovacic, 1966; Poser, 1960). Vando (1979) found that pain tolerance correlated .839 with the Vando R-A Scale in his female sample. Thus, the scale has high validity in assessing the same factors as Petrie's KFA task.

However, Vando (1969) cautions against equating the scale with pain tolerance ratings. "The R-A Scale and the pain tolerance ratings are both measures of the reducer-augmenter personality dimension, but from different directions," writes Vando (1969). He suggests viewing the scale as a

description of a personality dimension rather than a measure of pain tolerance. Vando's 1969 study revealed a number of personality and behavioral variables which acounted for 47% of the variance in the reducer-augmenter personality dimension. These findings support Petrie's earlier hypotheses and Solon's (1967) findings. Some of these variables are:

-Extraversion/Introversion, which correlates .648 with the Vando R-A Scale.

-Cigarette smoking, which correlates .348 with Vando R-A Scale scores.

-Hours of sleep, which correlated -.593 with Vando R-Scale scores, such that augmenters sleep more.

-Hypochondriasis, which correlated negatively with Vando R-A Scale scores ($r = -.593$).

The Vando Reducer-Augmenter Scale was chosen for its ease of administration, efficiency, reliability and validity. Reliability coefficients range from .69 to .91 (Vando, 1969). Test-retest correlations were .74 for the scale. The Vando Reducer-Augmenter Scale correlates well with other reducing-augmenting measures (Goldman et al, in press; Sales and Throop, 1972), with pain tolerance (Petrie, 1967; Vando, 1969), with extraversion-introversion (Vando, 1969; Barnes, 1984), with sensation-seeking and perceived pain (Barnes, 1984; Vando, 1969).

Some biases have been observed in the Vando R-A Scale. Barnes and Vulcano (unpublished manuscript) report a correlation of -.28 between the Vando R-A Scale scores and Marlowe-Crowne Social Desirability Scale, with augmenters giving the more socially desirable responses. However, none of the items correlated over .25 with the Marlowe-Crowne Scale. Gender differences have been noted with the various reducing-augmenting measures. Women are susceptible to fluctuations on the reducing-augmenting dimension, dependent upon stage of the menstrual cycle (Petrie, 1967; Baker et al, 1976). Most extreme reducers are also males (Petrie, 1967; Barnes, 1985).

Breathalyzer Measurement of Blood Alcohol Content. The second independent variable is blood alcohol level. Blood alcohol content was measured by a breathalyzer, "Alcohol Checker," Model RK-1000. Blood alcohol content assessment by breathalyzer was considered a more reliable and valid measurement than self-report or observer-reported blood alcohol levels. These methods have been used in past research, and lead to tentative results, at best.

Selected levels of blood alcohol content are 0 - 100/1000 mg/l (20 mg%) (low blood alcohol level), 101 - 200/1000 mg/l (21 - 40 mg%) (moderate blood alcohol level), and 201/1000 mg/l and over (high blood alcohol level) (over 40 mg%).

Estimates of time duration in the bar were approximated from past research. Ratcliffe, Nutter, et al (1982) noted that 50% of patrons observed in 1963 stayed for thirty minutes or less. In 1978, the same authors noted a mean forty-minute stay, drinking at an average rate of three drinks per hour. Of Kessler and Gomberg's (1974) patrons, 62% had one or two drinks and spent an hour or less in the bar. Cutler and Storm (1975) found 13% of patrons left with blood alcohol levels greater than 80 mg% (legal blood alcohol content limit for operating a motor vehicle). Time spent in the bar is affected also by pricing (Bruun, 1975), and happy hour (Babor, 1978). In the Winnipeg beverage room selected as a research site, patrons were expected to stay slightly longer due to lower pricing and the type of tavern it is.

Because of the anticipated longer stays, ethical responsibilities for subjects over the legal blood alcohol limit (80 mg%) were a concern. The researcher advised subjects over .08 not to drive, and offered a taxi ride home if the individual had no other means of transportation available.

Profile of Mood States Questionnaire. The dependent variables in the study were the six mood dimensions measured by the Profile of Mood States (POMS) questionnaire. Developed by McNair, Lorr, and Droppleman in 1971, the POMS questionnaire is a factor-analytically derived inventory

assessing transient affective states. The six mood states are: tension-anxiety, depression-dejection, anger-hostility, fatigue-inertia, confusion-bewilderment, and vigor-activity. The POMS is a 65-item scale, with each item an adjective followed by a five-point intensity scale. The instructions are to "circle the word that best describes the way you feel right now" (see Appendix B). Scores are sum ratings over adjectives in each mood category.

The POMS questionnaire appears reliable and valid. Standardization and development of the questionnaire was based on large sample sizes. Six factor analytic replications in the test development support factorial validity. Its construct and predictive validity have been borne out by outcome studies using drug trials (Lorr, McNair and Weinstein, 1964), and by concurrent validity coefficients and correlates of the scale. The POMS is moderately reliable, with previous correlations of test-retest reliability at approximately .65 (McNair, Lorr and Droppleman, 1971). Its moderate reliability is best for measuring changeable mood states. Too high a reliability coefficient could indicate a lack of discriminatory power between subtle mood states. In addition, the POMS is relatively independent from social desirability, as measured by the Marlowe-Crown Social Desirability Scale (McNair, Lorr and Droppleman, 1971). The short time required for completion is important in this study because of the limited time bar patrons may be willing to devote to test-taking.

Miscellaneous Measures. Other measures to be used are: are:

1)Demographics: Age, marital status, ethnicity, education, employment and income level were recorded to compare with Canada Health Survey (Health and Welfare Canada, 1981) and Manitoba Health and Drinking Survey (Murray, 1978) data, in order to determine the representativeness of the sample.

2) Drinking History: A scale adapted from the Canada Health Survey assessed current level of drinking and aided in determining the presence of "problem drinking."

3) Barroom Behavior: Barroom activities were assessed, in addition to other behaviors, in order to examine correlations with other variables.

Experimental Design

A 2 x 3 x 2 factorial design was utilized. The first independent variable is personality type, with two levels (reducer and augmenter) examined. These levels are defined by a median split on the Vando Reducer-Augmenter Scale. The second factor, blood alcohol level, has three levels: low, moderate and high. These levels are defined by breathalyzer readings of a maximum of 100/1000 mg/l (low B.A.L.), 101/1000 mg/l to 200/1000 mg/l (moderate B.A.L.), and over 200/1000 mg/l (high B.A.L.) These levels were determined by

distributing sampled breathalyer readings into three equal groups. The third variable is the two separate recordings (trials) of mood state dependent variables (anxiety, anger, confusion, depression, fatigue, and vigor) at pre-treatment and post-treatment.

Procedure

A pre-treatment phase, treatment phase, and post-treatment phase exist. Pre-treatment consists of assessing subjects' self-reported Trial 1 mood, demographic information, reducer-augmenter level and drinking history. Treatment consists of unlimited social drinking in the pub. Post-treatment includes an assessment of mood (Trial 2), blood alcohol level and miscellaneous questions regarding barroom behavior.

The pre-treatment phase of the study began in the anteroom of the establishment. Volunteering subjects were administered the initial POMS, Vando Reducer-Augmenter Scale, Demographics and Drinking History Scales. Each completed questionnaire was numbered and the identical number written on a card and given to each subject. Subjects then entered the tavern, with instructions to return for the second questionnaire when they leave. The pre-treatment phase lasted approximately fifteen minutes.

The treatment phase of the study included ordinary social drinking in the tavern, at the subjects' own rate and for an unlimited time.

This particular Winnipeg tavern was chosen as a research site because:

1) there is little entertainment other than a television, a few video games, pool table and "music man" for a few hours nightly;

2) the primary reason for attendance is not eating;

3) the bar management expressed an interest in the project.

The post-treatment phase began as subjects exited the tavern. In the anteroom of the establishment, subjects were administered the Profile of Mood States questionnaire, the Breathalyzer test, and a brief questionnaire on the miscellaneous variables (size of the group, time out of the tavern, activities, etc.). Completed questionnaires were matched and treated as a package, according to the numbered card each subject presented. The post-treatment phase lasted several minutes.

Analysis

A 2 x 3 x 2 analysis of variance was computed with repeated measures on the last variable, assessment of mood with the POMS questionnaire. Two levels of personality

(reducers and augmenters) were determined by a median split on the 67 male subjects. Subjects scoring 33 or less were considered augmenters, while subjects scoring 34 or greater were selected as reducers. Three blood alcohol levels were determined by assigning to low, moderate and high groups the corresponding 33% of sampled readings. These groups are identical to those specified earlier. All cells had frequencies equal to or above five. A chi square test was performed to ensure independence of the reducing-augmenting groups and blood alcohol level groups. Six dependent variables were the Profile of Mood States Scale dimensions of tension, confusion, depression, anger, vigor and fatigue. Dunn's comparison procedure followed the analysis of variance to pinpoint areas of significant differences.

Predictions

The following three-way interactions were predicted for reducer-augmenter level, blood alcohol level and trials:

1) At low blood alcohol levels, mild stimulation effects are anticipated. Thus, reducers should report the greatest "beneficial" mood changes (e.g., less anxiety, depression, anger, fatigue and/or confusion, and more vigor) because of their stimulation preference.

2) At moderate (peak stimulation) blood alcohol levels, reducers are expected to report "beneficial" mood changes (e.g., less anxiety, depression, anger, fatigue and confusion and more vigor). Reducers may achieve their

optimal stimulation level with moderate blood alcohol levels, while augmenters may be beyond their "comfort range" and are expected to report negative mood changes.

3) At high (depressant) blood alcohol levels, augmenters are expected to report the most "beneficial" mood changes, while reducers are expected to report negative mood changes. Augmenters are assumed to be more comfortable with alcohol's depressant effects than are the stimulation-seeking reducers.

The following two-way interactions were predicted:

4) A relationship is expected between the reducing-augmenting variable and blood alcohol level, so that augmenters with greatest mood discomfort will drink to high, depressant-level B.A.L.s in an attempt to maintain an optimal arousal level. Reducers with greatest discomfort, then, will drink to lower, stimulation-level B.A.L.s in an attempt to maintain an optimal arousal level.

5) An interaction effect is expected between blood alcohol level and trials. At the higher amounts of blood alcohol content, greater mood changes are expected between trials than at lower amounts. Following from the third hypothesis, reducers are expected to experience greatest decreases and augmenters to experience greatest increases in mood at high blood alcohol levels, each group being furthest from (reducers) or closest to (augmenters) optimal stimulation points.

No main effects were predicted.

Thus, an interaction is expected involving a blood alcohol and mood curve, with reducers achieving their "peak" stimulation point and feeling best with low to moderate (stimulation) doses of alcohol, while augmenters feel best at high (depressant) doses of alcohol.

Results

Sample Demographics and Drinking History

Approximately 50-60% of the bar patrons approached participated in the study. The mean age of these mainly Caucasian men was 27 years, with approximately 40% of them having completed high school. Most were single (63.6%), full-time workers earning a mean annual wage of $15,000-20,000. In comparison with participants in the Manitoba Health and Drinking Survey (Murray, 1978), the sample was biased toward younger, single, well-educated men. The sample of 67 male bar patrons is described in Table 1.

Drinking history of the sampled men is displayed in Table 2. In support of earlier findings by Cahalan et al (1969) and Clark (1977), the sample tends toward heavy drinking with a mean 31.4 weekly number of drinks. In comparison, only 8% of participants in the Manitoba Health and Drinking Survey, but 31% of Canada Health Survey participants (Health and Welfare Canada, 1981) drank similarly heavy weekly amounts. (The Canada Health Survey suggests that 14 or more weekly drinks is "cause for concern"). Twenty-six percent (26%) of the men were daily drinkers, compared with twenty (20%) of Canada Health Survey participants. In addition, 34.3% of the sample reported some problem(s) caused by drinking. Most men (62%) reported no change in drinking habits in the past year.

TABLE 1

Sample Demographic Characteristics & Comparisons

	Number	Percent	Manitoba Health & Drnkg. Survey Percent (1978)
Number of men	67	100	(n = 318)
Mean age	27.1	---	28 (< 30 yrs
Education:			
Some grade school	4	6.0	27.4
Grade school complete	8	11.9	42.0
High school complete	27	40.3	13.0
Some college/technical diploma	21	31.3	9.5
University graduate	1	1.5	5.1
Some post-graduate work	6	9.0	2.6
Annual Income:			
Under $5,000	6	9.1	12.5
$5,000 - 10,000	13	19.7	19.3
$10,001 - 15,000	10	15.2	24.0
$15,001 - 20,000	7	10.6	18.1
$20,001 - 25,000	15	22.7	9.6
$25,001 - 30,000	4	6.1	5.2
Over $30,000	11	16.7	11.1
Employment Status:			
Full Time	42	63.6	Comparison
Part Time	7	10.6	Figures
Student	7	10.6	Unavailable
Unemployed	10	15.2	
Marital Status:			
Single	44	65.7	16.8
Divorced	3	4.5	2.2
Widowed	0	0	4.1
Married/Equivalent	20	29.9	76.9
Ethnicity:			
Caucasian	64	95.5	Comparison
Asian (Indian)	1	1.5	Statistics
Native	1	1.5	Unavailable
Oriental	1	1.5	in
Black	0	0	Similar
Other	0	0	Categories

TABLE 2

Drinking History Demographics & Comparisons

	Number	Percent	Canada Health Survey Males %	Manitoba Health & Drkg Svy Percent
Mean Age Started Drinking	15.2	---	21.8% (20-24 yrs. age group)	---
Drinking Frequency:				
Two or more time daily	13.0	17.3	(see "daily")	---
Once Daily	7.0	8.6	20.4	---
4-6 Times Weekly	25.0	35.8	11.8	---
2-3 Times Weekly	15.0	23.5	24.3	---
Once per Week	6.0	11.1	19.1	---
2-3 Times Monthly	1.0	1.2	12.7	---
About Once per Month	0	0	9.2	---
Mean Weekly Number of Drinks	31.4	---	31.0	8.0 (of men)
Drinking in Past Year:				
More	14	21.2	---	---
Less	11	16.7	---	---
No Change	41	62.1	---	---
Usual Beverage:				
Beer	50	74.6	---	---
Wine	0	0	---	---
Liquor/Mixed Drinks	9	13.4	---	---
It varies	8	11.9	---	---
Total Drinking Problems:				
None	44	65.7	---	71.0
One	9	13.4	---	
Two	6	9.0	---	29.0
Three	3	4.5	---	with
Four	5	7.5	---	> one

Barroom Behavior

Various aspects of patrons' behaviors are statistically outlined in Table 3. Patrons spent a mean total time in the bar of 107.6 minutes, longer than the mean 30-60 minute stays found in earlier studies (Ratcliffe et al, 1982 and 1978; Kessler and Gomberg, 1974). In addition, the sampled patrons drank a mean of 77.49 ounces (of beer or B.A.L. equivalent) during this time, more than the average drinking rate of three drinks per hour noted by Ratcliffe et al. Perhaps because 78.8% drank draft beer in eight-ounce glasses, the drinking rate is approximately three times Ratcliffe's observed rate. However, reduced pricing (Bruun, 1975) and round drinking (42.6%) may have contributed to this high drinking rate.

However, this sample had less than Cutler and Storm's (1975) thirteen percent (13%) of patrons surpassing 80 mg% blood alcohol level. These patrons were offered taxi rides home, but all declined as they had friends driving them home. Approximately fifteen percent (15%) of the sample was intoxicated enough to necessitate the researcher's reading Trial 2 mood questions aloud.

TABLE 3

Barroom Behavior

		Number	Percent
Mean Time Entering the Bar	7:50 pm		
Mean Time Exiting the Bar	9:36 pm		
Mean Time (minutes) in Bar	-----	107.6	-------
Eating:			
yes		16	23.9
no		51	76.1
Activities:			
yes		33	50.0
no		33	50.0
Main Beverage Consumed in Bar:			
Beer		60	90.9
Wine		2	3.0
Liquor/Mixed Drinks		3	4.5
It Varies		1	1.5
Brand:			
Draft Beer		52	78.8
Other		14	21.2
Mean Ounces Consumed in Bar (Beer or Beer-Equivalent):		77.49	
Number of Other People at Table:			
Alone		3	4.5
One		11	16.4
Two		12	17.9
Three or More		41	61.1
Drinking in "Rounds"			42.6

Mean ounces (beer or beer-equivalent) consumed before entering bar: 32.12

Correlations

The "Alcohol Checker," Model RK-1000 proved to have acceptable validity. Self-reported alcohol consumption (ounces) correlated with breathalyer readings at r =.74, when patrons who drank before entering the bar were excluded.

Correlations between the independent variables, dependent variables, drinking history variables and age appear in Table 4. The Vando R-A Scale correlates negatively with age (r =-.39). Vando scores also correlated moderately (r =.31) with reported weekly number of drinks, with reducers reporting higher weekly consumption.

Blood alcohol level shows highest correlations with Trial 1 depression (r =.44), drinking frequency (r =-.28, where the lower the drinking-frequency code, the higher the reported drinking frequency), total time in the bar (r =.21) and age (r =.21), indicating that high B.A.L.S were attained by older, depressed, frequent and heavy drinkers.

There are several high intercorrelations among POMS Trial 1 mood variables, ranging from r =.78 (tension and depression) to r =-.31 (vigor and confusion). In addition, some Trial 1 mood subscale scores correlate with drinking history variables. Drinking frequency correlates most highly with tension (r =.11) and confusion (r =.13), whereby those feeling most tense and confused drink less frequently.

TABLE 4

Correlations: Independent, Dependent, & Misc.Variables

Variable Name/#		1	2	3	4	5	6	7	8	9	10	11	12	13
Vando Scores	(1)	1												
B.A.L.	(2)	-.06	1											
Tension (T1)	(3)	.09	.13	1										
Depression (T1)	(4)	.09	.44	.78	1									
Anger (T1)	(5)	.12	.18	.70	.75	1								
Confusion (T1)	(6)	.01	.16	.68	.74	.46	1							
Vigor (T1)	(7)	.10	.06	-.01	-.08	-.03	-.31	1						
Fatigue (T1)	(8)	.07	.14	.39	.46	.23	.54	-.42	1					
Drinking Freq.	(9)	0	-.28	.11	-.03	.02	.13	-.10	.10	1				
No. Drinks/Wk.	(10)	.31	.18	.18	.29	.17	.20	-.01	.05	-.42	1			
# Drnkg. Probs	(11)	.13	.17	.13	.20	.12	.27	.06	.05	-.14	.28	1		
Time in Bar	(12)	.15	.21	-.07	.11	.12	-.10	.18	-.20	0	.05	.13	1	
Age	(13)	-.39	.21	-.30	.17	-.07	-.2	-.06	-.13	-.05	-.33	-.25	.01	1.

NOTE: Correlations above .25 are significant $p < .05$, two-tailed test of significance.

Weekly number of drinks correlates most highly with depression (r =.29) and confusion (r =.20). Total drinking problems correlates most highly with depression (r =.20) and confusion (r =.27). Confusion, then, appears to be the mood most consistently influenced by drinking history.

Among the drinking history variables, the highest correlation appears between weekly number of drinks and drinking frequency ($r = -.42$, where the lower the drinking-frequency code, the higher the reported drinking frequency), indicating that the higher the weekly number of drinks, the more frequent the drinking episodes. Total drinking-related problems correlates $r = .28$ with weekly number of drinks and $r = -.14$ with frequency of episodes (more problems with greater frequency).

Analysis of Variance

The following results were obtained by performing analyses of variance with repeated measures. Dunn's multiple comparison procedure followed the analysis of variance to determine which means differed significantly.

Tension. Results of the repeated measures analysis of variance for tension are presented in Table 5. The analysis yielded the expected significant Trial X Reducing-augmenting Level X Blood Alcohol Level interaction effects for tension ($p < 0.05$). These interactions are depicted graphically in Figure 3. Self-reported tension significantly decreased (Dunn's procedure, $p < 0.05$) for both reducers and augmenters at low blood alcohol levels (Figure 3a). At moderate blood alcohol levels, however, reducers report significant decreases (Dunn's procedure, $p < 0.05$), while augmenters report nonsignificant increases in tension

TABLE 5

Analysis of Variance Table: Tension

Source	df	Mean Square	F
Reducer-Augmenter Level	1	14.02	.25
Blood Alcohol Level	2	50.96	.92
R-A Level X Blood Alcohol Level	2	59.72	1.07
Error	60	55.68	
Trial	1	7.50	1.18
Trial X Reducing-Aug. Level	1	5.31	.83
Trial X B.A.L.	2	29.57	4.64 *
Trial X R-A Level X B.A.L.	2	20.54	3.22 *
Error	60	6.38	

* $p < 0.05$

(Figure 3b). At high blood alcohol levels, reducers report nonsignificant increases while augmenters begin to report non-significant decreases in tension (Figure 3c).

There were significant changes between trials in self-reported tension at various blood alcohol levels ($p < 0.05$, Trial X B.A.L. effect). Graphic depiction of these results appears in Figure 4. Significant tension reduction occurred only at low B.A.L.s. (Dunn's, $p < 0.05$).

There were no other significant effects on the tension dependent variable.

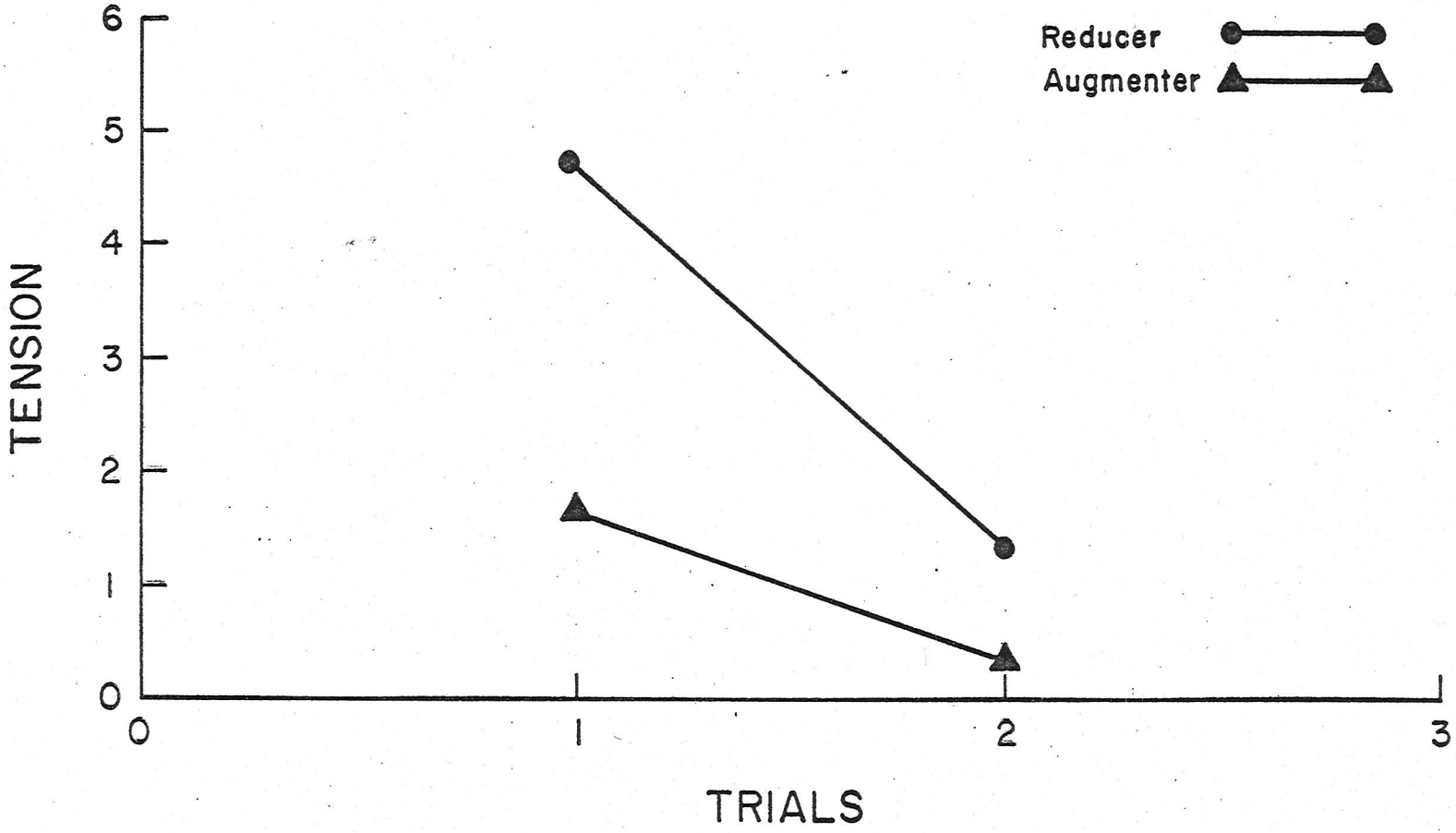

FIG. 3a. TENSION: 3-WAY INTERACTION-LOW BAL

Figure 3: Tension: 3-Way Interaction

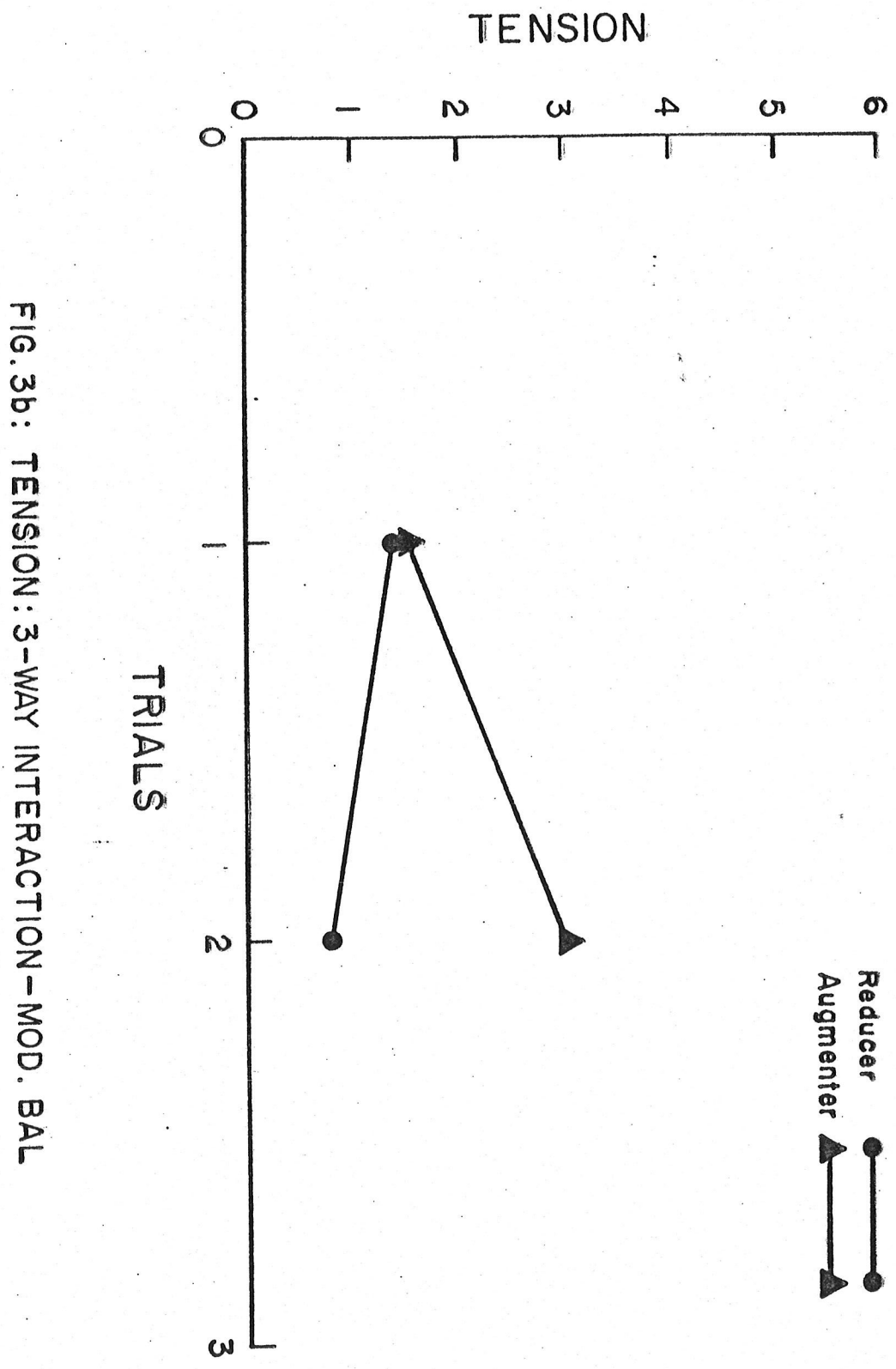

FIG. 3b: TENSION: 3-WAY INTERACTION-MOD. BAL

Figure 3: Tension: 3-Way Interaction

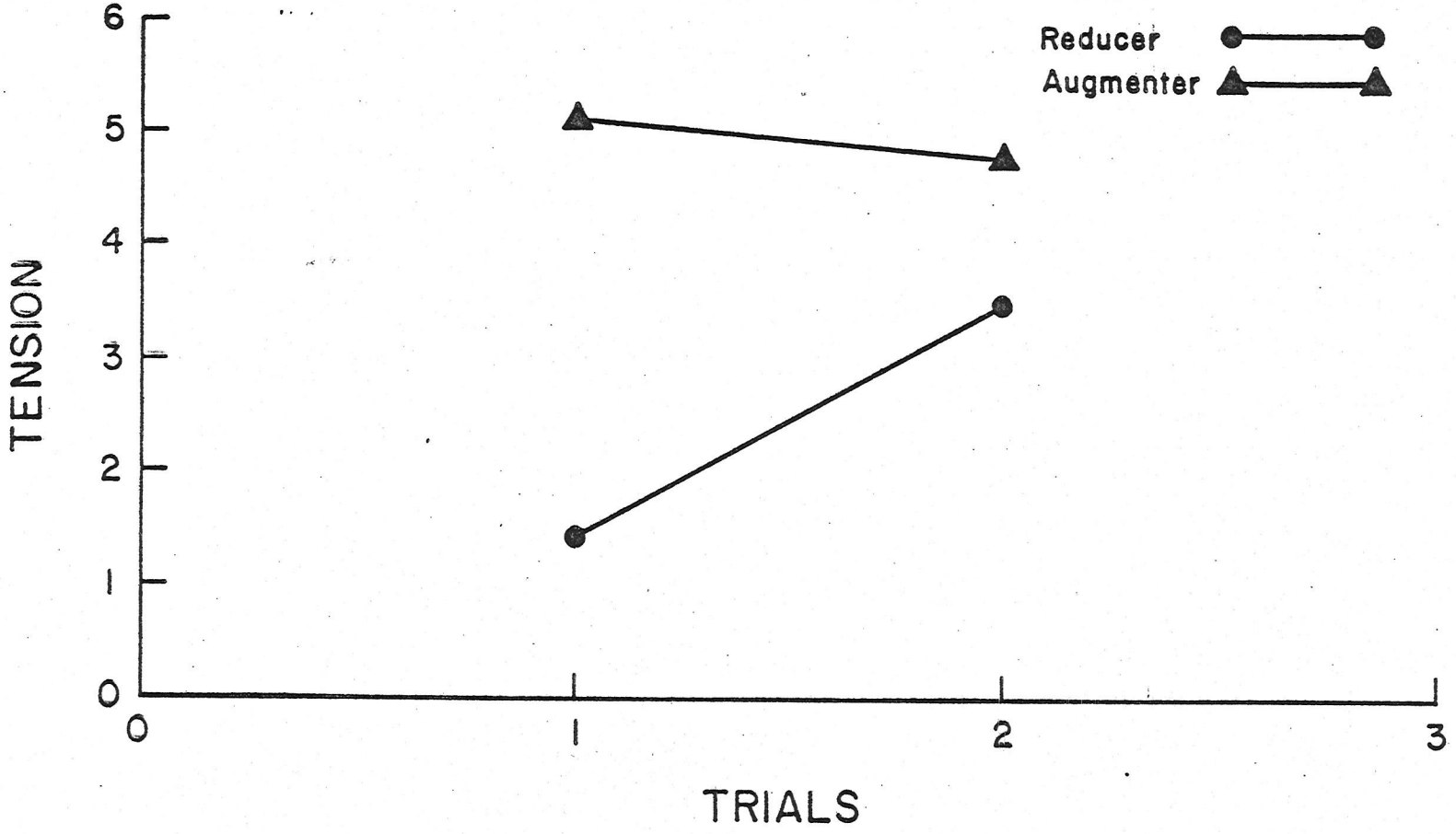

FIG. 3c: TENSION 3-WAY INTERACTION- HIGH BAL

Figure 3: Tension: 3-Way Interaction

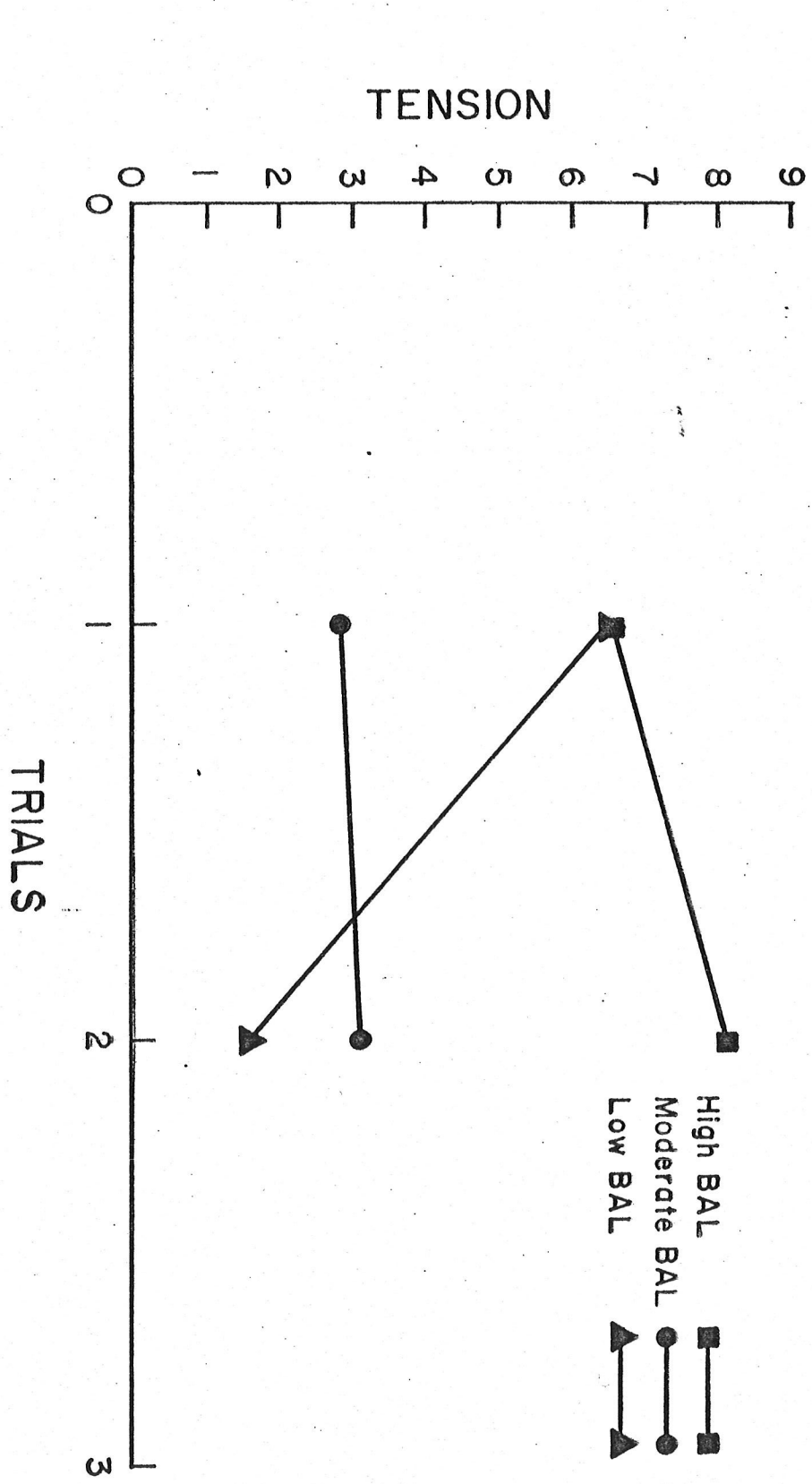

Figure 4: Tension: B.A.L. X Trial Interaction

Confusion. Results of the repeated measures analysis of

TABLE 6

Analysis of Variance Table: Confusion

Source	df	Mean Square	F
Reducing-Augmenting Level	1	.06	0
Blood Alcohol Level	2	7.59	.28
Reducing-Augmenting Level X B.A.L.	2	7.50	.27
Error	60	27.39	
Trial	1	11.39	2.51
Trial X Reducing-Aug. Level	1	0	0
Trial X Blood Alcohol Level	2	12.42	2.74
Trial X R-A Level X B.A.L.	2	29.40	6.49 **
Error	60	4.53	

** $p < 0.01$

variance for confusion are presented in Table 6. This analysis yielded the significant Trial X Reducing-Augmenting Level X Blood Alcohol Level interaction effects for confusion ($p < 0.01$). The results are graphically depicted in Figure 5. Self-reported confusion decreased for reducers at low B.A.L.s, while confusion increased for augmenters at these levels (Figure 5a). At moderate B.A.L.s, reducers slightly increase while augmenters significantly increased in confusion (Dunn's procedure, $p < 0.05$) (Figure 5b). At

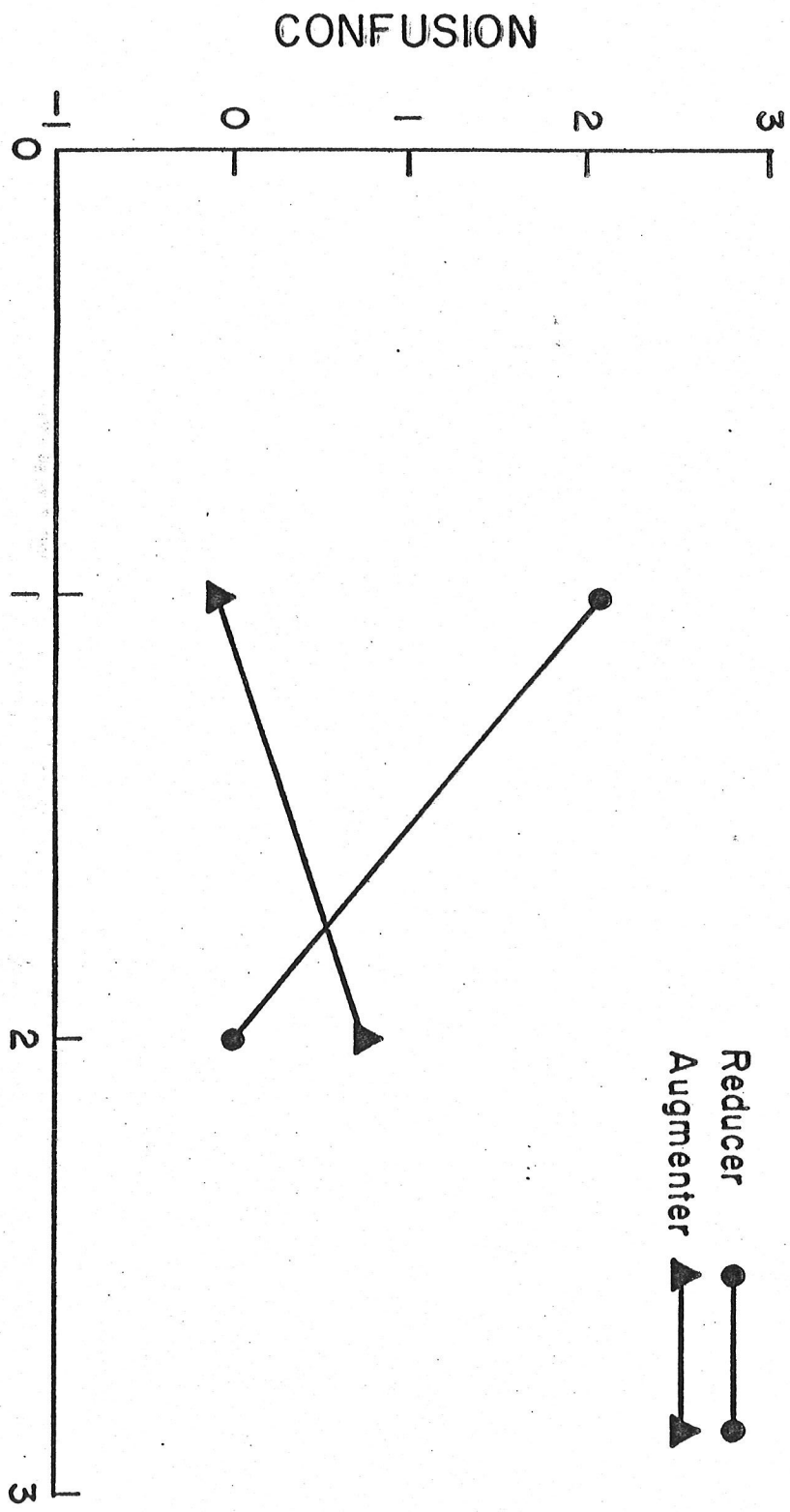

FIG. 5a. CONFUSION: 3-WAY INTERACTION-LOW BAL

Figure 5: Confusion: 3-Way Interaction

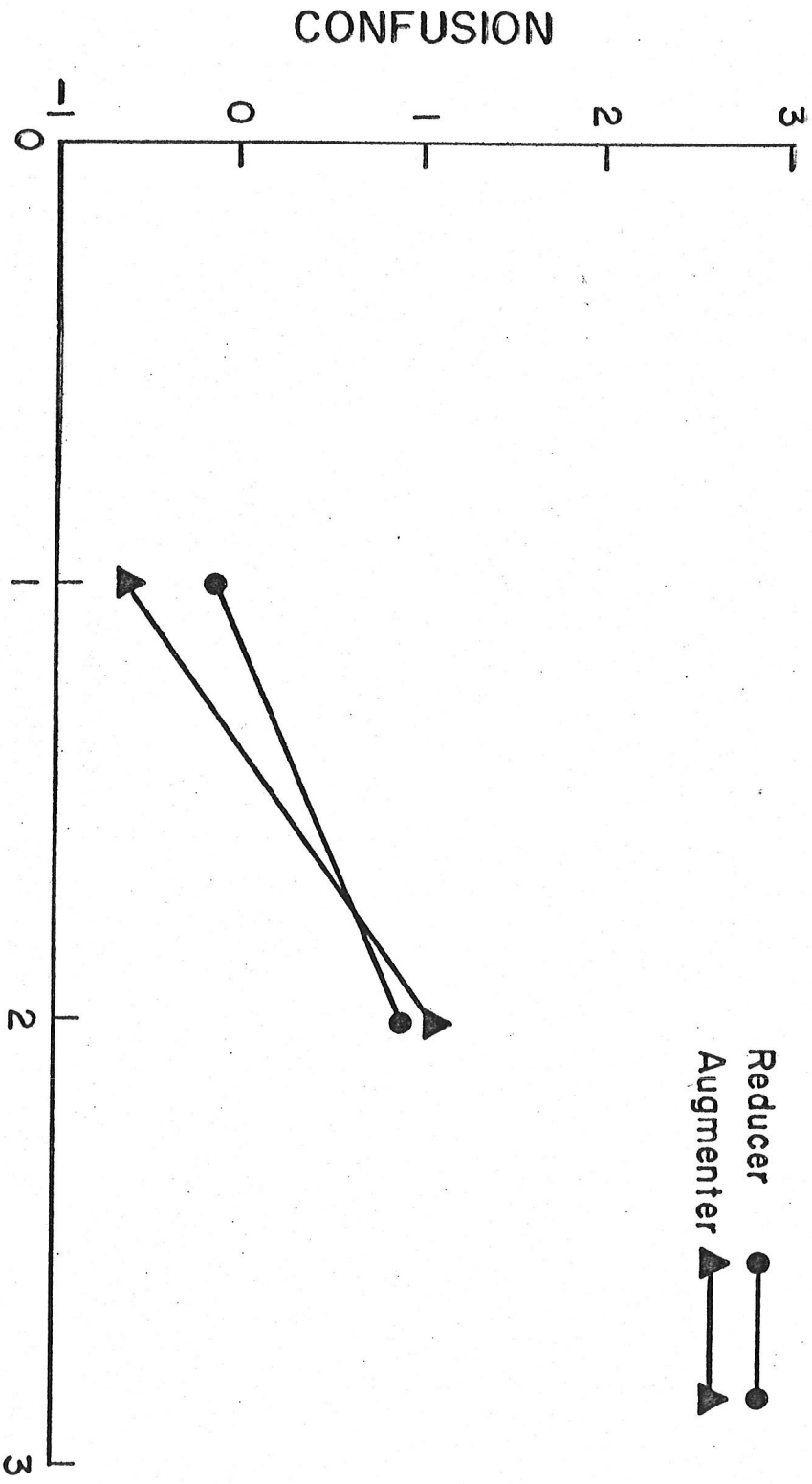

FIG. 5b: CONFUSION: 3-WAY INTERACTION-MOD. BAL

Figure 5: Confusion: 3-Way Interaction

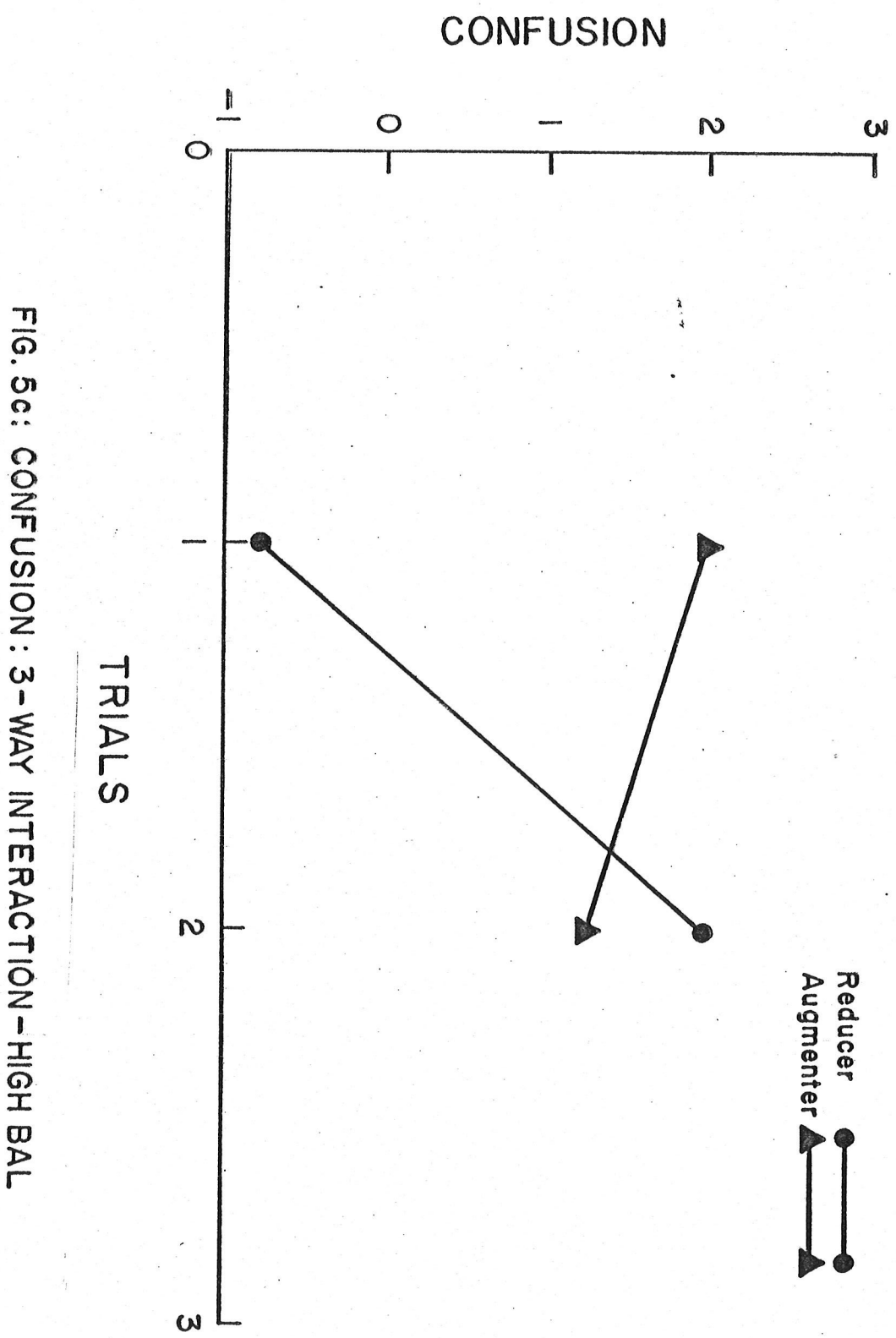

Figure 5: Confusion: 3-Way Interaction

high B.A.L.s, reducers significantly increased in confusion (Dunn's procedure, $p < 0.05$) while augmenters decreased in confusion (Figure 5c). There were no other significant effects on the confusion dependent variable.

Depression. The results of the repeated measures analysis of variance for depression are presented in Table 7. This analysis yielded a significant Reducer-augmenter Level X B.A.L. interaction effect ($p < 0.05$). While reducers drank mostly at low B.A.L.s when depressed, augmenters drank mostly at high B.A.L.s when depressed. The

TABLE 7

Analysis of Variance Table: Depression

Source	df	Mean Square	F
Reducing-Augmenting Level	1	12.26	.10
Blood Alcohol Level	2	181.03	1.53
Reducing-Augmenting Level X B.A.L.	2	382.10	3.23 *
Error	60	118.24	
Trial	1	78.35	7.84 **
Trial X Reducing-Augmenting Level	1	3.44	.34
Trial X Blood Alcohol Level	2	29.0	2.90
Trial X R-A Level X B.A.L.	2	18.48	1.85
Error	60	10.0	

* $p < 0.05$

** $p < 0.01$

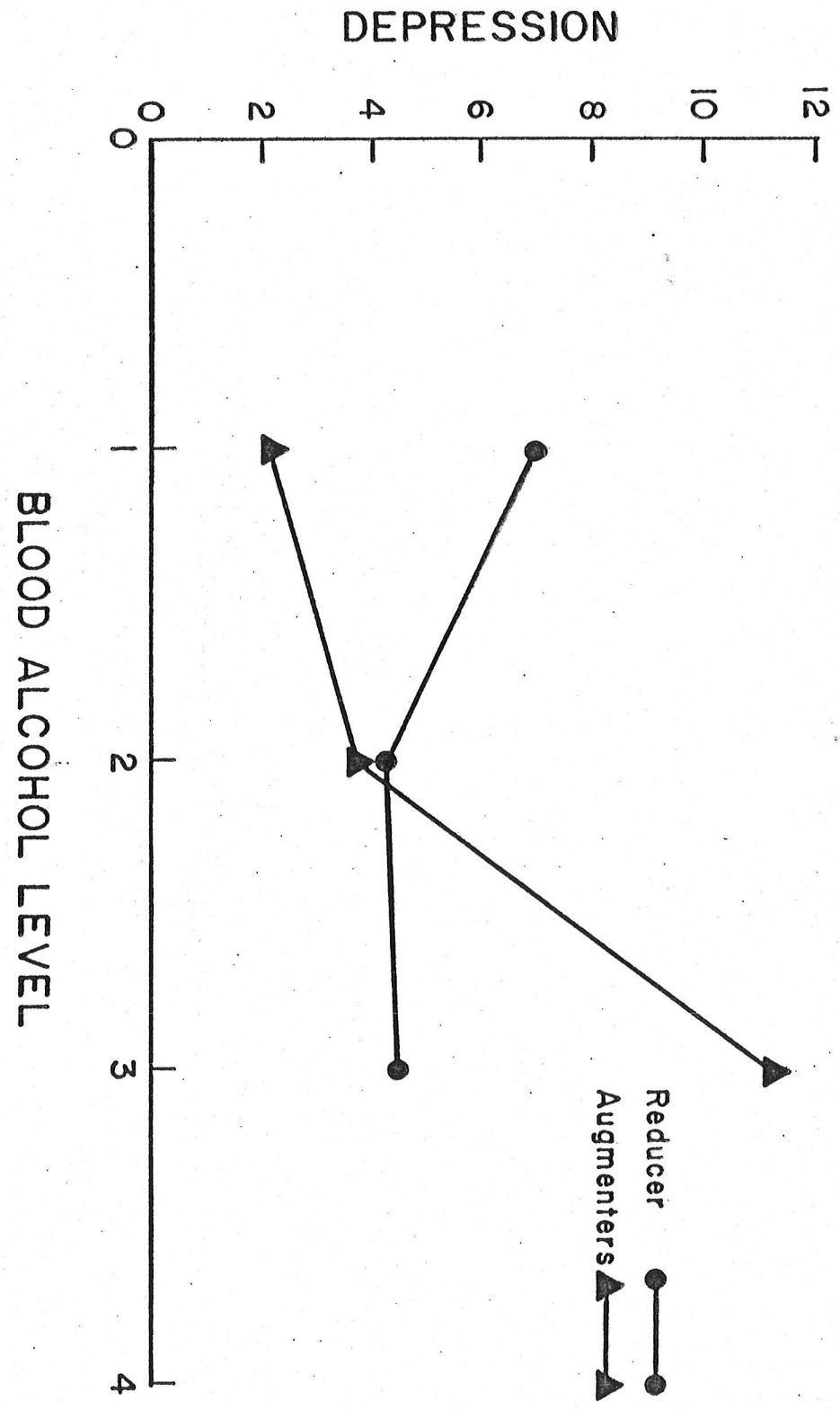

Figure 6: Depression: R-A Level X B.A.L. Interaction

results appear in Figure 6.

A simple Trial effect emerged for depression ($p < 0.01$). The results are graphically depicted in Figure 7, and show decreases in depression regardless of blood alcohol level. No other significant effects were revealed for depression.

Anger. Results of the analysis of variance for anger appear in Table 8. Significant trial effects emerged, with decreases in anger following alcohol ingestion ($p < 0.05$). Figure 7 graphically depicts the significant decrease in anger following alcohol ingestion. No other significant effects emerged for anger.

Vigor. No significant effects emerged for the vigor dependent variable.

Fatigue. No significant effects emerged for the fatigue dependent variable.

Summary. In summary, results supported the predictions made as follows.

Prediction number 1, that at low blood alcohol levels reducers would report greater beneficial mood changes than augmenters, was supported on both tension and confusion dependent variables.

Prediction number 2, that at moderate blood alcohol levels, reducers would report beneficial mood changes while

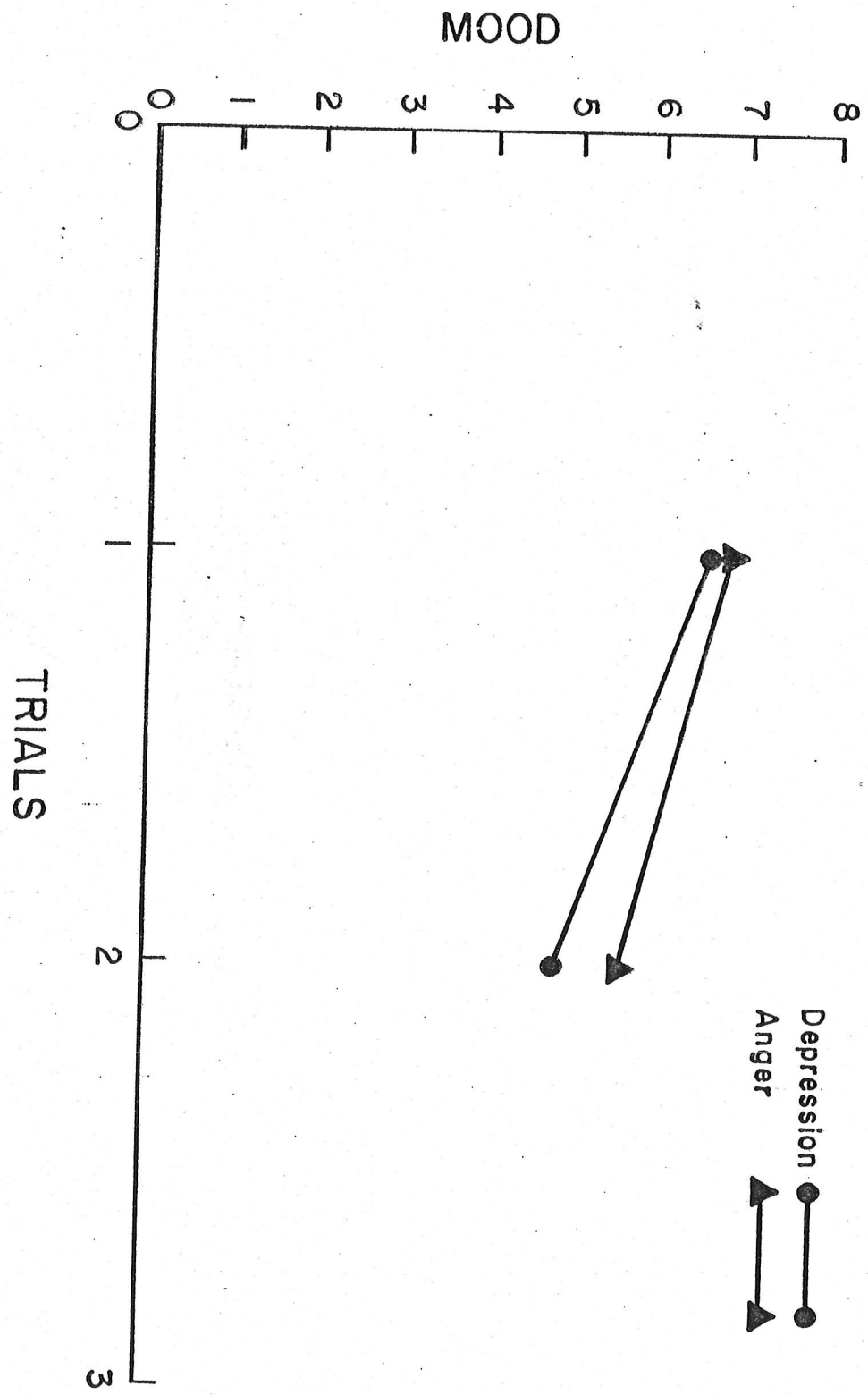

Figure 7: Depression and Anger: Trial Effects

TABLE 8

Analysis of Variance Table: Anger

Source	df	Mean Square	F
Reducing-Augmenting Level	1	.05	0
Blood Alcohol Level	2	212.43	1.50
Reducing-Augmenting Level X B.A.L.	2	347.45	2.45
Error	60	141.78	
Trial	1	58.85	4.32 *
Trial X Reducing-Augmenting Level	1	7.24	.53
Trial X B.A.L.	2	.49	.04
Trial X R-A Level X B.A.L.	2	8.13	.60
Error	60	13.61	

* $p < 0.05$

augmenters reported negative mood changes, was supported on the tension dependent variable. On the confusion dependent variable, augmenters did report greater negative mood changes, but reducers did not report beneficial mood increases as predicted.

Prediction number 3, that at high blood alcohol levels, reducers would report negative mood changes while augmenters reported beneficial mood changes, was supported on both tension and confusion dependent variables.

Prediction number 4, that reducers with most mood discomfort would would drink to stimulation (low-moderate) blood alcohol levels while augmenters would drink to depressant (high) blood alcohol levels, was supported by a significant Reducer-augmenter X B.A.L. effect on the depression dependent variable.

Prediction number 5, that the greatest levels of change between trials would appear at high blood alcohol levels, was not supported.

Discussion

The barroom setting for this study appears to be an appropriate one for alcohol and mood research. The sample provides a fairly even distribution of reducers and augmenters. The augmenting group leans slightly toward higher scores (mean = 26.7), possibly resulting in the inclusion of moderates in the augmenter group and working against significant findings. Although more often single, white and more highly educated than the Manitoba Health and Drinking Survey sample, this sample provides a good distribution along different demographic dimensions. Although the sample tends toward heavy drinking, this bias was predicted from earlier research (Cahalan et al, 1969; Clark, 1977).

As suggested by earlier research (Barnes, 1985), Vando scores in this study correlated with age, such that reducers tend to be younger while augmenters tend to be older. In addition, Vando scores correlate with the number of weekly drinks consumed, i.e., reducers report consuming more drinks weekly than augmenters. There was a zero correlation between Vando R-A scores and drinking frequency, suggesting that both reducers and augmenters span the drinking-frequency categories. Together, these results indicate that the frequent-drinking reducers consume more drinks than frequent-drinking augmenters.

Patrons drinking to high B.A.L.s tended to be older, with higher depression (Trial 1) scores, more frequent and heavier drinking and longer time spent in the bar: in short, an alcoholic profile (Nathan and O'brien, 1971 and others). Figure 6 suggests that these depressed heavy-drinkers are augmenters, supporting the theory that alcoholics tend to be augmenters (Petrie, 1967; Barnes, 1985). If augmentation precedes this particular alcoholic profile as some suggest (Barnes, 1985; Hennecke, 1984), some support is indicated for the theory of a "personality" predisposition to alcoholism (Tarter et al, 1985).

The major hypothesis, that the reducing-augmenting personality dimension and blood alcohol level interact to influence mood, has been generally supported. Results indicate differential mood effects experienced by reducers

and augmenters at various blood alcohol levels, apparently varying with the stimulant or depressant effects of alcohol. Whether positive or negative mood changes are experienced relates to blood alcohol level and reducer-augmenter level.

A 3-way interaction appears on the tension dependent variable, as anticipated by prediction numbers 1, 2 and 3. Reducers report strong significant declines in tension at low (mild stimulation) B.A.L.s. However, augmenters also report declines in tension at low B.A.L.s, and this is the largest significant tension reduction that augmenters receive. First, this finding may result from the inclusion of moderates within the augmenter group, given the median-split determination of reducer-augmenter groups and the high upper limit of 33 for inclusion in the augmenter group. Moderates, then, might find the mild stimulation of these B.A.L.s more pleasurable than augmenters, and the depressant effects of high B.A.L.s less so. Second, augmenters may have been responding in a socially-desirable way at low blood alcohol levels. If socially-desirable responding did occur, it would more likely occur with augmenters as opposed to reducers (Barnes and Vulcano). Third, augmenters may be demonstrating a popular expectation effect, e.g., of alcohol's "tension-reducing" properties (Horn and Wanberg, 1969). Fourth, 53% of the sample had been drinking prior to entering the bar, thus diminishing potential significant changes between mood trials. This "washing-out" effect due

to pre-drinking would be especially true at moderate and high blood alcohol levels. Lastly, augmenters drinking to high B.A.L.s show a classic alcoholic profile. If some of these alcoholics report increases in tension and depression that early literature suggests (Nathan and O'brien, 1971; Steffen et al, 1974; Avery et al, 1982; and Alterman et al, 1975), then significant effects may have diminished at high B.A.L.s. These methodological difficulties work against findings of significant change between trials, especially in predicted directions.

In contrast to prediction number 5, the significant Trial X B.A.L. effect for tension appears. This interaction indicates that significant tension decreases occur at low B.A.L.s, while increases occur at high B.A.L.s. Again, methodological difficulties may have obscured any significant directional change between trials, due to inclusion of pre-drinkers. The current findings, however, do support Williams' (1966) findings of tension decreases at low B.A.L.s dissolving into tension increases at higher B.A.L.s.

The POMS confusion subscale (Figure 5) also reveals a significant three-way interaction and supports prediction numbers 1 and 3. At low blood alcohol levels and assuming a stimulation effect, reducers become less confused while augmenters become more so. Reducers at high B.A.L.s report being very uncomfortable (e.g., more confused) with this

depressant effect, while augmenters report more pleasant mood experiences (e.g., less confusion). Reducers, then, experience confusion reductions at low B.A.L.s, while augmenters experience significant confusion increases at low/moderate B.A.L.s. These results were expected because the stimulation-seeking reducers find the peak stimulation of alcohol a pleasant experience (e.g., feeling less confused, more comfortable), while the augmenters appear to find the peak stimulation unpleasant (e.g., feeling more confused, less comfortable). However, at moderate B.A.L.s, reducers increase nonsignificantly in confusion and augmenters increase significantly in confusion. The reducer trend toward increasing confusion, although nonsignificant, is contrary to prediction number 2. This finding may be due to reducers drinking at the high end of the moderate blood alcohol level, with some reducers beginning to experience depressant effects and thus biasing the directional mood change.

However, in general, the significant differential mood reactions to drug stimulation and depression are in accord with optimal stimulation theory. The findings support the theory of personality mediation of drug effects (Eysenck, 1967; Petrie,1967) and indicate that this mediation extends to some moods. The implication, then, is that both individual differences and some moods have physiological components related to arousal (Eysenck, 1967; Schacter and Singer, 1962).

Significant Reducing-augmenting Level X B.A.L. effects for depression support prediction number 4, indicating that reducers consumed low amounts of alcohol when most depressed, while augmenters consumed high amounts when depressed. This finding supports early research suggesting that drugs are preferred for their stimulation or depressant effects (Petrie, 1967). Depressed reducers drink to "preferred" stimulation-phase B.A.L.s. Depressed augmenters, on the other hand, drink to depressant-phase (high) B.A.L.s. Both reducers and augmenters consume alcohol, but given alcohol's biphasic nature, the level to which it is consumed can achieve the preferred effect. A tendency to drink for "mood correction" is implied. For reducers, the effects of alcohol appear at low or moderate (stimulation) B.A.L.s with tension and confusion. For augmenters high stimulation B.A.L.s are unpleasant and an augmenter tendency to drink to high B.A.L.s when distressed exists. If depression can be considered "overstimulation," then this finding supports Ludwig et al's (1977) finding regarding overstimulated augmenter's tendency to drink. In accordance with optimal stimulation theory, these results suggest that reducers and augmenters drink to certain blood alcohol levels to correct unpleasant mood (e.g., depression), as noted in past literature (Grossman, 1965; Ludwig, 1972).

In addition, the POMS anger, confusion and tension subscales mimic this R-A Level X B.A.L. pattern, although to a non-significant degree. The most "mood-uncomfortable" individuals drank to their optimal stimulation level, thus becoming "mood comfortable." Those who were most "mood-comfortable" drank to unlikely levels, e.g., least tense augmenters drank to moderate (stimulant) levels and least confused reducers drank to high (depressant) levels. Perhaps these "comfortable" drinkers were seeking "different" experiences and did not have as a goal drinking to correct mood deficiencies. These individuals may have been drinking for "social conviviality" (Grossman, 1965). Larger sample sizes in future research may clarify this relationship for other moods.

It is interesting to note that the augmenters were the heaviest drinkers when highly depressed. This pattern appears similar to that of alcoholics (Nathan et al, 1970; Tamerin et al, 1970; Alterman et al, 1975, etc.). This finding suggests that the "classic" alcoholics of the sample (e.g., those drinking to alleviate depression) may consist primarily of augmenters. In addition, because augmenters may prefer to drink to depressant levels when "mood uncomfortable," they predispose themselves to drinking higher amounts. Thus, some support exists for the augmenter-alcoholic link suggested in earlier research (Petrie, 1967; Barnes, 1980).

Two main trial effects were not predicted: the overall decreases in depression and anger. The results for depression are consistent with some past research on social drinkers (Goldberg, 1966; Nathan and O'brien, 1971), although inconsistent with Williams' (1966) findings in a natural setting. Most likely, trial changes at each blood alcohol level were not differentially significant because of the inclusion of pre-drinkers in this study. The general decreases in these moods might be attributed to: 1) socially-desirable responding (i.e., those who routinely say they drink to allay depression and/or anger); or 2) expectancy of these effects.

In summary, the findings of a Reducing-augmenting Level X Trial X B.A.L. interaction effect for tension and confusion support Eysenck's (1967) and Petrie's (1967) theories for personality mediation of drug effects. The results of this study indicate that this mediation extends to mood effects, especially those connected with arousal such as tension (Conger, 1956; Kingham, 1958) and with attention such as confusion. The affected moods, then, support Eysenck's and Petrie's theoretical connection of personality and attention-arousal mechanisms, and thus a biological basis for the reducing-augmenting dimension (Vando, 1969). The reducing-augmenting differences may also account for inconsistent results in earlier post-alcohol mood research. Accurate measurement of blood alcohol level and a natural

environment may also have contributed to significant results in this study.

Future research might include a Trial 1 blood alcohol level measurement to assure zero blood alcohol level and thus alleviate pre-drinking biases. In addition, three reducing-augmenting levels are preferable to two median-split levels. Three reducing-augmenting levels can reduce moderate biases in either reducing or augmenting groups, thus eliminating another source of error. A comparison of problem and non-problem drinkers would also be helpful in future research with a larger number of subjects.

REFERENCES

Abrams, D.B. and Wilson, G.T. (1979). Effects of alcohol on social anxiety in women: cognitive versus physiological processes. Journal of Abnormal Psychology, 88, 161-173.

Alterman, A.I., Gottheil, E. and Crawford, H.D. (1975). Mood changes in an alcoholism treatment program based on drinking decisions. American Journal of Psychiatry, 132, 1032-1037.

Avery, D., Overall, J., Calil, H., and Hollister, L. (1982). Alcohol-induced euphoria: Alcoholics compared to non-alcoholics. International Journal of the Addictions, 17, 823-845.

Babor, T.F., Mendelson, J.H., Greenberg, I., and Kuchnle, J. (1978). Experimental analysis of the "happy hour": Effects of purchase price on alcohol consumption. Psychopharmacology, 58, 35.

Baker, A.H., Mishara, B.L, Kostin, I.W., and Parker, L. (1976). Kinesthetic after-effects and personality: A case study of issues involved in construct validity. Journal of Personality and Social Psychology, 34, 1-13.

Barnes, G.E. (1976). Individual differences in perceptual reactance: A review of the stimulus intensity modulation individual difference dimension. Canadian Psychological Review, 17, 29-51.

Barnes, G.E. (1977). The clinical alcoholic personality. Doctoral dissertation. York University, Toronto.

Barnes, G.E. (1979). The alcoholic personality: A reanalysis of the literature. Journal of Studies on Alcohol 40, 571-634.

Barnes, G.E. (1980). Characteristics of the clinical alcoholic personality. Journal of Studies on Alcohol, 41, 894-910.

Barnes, G.E. (1984). The Vando Reducer-Augmenter Scale as a measure of stimulus Reducing-Augmenting. In J. Strelau, F. Farley and A. Gale (eds.): The Biological Basis of Personality and Behavior. Washington D.C.: Hemisphere Press, pp. 171-180.

Barnes, G.E. and Fishlinsky, M. (1976). Stimulus intensity modulation, smoking and craving for cigarettes. Addictive Diseases: An International Journal, 2, 479-484.

Barnes, G.E. and Hoffman, F. Pinball playing, risk-taking and sensation-seeking. Unpublished manuscript.

Barnes, G.E. and Vulcano, B. Comparing two different techniques for measuring social desirability. Unpublished manuscript.

Battig, K. and Fischer, H. (1965). Personality traits, subjective feelings and psychomotor performance under the influence of alcohol in young people unaccustomed to alcohol. Z. Prav. Med., 10, 386-396.

Blitz, B., Dinnerstein, A.J. and Lowenthal, M. (1966). Relationship between pain tolerance and kinesthetic size judgment. Perceptual and Motor Skills, 22, 463-469.

Broadhurst, P.L. (1978). Drugs and the Inheritance of Behavior. New York: Plenum Press.

Brown, R.A. and Cutter, H.S. (1977). Alcohol, customary drinking behavior and pain. Journal of Abnormal Psychology, 86, 179-188.

Brown, R.A., Fader, K., and Barber, T.X. (1973). Responsiveness to pain: Stimulus specificity versus generality. Psychological Record, 23, 1-7.

Bruun, K., Edwards, G., Lymia, M., Makela, K., Pam, L., Popham, R.D., Room, R., Schmidt, W., Skog, O., Sulkumen, P., and Osterberg, E. (1975). Alcohol control policies in public health perspective. Finnish Foundation for Alcohol Studies, 25.

Buchsbaum, M.S. and Ludwig, A.M. (1978). Effects of sensory input and alcohol administration on visual evoked potentials in normal subjects and alcoholics. In H. Beleiter (ed.): Biological Effects of Alcohol. New York: Plenum Press.

Buchsbaum, M.S. and Silverman, J. (1968). Stimulus intensity control and the cortical evoked response. Psychosomatic Medicine, 30, 12-22.

Burns, T.F. (1980). Getting rowdy with the boys. Journal of Drug Issues - Tallahassee, 10, 273-286.

Cahalan, D., Cisin, I.H., and Crossley, H.M. (1969). American Drinking Practices: A Methodological Study of Drinking Behavior and Attitudes. New Brunswick, New Jersey: Rutgers Center for Alcohol Studies, (Monograph No. 6).

Cahalan, D. (1970). Problem Drinkers. San Francisco: Jossey-Bass.

Cameron, D. (1974). The physiological and behavioural effects of moderate doses of alcohol: The psychopharmacology of social drinking. Journal of Alcoholism, London, 9, 50-55.

Cappell, H. and Herman, C.P. (1972). Alcohol and tension reduction: A review. Quarterly Journal of Studies on Alcohol, 33, 33-64.

Carpenter, J.A. (1957). Effects of alcoholic beverages on skin conductance. An exploratory study. Quarterly Journal of Studies on Alcohol, 18, 1-18.

Cavan, S.E.G. (1965). Social interaction in public drinking places. Doctoral dissertation, University of California, Berkeley, (University microfilms No. 66-3559.)

Child, J.S., Kovick, R.B., Levisman, J.A. and Pearce, M.L. (1979). Cardiac effects of acute ethanol ingestion unmasked by autonomic blockade. Circulation, 59, 120-125.

Clark, W.B. (1981). The contemporary tavern. In: Israel, Y., Glaser, F., Kalant, H., Popham, R., Schmidt, W., and Smart, R. (eds.). Research Advances in Alcohol and Drug Problems. New York: Plenum Press, 1981.

Clark, J.W. and Bindra, D. (1956). Individual differences in pain thresholds. Canadian Journal of Psychology, 10, 69-70.

Clinard, M. B. (1962). The public drinking house and society. In Pittman, D.J. and Snyder, C.R. (eds): Society, Culture, and Drinking Patterns, New York: Wiley, pp. 270-292.

Coger, R.W., Dymond, A.M., Serafetinides, E.A., Lowenstam, I., and Pearson, D. (1976). Alcoholism: Averaged visual evoked response amplitutudeintensity slope and symmetry in withdrawal. Biological Psychiatry, 11.

Conger, J.J. (1956). Reinforcement theory and the dynamics of alcoholism. Quarterly Journal of Studies on Alcohol, 17, 296-305.

Cutler, R.E. and Storm, T. (1975). Observational study of alcohol consumption in natural settings: the Vancouver beer parlor. Journal of Studies on Alcohol, 36, 1173-1183.

Cutter, H.S., Maloof, B., Kurtz, N.R. and Jones, W.C. (1976). Feeling no pain: Differential responses to pain by alcoholics and nonalcoholics before and after drinking. Journal of Studies on Alcohol, 37, 273-277.

Davidson, P.O. and McDougall, C.E. (1969). The generality of pain tolerance. Journal of Psychosomatic Research, 13, 83-89.

Davis, D. (1971). Mood changes in alcoholic subjects with programmed and free-choice experimental drinking. In: N.K. Mello and J.H. Mendelson (eds.), Recent Advances in Studies of Alcoholism: An Interdisciplinary Symposium. Rockville, MD: National Institute of Mental Health, NIAAA.

Deaux, E. (1976). A psychophysiological influence on the choice of illicit drugs. Physiological Psychology, 4, 400-404.

Deardorff, C.M., Melges, F.T., Hout, C.N. and Savage, D.J. (1975). Situations related to drinking alcohol: A factor analysis of questionnaire responses. Journal of Studies on Alcohol, 36, 1184-1195.

Dengerink, H.A. and Fagan, N.J. (1978). Effect of alcohol on emotional responses to stress. Journal of Studies on Alcohol, 39, 525-539.

Dinnerstein, A., Lowenthal, M., Marion, R. and Olivo, J. (1962). Pain tolerance and kinesthetic aftereffect. Perceptual and Motor Skills, 2, 247-250.

Ekman, G., Frankenhaeuser, M., Goldberg, L., Bjerver, K., Jarpe, G., and Myrsten, A. (1963). Effects of alcohol intake on subjective and objective variables over a five-hour period. Psychopharmacologia, Berlin, 4, 28-38.

Ekman, G., Frankenhaeuser, M., Goldberg, L., Hagdahl, R. and Myrsten, A. (1964). Subjective and objective effects of alcohol as functions of dosage and time. Psychopharmacologia, 6, 399-409.

Epstein, S. (1972). The nature of anxiety with emphasis upon its relationship to expectancy. In C.D. Spielberger (ed.), Anxiety: Current Trends in Theory and Research, New York: Academic Press, Volume Two, 292-338.

Eysenck, H.J. (1967). The Biological Basis of Personality. Springfield, Illinois: Thomas.

Eysenck, H.J., Holland, H. and Trouton, D.S. (1957). Drugs and personality: III. The effects of stimulant and depressant drugs on visual after-effects. Journal of Mental Science, 103 650-655.

Freed, E.X. (1978). Alcohol and Mood: An updated review. International Journal of the Addictions, 13, 173-200.

Fruhstorfer, H. and Soveri, P. (1968). Alcohol and auditory evoked responses in man. Acta Physiol. Scand., 74, 26A-27A.

Gerstel, E.K., Mason, R.E., Piserchid, P.V. and Kristiansen, P.L. (1975). A pilot study of the social contexts of drinking and correlates. R.I.I. Project No. 234-892, August, Research, Triangle Park.

Goldberg, L. (1966). Behavioral and physiological effects of alcohol on man. Psychosomatic Medicine, 28, 570-595.

Goldman, D., Kohn, P.M., and Hunt, R.W. Sensation seeking, augmenting-reducing and absolute auditory threshold: A strength-of-the-nervous system perspective. Journal of Personality and Social Psychology, in press.

Gottlieb, D. (1957). The neighborhood tavern and the cocktail lounge: A study of class differences. American Journal of Sociology, 62, 559-562.

Greenberg, L.A. and Carpenter, J.A. (1957). The effect of alcoholic beverages on skin conductance and emotional tension, I. Wine, whisky and alcohol. Quarterly Journal of Studies on Alcohol , 18, 190-204.

Gross, M.M., Begleiter, H., Tobin, M., and Kissin, B. (1966). Changes in auditory evoked response induced by alcohol. Journal of Nervous and Mental Diseases, 143, 152.

Grossman, P.H. (1965). Drinking motivation: A cluster analytic study of three samples. Doctoral dissertation, University of Colorado. (University Microfilms No. 66-2793).

Gupta, B.S. (1974). Stimulant and depressant drugs on kinaesthetic figural aftereffects. Psychopharmalogical, 36, 275-280.

Hall, R.A. (1973). Tobacco and evoked potential. Science, 180, 212-214.

Harford, T. (1975). Policy implications of a contextual analysis of drinking. 21st International Institute on the Prevention and Treatment of Alcoholism, June, Helsinki.

Hartocollis, P. (1962). Drunkenness and suggestion: An experiment with intravenous alcohol. Quarterly Journal of Studies on Alcohol, 23, 376-389.

Haslam, D.R. (1967). Individual differences in pain threshold and level of arousal. British Journal of Psychology, 58, 139-142.

Health and Welfare Canada. (1981). The Health of Canadians: Report of the Canada Health Survey. Ottawa: Minister of Supply and Services Canada, (June).

Hennecke, L. (1984). Stimulus augmenting and field dependence in children of alcoholic fathers. Journal of Studies on Alcohol, 45, 486-492.

Hobi, V., Miest, P., Richter, R., Schwarz, E., Goldberg, L., Ladewig, D. and Reggiani, G. (1976). The time course of alcohol-induced changes in self-rating scales of mood. Pharmakopsychiat. Stuttgart, 9, 313-322.

Horn, J.L. and Wanberg, K.W. (1969). Symptom patterns related to excessive use of alcohol. Quarterly Journal of Studies on Alcohol, 30, 35-58.

Huxley, A. (1957). The history of tension. Ann. N.Y. Acad. Sci., 67, 6759-684.

James, M.F., Duthie, A.M., Duffy, B.L., McKeag, A.M. and Rice, C.P. (1978). Analgesic effect of ethyl alcohol. Brit. J. Anaesth., 50, 139-141.

Jones, B.M., Parsons, O.A., and Rundell, O.H. (1976). Psychophysiological correlates of alcoholism. In R.E. Tarter and A.A. Sugerman (eds), Alcoholism. Reading, Mass.: Addison-Wesley.

Kalin, R., McClelland, D.C. and Kahn, M. (1965). The effects of male social drinking on fantasy. Journal of Personality and Social Psychology, 1, 441-452.

Kastl, A. (1969). Changes in ego functioning under alcohol. Quarterly Journal of Studies on Alcohol, 30, 371-383.

Kelly, M., Myrsten, A.L., Neri, A., and Rydberg, U. (1970). Effects and aftereffects of alcohol on physiological and psychological functions in man: a controlled study. Blutalkohol, 7, 422-436.

Kessler, M. and Gomberg, C. (1974). Observations of barroom drinking: methodology and preliminary results. Quarterly Journal of Studies on Alcohol, 35, 1392-1396.

Kilty, K.M. ((1980). Situational context and the meaning of drinking. International Journal of Addiction, 15, 1021-1033.

Kingham, R.J. (1958). Alcoholism and the reinforcement theory of learning. Quarterly Journal of Studies on Alcohol, 19, 320-330.

Knott, D.H. and Beard, J.D. (1972). Changes in cardiovascular activity as a function of alcohol intake. In B. Kissin and H. Begleiter (eds), The biology of alcoholism: Volume, 2. Physiology and Behavior. New York: Plenum Press.

Kohn, P.M., Barnes, G.E., and Hoffman, F.M. (1979). Drug-use history and experience seeking among adult male correctional inmates. Journal of Consulting and Clinical Psychology, 47, 708-715.

Kohn, P.M., Fox, J., Barnes, G.E., Annis, H.M., Hoffman, F.M., and Ejchental, B. (1979). Progressive development of a model of youthful marijuana use. Representative Research in Social Psychology, 9, 122-139.

Lange, A.R., Goechner, D.J., Adesso, V.J. and Marlatt, G.A. (1975). Effects of alcohol on aggression in male social drinkers. Journal of Abnormal Psychology, 1975, 84, 508-518.

Lennard, H.L., Epstein, L.J., Bernstein, A., and Ransom, D.C. (1971). Mystification and drug use. San Francisco: Jossey-Bass, Inc..

Levenson, R., Sher, K.J., Grossman, L., Newman, J. and Newlin, D. (1980). Alcohol and stress response dampening: Pharmacological effects, expectancy, and tension-reduction. Journal of Abnormal Psychology, 89, 528-38.

Lewis, E.G., Dustman, R.E. and Beck, E.C. (1970). The effects of alcohol on visual and somato-sensory evoked responses. Electroenceph. Clin. Neurophysiol., 28, 202-205.

Lienert, G.A. and Traxel, W. (1959). The effects of meprobamate and alcohol on galvanic skin response. Journal of Personality, 48, 329-344.

Lipscomb, T.R., Nathan, P.E., Wilson, G.T. and Abrams, D.B. (1980). Effects of tolerance on the anxiety-reducing function of alcohol. Archives of General Psychiatry, 37, 577-582.

Logue, P.E., Gentry, W.D., Linnoila, M. and Erwin, C.W. (1978). Effect of alcohol consumption on state anxiety changes in male and female nonalcoholics. American Journal of Psychiatry, 135, 1079-1081.

Lorr, M., McNair, D.M. and Weinstein, G.J. (1964). Early effects of chlordiazepoxide (Librium) used with psychotherapy. Journal of Psychiatric Research, 1, 257-270.

Ludwig, A.M. (1972). On and off the wagon: Reasons for drinking by alcoholics. Quarterly Journal of Studies on Alcohol, 33, 91-96.

Ludwig, A.M., Wikler, A., and Stark, L.H. (1974). The first drink. Archives of General Psychiatry, 30, 539-547.

Ludwig, A.M., Cain, R.B., and Wikler, A. (1977). Stimulus intensity modulation and alcohol consumption. Journal of Studies on Alcohol, 38, 11.

Ludwig, A.M., Wilker, A., Cain, R.B., Buchsbaum, M., Rinsky, G., and Taylor, R. (1977). Alcoholics and high-low sensory input: a pilot study. Diseases of the Nervous System, 38, 681-683.

Maisto, S., Connors, G., Tucker, J., McCollam, J., and Adesso, V. (1980). Validation of the sensation scale: A measure of subjective psychological responses to alcohol. Behavior Research and Therapy, Oxford, 18, 37-43.

Majczak, A. (1967). On mood changes during alcoholization in humans. Probl. Alkzmu, Wars., 15, 4-6.

Martarano, R.D. (1974). Mood and social perception in four alcoholics: Effects of drinking and assertion training. Quarterly Journal of Studies on Alcohol, 35, 445-457.

Mass Observation. (1970). The Pub and the People. Welwyn Garden City, Great Britain: Seven Dials Press.

Mayfield, D.G. (1968a). Psychopharmacology of alcohol. I. Affective change with intoxication, drinking behavior and affective state. Journal of Nervous and Mental Disease, 146, 314-321.

Mayfield, D.G. (1968b). Psychopharmacology of alcohol. II. Affective tolerance in alcohol intoxication. Journal of Nervous and Mental Diseases, 146, 322-327.

McClelland, D.C., Davis, W.N., Kalin, R., and Wanner, E. (1972). The Drinking Man. New York: The Free Press.

McCollam, J., Burish, T., Maisto, and Sobell, M. (1980). Alcohol's effects on physiological arousal and self-reported affective sensations. Journal of Abnormal Psychology, 89, 224-233.

McDonnell, G.J. and Carpenter, J.A. (1959). Anxiety, skin conductance and alcohol: A study of the relation between anxiety and skin conductance and the effect of alcohol on the conductance of subjects in a group. Quarterly Journal of Studies on Alcohol, 20, 38-52.

McGuire, M.T., Stein, S., and Mendelson, J.H. (1966). Comparative psychosocial studies of alcoholic and nonalcoholic subjects undergoing experimentally induced ethanol intoxication. Psychosomatic Medicine, 28, 13-26.

McNair, D.M., Lorr, M., and Droppleman, L.F. (1971). Profile of Mood States Manual. San Diego: Educational and Industrial Testing Service.

McNamee, H.B., Mello, N.K. and Mendelson, J.H. (1968). Experimental analysis of drinking patterns of alcoholics; concurrent psychiatric observations. American Journal of Psychiatry, 124, 1063-1069.

Mello, N.K. and Mendelson, J.H. (1970). Experimentally-induced intoxication in alcoholics: A comparison between programmed and spontaneous drinking. J. Pharm. Exp. Ther., 173, 101-116.

Mendelson, J.H. and Mello, N.K. (1966). Alcohol and food in health and disease: experimental analysis of drinking behavior of chronic alcoholics. Ann. N.Y. Acad. Sci., 133, 828-845.

Mishara, B.L., Kastenbaum, R., Baker, F. and Patterson, R. (1975). Alcohol effects in old age: An experimental investigation. Social Science and Medicine, 9, 535-547.

Murray, R.P. (1978). Manitoba Health and Drinking Survey: The social epidemiology of alcohol abuse in Eastman Region. Winnipeg, Canada.

Naitoh, P. (1972). The effects of alcohol on the autonomic nervous system of humans: Psychophysiological approach. In B. Kissin and H. Begleiterq (eds), The biology of alcoholism. New York: Plenum Press.

Nathan, P.E. (1971). Recent Advances in Studies of Alcoholism: An Interdisciplinary Symposium. Rockville, Maryland: NIMH, NIAAA, pp. 619-646.

Nathan, P.E., and O'Brien, J.S. (1971). An experimental analysis of the behavior of alcoholics and non-alcoholics during prolonged experimental drinking: A necessary precursor of behavior therapy? Behavior Therapy, 2, 455-476.

Nathan, P.E., Titler, N.A., Lowenstein, L.M., Solomon, P. and Rossi, M. (1970). Behavioral analysis of chronic alcoholism: Interaction of alcohol and human contact. Archives of General Psychiatry, 22, 418-430.

Nathan, P.E., Zare, N.C., Ferneau, E.W., Jr., and Lowenstein, L.M. (1970). Effects of congener differences in alcoholic beverages on the behavior of alcoholics. Quarterly Journal of Studies on Alcohol, Supplement No. 5, 87-100.

Pearson, R.G. (1968). Alcohol-hypoxia effects upon operator tracking, monitoring, and reaction time. Aerospace Medicine, 39, 303-307.

Petrie, A. (1967). Individuality in Pain and Suffering. Chicago: University of Chicago Press.

Petrie, A., Collins, W., and Solomon, P. (1958). Pain, sensitivity, sensory deprivation and susceptibility to satiation. Science, 128, 1431-1433.

Petrie, A., Collins, W., and Solomon, P. (1960). The tolerance for pain and sensory deprivation. American Journal of Psychology, 73, 80-90.

Pliner, P. and Cappell, H. (1974). Modification of affective consequences of alcohol: A comparison of social and solitary drinking. Journal of Abnormal Psychology, 83, 418-425.

Pohorecky, L.A. (1981). The interaction of alcohol and stress: A review. Neurosci. Biobehav. Review, 5, 209-229.

Polivy, J., Schueneman, A.L., and Carlson, K. (1976). Alcohol and tension reduction: Cognitive and physiological effects. Journal of Abnormal Psychology, 85, 595-600.

Popham, R.E. (1978). The social history of the tavern. In Israel, Y., Glaser, F.B., Kalant, H., Popham, R.E., Schmidt, W. and Smart, R.G. (eds.): Research Advances in Alcohol and Drug Problems, 4, pp. 225-302.

Poser, E. (1960). Figural aftereffect as a personality correlate. Proceedings of the Sixteenth International Congress of Psychology. Amsterdam: North Holland Publishing Co., pp. 748-749.

Poser, E. (1962). A simple and reliable apparatus for the measurement of pain. American Journal of Psychology, 75, 304-305.

Ratcliffe, W.D., Nutter, R.W., Hewitt, D., Gruber, G., Flanders, P. and Caverhill, K. (1982). Drinking in Taverns: A fifteen-year comparison. The International Journal of the Addictions, 17, 869-877.

Rhodes, L.E., Obitz, F.W. and Creel, D. Effect of alcohol and task on hemispheric assymetry of visually evoked potentials in man. Electroenceph. Clinical Neurophysiology, 30, 561-568.

Robbins, B.J. and Brotherton, P.L. (1980). Mood change with alcohol intoxication. British Journal of Social and Clinical Psychology, 19, 149-155.

Room, R. (1972). Drinking patterns in large U.S. cities: A comparison of San Francisco and national samples. Quarterly Journal of Studies on Alcohol, Supplement No. 6, 28-57.

Russell, J.A. and Bond. C.R. (1979). Beliefs among college students on settings and emotions conducive to alcohol and marijuana use. International Journal of the Addictions, 14, 977-986.

Russell, J.A. and Mehrabian, A. (1975). The mediating role of emotions in alcohol use. Journal of Studies on Alcohol, 36, 1508-1536.

Ryan, E.D. and Foster, R. (1967). Athletic participation and perceptual augmentation and reduction. Journal of Personality and Social Psychology, 6, 472-476.

Ryan, E.D. and Kovacic, C.R. (1966). Pain tolerance and athletic participation. Perceptual and Motor Skills, 22, 383-390.

Sadoun, R., Lolli, G. and Silverman, M. (1965). Drinking in French Culture. New Brunswick, New Jersey: Rutgers Center of Alcohol Studies.

Salamy, A. and Williams, H.L. (1973). The effects of alcohol on sensory evoked and spontaneous cerebral potentials in man. Electroenceph. Clin. Neurophysiol, 35, 3-11.

Sales, S. M. (1971). Need for stimulation as a factor in social behavior. Journal of Personality and Social Psychology, 19, 124-134.

Sales, S.M. and Throop, W.F. (1972). Relationship between kinesthetic aftereffects and strength of the nervous system. Psychophysiology, 9, 492-497.

Schacter, S. and Singer, J. (1962). Cognitive, social and physiological determinants of emotional state. Psychological Review, 69, 379-399.

Schwarz, R.M., Burkhart, B.R. and Green, S.B. (1982). Sensationseeking and anxiety as factrs in social drinking by men. Journal of Studies on Alcohol, 43, 1108-1114.

Sher, K.J. and Levenson, R.W. (1982). Risk for alcoholism and individual differences in the stress-response-dampening effect of alcohol. Abnormal Psychology, 91, 350-367.

Smith, G.M. and Carpenter, J.A. (1969). Alcohol absorption and field dependence. Journal of Studies on Alcohol, 30, 15-20.

Smith, R.C., Parker, E.S., and Noble, E.P. (1975). Alcohol and affect in dyadic social interaction. Psychosomatic Medicine, 37, 25-40.

Solon, J.A. (1967). (Cited in: A. Petrie, Individuality in Pain and Suffering. Chicago: University of Chicago Press, 1967.

Sommer, R. (1965). The isolated drinker in the Edmonton beer parlor. Quarterly Journal of Studies on Alcohol, 26, 95-110.

Spilker, B. and Callaway, E. (1969a). Effects of drugs on "augmentingreducing" in averaged visual evoked responses in man. Psychopharmacologia, 15, 116-124

Steffen, J.J., Nathan, P.E. and Taylor, H.A. (1974). Tension-reducing effects of alcohol. Journal of Abnormal Psychology, 83, 542-547.

Storm, T. and Cutler, R.E. (1981). Observations of drinking in natural settings: Vancouver beer parlors and cocktail lounges. Journal of Studies on Alcohol, 42, 972-997.

Street, P. (1976). The warehouse of intimate places: The history of a tavern undergoing change. Berkeley, unpublished manuscript.

Strelau, J. (1982). Biologically determined dimension of personality or temperament? Personality and Individual Differences, 3, 355-360.

Strelau, J. (1975). Pavlov's typology and current investigations in this area. Nederlands Tijdschrift voor de Psychologie, 30, 177-200.

Strickler, D.P., Dobbs, S.D. and Maxwell, W.A. (1979). The influence of setting on drinking behaviors: The laboratory versus the barroom. Addict. Behav., Oxford, 4, 339-344.

Sweeny, D. (1966). Pain reactivity and kinesthetic aftereffect. Perceptual and Motor Skills, 22, 763-769.

Tamerin, J.S. and Mendelson, J.H. (1969). The psychodynamics of chronic inebriation: Observations of alcoholics during the process of drinking in an experimental group setting. American Journal of Psychiatry, 125, 886-899.

Tamerin, J.S., Tolor, A., Holson, P. and Neumann, C.P. (1974). The alcoholic's perception of self: A retrospective compaprison of mood and behaior during states of sobriety and intoxication. Ann. N.Y. Acad. Sci., 233, 48-60.

Tamerin, J.S., Weiner, S. and Mendelson, J.H. (1970). Alcoholics' expectancies and recall of experiences durng intoxication. American Journal of Psychiatry, 126, 1697-1704.

Tarter, R.E., Alterman, A. and Edwards, K.L. Vulnerability to Alcoholism in Men: A Behavior-Genetic perspective. Journal of Studies on Alcohol, 46, 329-356.

Thomas, A. (1976). Class and sociability among urban workers: A study of the bar as a social club. Med. Anthropol., 2(4), 9.

Transport Canada, Road and Motor Vehicle Traffic Safety Branch, Department of Transport. (1979). Smashed: The Magazine on Drinking and Driving. Ottawa, Ontario: Catalogue No. T46-11.

Vaillant, G.E., Brighton, J.R. and McArthur, C. (1970). Physicians' use of mood-altering drugs. New England Journal of Medicine, 282, 365-370.

Van der Spuy, J.I. (1972). The influence of alcohol on the mood of the alcoholic. British Journal of the Addictions, 67, 255-265.

Vando, A. (1969). A personality dimension related to pain tolerance. Doctoral dissertation, Columbia University.

von Knorring, L. (1976). Visual average evoked responses in patients suffering ffrom alcoholism. Neuropsychobiologica, 2, 233-238.

Wanberg, K.W. (1969). Prevalence of symptoms found among excessive drinkers. International Journal of the Addictions, 4, 169-185.

Warren, G.H. and Raynes, A.E. (1972). Mood changes during three conditions of alcohol intake. Quarterly Journal of Studies on Alcohol, 33, 979-989.

Williams, A.F. (1966). Social drinking, anxiety and depression. Journal of Personality and Social Psychology, 3, 689-693.

Williams, A.F. (1967). Self-concept of college problem drinkers: II. Heilbrun Need Scales. Quarterly Journal of Studies on Alcohol, 28, 267-276.

Williams, A.F. (1968). Psychological needs and social drinking among college students. Quarterly Journal of Studies on Alcohol, 29, 355-363.

Wilson, G.T. and Abrams, D. (1977). Effects of alcohol on social anxiety and physiological arousal: Cognitive versus pharmacological processes. Cognitive Therapy and Research, 1, 195-210.

Wilson, G.T., Abrams, D.B., and Lipscomb, T.R. (1980). Effects of increasing levels of intoxication and drinking pattern on social anxiety. Journal of Studies on Alcohol, 41, 250-264.

Wolff, B.B. (1971). Factor analysis of human pain responses: Pain endurance as a specific pain factor. Journal of Abnormal Psychology, 78, 292-298.

Wolff, H.G., Hardy, J. and Goodell, H. Studies on pain: measurement of the effect of ethyl alcohol on the pain threshold and on the "alarm reaction." Journal of Pharmacology, 75, 38-49.

Wolpaw, J.R. and Penry, J.K. (1978). Effects of ethanol, caffeine, and placebo on the auditory evoked response. Electroenceph. Clin. Neurophysiol., 44, 568-574.

APPENDIX A: VANDO REDUCER-AUGMENTER SCALE

Following you will find a series of paired statements which you are asked to regard as choices. In some cases you will dislike both choices. In other cases you will find the choices neutral. No matter how the items strike you, however, you are asked to choose between them. In each case you are to decide which of the alternatives you prefer in comparison to the other alternative and then to indicate your selection by drawing a circle around the (a) or (b) to the left of the statement. It is important to answer all items. Do not skip any. It is best to work as rapidly as possible.

1. a) see a war drama
   b) see a situation comedy

2. a) play sports requiring endurance
   b) play games with rest stops

3. a) raunchy blues
   b) straight ballads

4. a) jazz combo
   b) 101 strings

5. a) stereo on too loud
   b) stereo on too low

6. a) own a goldfish
   b) own a turtle

7. a) conservatism
   b) militantism

8. a) too much sleep
   b) too little sleep

9. a) danger
   b) domesticity

10. a) passenger car
    b) sports car

11. a) have several pets
    b) have one pet

12. a) be a shepherd
    b) be a cowboy

13. a) motorcycle
    b) motor scooter

14. a) see the movie
    b) read the book

15. a) cocktail music
    b) discotheque music

16. a) do research in the library
    b) attend a classroom lecture

17. a) a hot drink
    b) a warm drink

18. a) a drum solo
    b) a string solo

19. a) too much exercise
    b) too little exercise

20. a) loud music
    b) quiet music

21. a) prepare medications
    b) dress wounds

22. a) a driving beat
    b) a nice melody

23. a) hard rock music
    b) regular popular music

24. a) like athletics
    b) dislike athletics

25. a) unamplified music
    b) electrically amplified music

26. a) smooth-texured foods
    b) crunchy foods

27. a) wake-up pill ("upper")
    b) sleeping pill ("downer")

28. a) speed
    b) safety

29. a) rock music
    b) ballads

30. a) soccer
    b) golf

31. a) excitement
    b) calm

32. a) a family of six
    b) a family of three

33. a) thrills
    b) tranquility

34. a) play contact sports
    b) non-contact sports

35. a) live in a crowded home
    b) live alone

36. a) share intimacy
    b) share affections

37. a) games emphasizing speed
    b) games paced slowly

38. a) thinking
    b) doing

39. a) competitive sports
    b) non-competitive sports

40. a) emotionally expressive, somewhat unstable people
    b) calm, even-tempered people

41. a) be a nurse on an acute care ward
    b) be a nursing home operator

42. a) be a NASA scientist
    b) be an astronaut

43. a) be a stuntman
    b) be a propman

44. a) a job which requires a lot of travel
    b) a job which keeps you in one place

45. a) climb a mountain
    b) read about a dangerous adventure

46. a) body odors are disgusting
    b) body odors are appealing

47. a) keep on the move
    b) spend time relaxing

48. a) have a cold drink
    b) have a cool drink

49. a) being confined alone in a room

    b) being free in the desert

50. a) security

    b) excitement

51. a) continuous anesthesia

    b) continuous hallicunations

52. a) water skiing

    b) boat rowing

53. a) hostility

    b) conformity

54. a) traditional art (e.g., Renoir)

    b) abstract art (e.g., Picasso)

Appendix B

APPENDIX B: PROFILE OF MOOD STATES QUESTIONNAIRE

Instructions: Below is a list of words that describe feelings people have. Please read each one carefully. Then circle the number under the answer to the right which best describes how you are feeling RIGHT NOW.

THE NUMBERS REFER TO THESE PHRASES:

0 = Not at all

1 = A little

2 = Moderately

3 = Quite a bit

4 = Extremely

1.	Friendly	0	1	2	3	4
2.	Tense	0	1	2	3	4
3.	Angry	0	1	2	3	4
4.	Worn out	0	1	2	3	4
5.	Unhappy	0	1	2	3	4
6.	Clear-headed	0	1	2	3	4

7. Lively 0 1 2 3 4

8. Confused 0 1 2 3 4

9. Sorry for things done..0 1 2 3 4

10. Shaky 0 1 2 3 4

11. Listless 0 1 2 3 4

12. Peeved 0 1 2 3 4

13. Considerate 0 1 2 3 4

14. Sad 0 1 2 3 4

15. Active 0 1 2 3 4

16. On edge 0 1 2 3 4

17. Grouchy 0 1 2 3 4

18. Blue 0 1 2 3 4

19. Energetic 0 1 2 3 4

20. Panicky 0 1 2 3 4

21. Hopeless 0 1 2 3 4

22. Relaxed 0 1 2 3 4

23. Unworthy 0 1 2 3 4

24. Spiteful 0 1 2 3 4

25. Sympathetic 0 1 2 3 4

26. Uneasy 0 1 2 3 4

27. Restless 0 1 2 3 4

28. Unable to concentrate .0 1 2 3 4

29. Fatigued 0 1 2 3 4

30. Helpful 0 1 2 3 4

31. Annoyed 0 1 2 3 4

32. Discouraged 0 1 2 3 4

33. Resentful 0 1 2 3 4

34. Nervous 0 1 2 3 4

35. Lonely 0 1 2 3 4

36. Miserable 0 1 2 3 4

37. Muddled 0 1 2 3 4

38. Cheerful 0 1 2 3 4

39. Bitter 0 1 2 3 4

40. Exhausted 0 1 2 3 4

41. Anxious 0 1 2 3 4

42. Ready to fight 0 1 2 3 4

43. Good natured 0 1 2 3 4

44. Gloomy 0 1 2 3 4

45. Desperate 0 1 2 3 4

46. Sluggish 0 1 2 3 4

47. Rebellious 0 1 2 3 4

48. Helpless 0 1 2 3 4

49. Weary.....0 1 2 3 4

50. Bewildered 0 1 2 3 4

51. Alert.....0 1 2 3 4

52. Deceived 0 1 2 3 4

53. Furious 0 1 2 3 4

54. Efficient 0 1 2 3 4

55. Trusting 0 1 2 3 4

56. Full of pep 0 1 2 3 4

57. Bad-tempered 0 1 2 3 4

58. Worthless 0 1 2 3 4

59. Forgetful 0 1 2 3 4

60. Carefree 0 1 2 3 4

61. Terrified 0 1 2 3 4

62. Guilty 0 1 2 3 4

63. Vigorous 0 1 2 3 4

64. Uncertain about things.0 1 2 3 4

65. Bushed 0 1 2 3 4

MAKE SURE YOU HAVE ANSWERED EVERY ITEM. /*