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Stressful events, personality, and mood disturbance: Gender differences in alcoholics and problem drinkers

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Abstract

The present study examined relationships among stressful events, personality characteristics, and affective status in males and females of various alcohol drinking patterns. We examined a total of 154 participants from three distinct alcohol subgroups: alcohol dependent, problem drinker, and light social drinker. These subjects did not meet criteria for any concurrent nonalcohol comorbid psychiatric disorder. The study included an alcohol quantity–frequency interview and self-report questionnaires on stressful life events, depressive symptoms, trait anxiety, and personality characteristics. Results showed female alcoholics reported significantly greater depression, anxiety, and neuroticism compared to their male counterparts (and all other drinking groups). Female problem drinkers reported significantly greater depressive symptoms and health-related stressful events compared to male problem drinkers and the light drinkers. In contrast, male problem drinkers did not show elevations on these dimensions and more closely resembled light drinkers, of whom no gender differences were found. The findings support theories suggesting a “telescoping” of complications, health-related stress, and mood dysfunction in women at a lower threshold level of alcohol consumption compared to their male counterparts.

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1. Introduction

In the US, men generally drink about twice as much alcohol as women (Dawson & Archer, 1992). Studies demonstrate a 4:1 male-to-female ratio of lifetime prevalence of alcohol

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dependence overall (Robins, Helzer, & Weissman, 1984) and a 2:1 male-to-female ratio of alcohol dependence within current drinker populations (Dawson, 1996). The converse is also true, i.e., lifetime abstinence or very rare alcohol drinking is more common among adult females (45%) than males (22%; Dawson, Grant, & Chou, 1995). It has been suggested that environmental influences, psychological vulnerabilities, and individual differences may account for a large proportion of the variance in the progression from social drinking to hazardous drinking between the sexes.

Individual differences in response to stressful events have been hypothesized to be an important determinant in the development and maintenance of substance use disorders (Cappell & Greeley, 1987; Goldman, Brown, & Christiansen, 1987; Kreek, 1992; Leigh, 1989; Polich & Orvis, 1979). In some studies, the relationship among stressful events, emotional distress, and alcohol drinking has been reported to be stronger in men compared to women drinkers (Cooper, Russel, Skinner, Frone, & Mudar, 1992; Gottlieb & Green, 1984; Harlow, Newcomb, & Bentler, 1986), but these findings have been challenged in other investigations (Cooke & Allan, 1984; Cronkite & Moos, 1984; Timmer, Veroff, & Colten, 1985; Wallen, 1992). In general, few studies examining this issue have systematically partialled out or excluded those persons with significant concurrent psychiatric or antisocial personality disorders (Allan & Cooke, 1985) and only recently have sufficient numbers of females been included to examine gender related issues underlying the mechanisms and consequences of alcohol intake.

The relationship between stress and associated psychological factors in persons who either do or do not progress to hazardous alcohol drinking would provide relevant information on the continuum of risk (low to high) for alcohol dependence (Birnbaum, Taylor, & Parker, 1983), especially in terms of gender and risk differences (Li, Lumeng, & Thomasson, 1995). For example, in social drinking women, even moderate increments in alcohol consumption are associated with increased symptoms of depression and anxiety that may lessen after a period of complete abstinence (Birnbaum et al., 1983; Bjork, Dougherty, & Moeller, 1999). At the higher end of the drinking continuum, alcohol-dependent women have higher lifetime prevalence rates of major psychiatric disorders compared to male alcoholics (for review, see Preuss & Wong, 2000), including a two- to threefold greater rate of phobias, mood disorders, anxiety disorders, and posttraumatic stress disorder (Regier et al., 1990; Schuckit et al., 1997). In contrast, some psychiatric conditions are more prevalent in males. There is a 1.5–3 times higher rate of antisocial personality disorder in male compared to female alcoholics (Kessler et al., 1997; Regier et al., 1990; Schuckit et al., 1997). Few studies have examined psychosocial indices in individuals at the intermediate level of drinking, i.e., heavy social or problematic drinking, so it is unclear whether female problem drinkers would report similar elevations in stressful events and affective disturbance as female alcoholics. This issue is important because surveys and epidemiological reports indicate steady increases in binge drinking in women, especially at the younger ages (Johnston, O'Malley, & Bachman, 1999).

Although there is no empirical support for an overall “alcoholic personality,” distinct alcoholic typologies (Babor et al., 1992; Cloninger, Bohman, & Sigvardsson, 1988) and a higher frequency of certain personality traits have been demonstrated (Neuringer, 1982; Preuss & Wong, 2000). However, the usefulness and validity of such classifications,

particularly with respect to females, has been called into question (Babor, 1996). This is largely due to the fact that the majority of research in this field has focused primarily on male alcoholism. For example, Eysenck's personality theory (Eysenck, 1967; Eysenck & Eysenck, 1975), which posits a biological basis of personality, has been examined mainly in samples of male alcoholics. Results are not entirely consistent but generally indicate that alcoholics demonstrate elevations in psychoticism and neuroticism compared to nonalcoholic controls (King, Errico, & Parsons, 1995; Orford, 1976; Rankin, Stockwell, & Hodgson, 1982). One study examining scores on the Eysenck Personality Questionnaire (EPQ) in severely dependent male and female alcoholics showed similar elevations in both groups on the neuroticism and psychoticism scales as compared to moderate/mildly dependent male and female alcoholics (Rankin et al., 1982). This study may be difficult to interpret because few exclusion criteria were utilized so the potential confound of comorbid psychiatric diagnoses (particularly antisocial personality disorder) could not be ruled out. Therefore, the vast majority of studies examining alcoholics' scores on the Eysenck questionnaire are limited by the inclusion of patients with comorbid diagnoses, lack of research along the continuum of drinking levels, and inadequate research in females, particularly nonsocio-pathic female alcoholics.

Thus, the present study compared the relationship among stressful life events, affective status, and personality characteristics in males and females at different levels of alcohol drinking. Although no standard definitions exist for specific alcohol drinking categories across studies, we decided to examine three distinct groups of lifetime drinkers to represent the continuum of progressive heightened alcohol patterns. These groups were determined based on reported alcohol consumption and included moderate-to-severe alcohol-dependent drinkers, problematic or binge drinkers, and lifetime social drinkers. Consistent with prior studies, we predicted greater stressful events, mood disturbance, and personality alterations (neuroticism, psychoticism) in the male and female alcoholics compared to the other drinking groups. In addition, we predicted higher reported depression, anxiety, and stressful events in females compared to their male counterparts at each level along the continuum of alcohol drinking, and the relationship between these factors would be different in female versus male drinkers.

2. Methods

2.1. Subjects

The total study sample consisted of 154 participants (83 males and 71 females) recruited from alcohol treatment centers and through local advertisements to community samples. Only those persons from both the clinic and the community samples who met the eligibility criteria (listed below) were considered for participation. All subjects ranged in age from 18 to 51 inclusive and had at least a ninth-grade education. The sample consisted primarily of Caucasian Americans (70.1%), but also included 18.8% African Americans, and 11.1% others (Hispanic, Native American, Asian, etc.).

The total sample was divided into three alcohol consumption subgroups, based on scores obtained from an interview-derived quantity–frequency index (QFI; Cahalan, Cisin, & Crossley, 1969) assessing alcohol drinking patterns and intake interview-derived (patients) clinical diagnoses (Diagnostic and Statistical Manual of Mental Disorders [DSM-III-R]; American Psychiatric Association, 1987). These groups were: (1) alcohol dependent (ALC: $n=67$; 40 males, 27 females); (2) problematic/heavy drinkers (PD: $n=31$; $n=17$ males, 14 females); and (3) light social drinkers (LD: $n=56$; 26 males, 30 females). The ALC group had a QFI score greater than 4.0, or the approximate equivalent of 42+ drinks weekly. All persons in the ALC group were inpatients in alcoholism treatment centers (meeting DSM-III-R criteria for alcohol dependence) examined after 3–4 weeks of sobriety. The PDs had a QFI score of 1.0–4.0 inclusive, or the equivalent of 11–42 drinks per week, with at least one drinking occasion weekly of five or more drinks (i.e., standard definition of a “binge”). This group included heavy episodic/binge drinkers from the community and alcoholics in treatment reporting less heavy drinking patterns. There were no differences in baseline characteristics between the community and treatment PDs. Finally, the LDs were lifetime light social drinkers recruited from community samples, with a QFI score of less than 1.0, or the equivalent of 10 or less drinks per week, with no current or past history of binge drinking or alcohol-related problems. Individuals with considerable variability in drinking patterns or inconsistent patterns over the last several years were excluded due to potential overlap between groups.

Based on a review of medical history and exam conducted by a psychiatrist, participants were excluded for significant drug abuse (other than alcohol), history of neurological disorders, or any other significant medical disorders, or medications that may affect cognitive functioning. Subjects were also excluded if they met criteria for other major DSM-III-R Axis I and II disorders, as determined by the psychiatric intake interview for the patients and a modified semistructured interview for the nonpatients using an adapted Structured Clinical Interview for DSM-III-R (SCID) format (Spitzer, Williams, Gibbon, & First, 1990). All alcoholic participants had a minimum of 21 days of sobriety, with questionnaires and interviews conducted during the fourth week of inpatient treatment. Community subjects were instructed to refrain from alcohol usage for a minimum of 48 hours prior to testing. All subjects were informed that they would be asked to submit to breathalyzer tests to confirm drinking status at the beginning of the testing session. Subjects were paid for participation and signed a consent form approved by the local institutional review boards.

2.2. Procedure

Subjects were instructed to refrain from alcohol, recreational drugs, or medications for a minimum of 48 hours prior to testing. Breathalyzer tests conducted at the beginning of the session via a portable model Lion Alcolmeter SD-2 (MPD Inc., Owensboro, KY) were all negative, confirming no recent alcohol use in any of the study participants. In addition, all subjects were instructed to minimize caffeine (up to one cup) and nicotine (one cigarette) use on the morning testing session. This was done to facilitate study participation while potentially reducing unpleasant affect that may be associated with total caffeine or nicotine abstinence.

On the morning of testing (approximately 8:00 a.m.), after signing informed consent, subjects were asked to complete a series of psychosocial and personality questionnaires and interviews administered by a master's level graduate assistant. The questionnaires and interviews used in this study assessed general demographics and areas of psychosocial functioning, including stressful events, affective status (depression and anxiety), and personality and were part of a larger investigation examining cardiovascular and physiological responses in various laboratory paradigms (Bernardy, King, Parsons, & Lovallo, 1996; King et al., 1995; King, Lovallo, Bernardy, & Parsons, 1994).

2.2.1. *Drinking levels*

The QFI (Cahalan et al., 1969) was computed for each subject based on a structured interview assessing reported quantity and frequency of wine, beer, and liquor consumption for the previous 6 months. A standard drink was the equivalent of 12 oz of beer, 1.5 oz of liquor, or 5 oz of wine. These estimates were converted to the QFI (i.e., ounces of 100% ethanol consumed per day).

2.2.2. *Stressful life events*

Subjects were administered the Scaling of Life Events (SLE) questionnaire (Paykel, Prusoff, & Uhlenhuth, 1971). The SLE is a 61-item paper-and-pencil scale derived from previous "life stress" questionnaires (Holmes & Rahe, 1967), but modified to make it suitable for participants from a lower socioeconomic background. The dependent measures yielded from the SLE were the total score and the four specific life category subscales, based on modified versions from previous studies (Jacobs, Prusoff, & Paykel, 1974; Paykel, McGuiness, & Gomez, 1976; Paykel et al., 1969; Paykel, Prusoff, & Myers, 1975): family/home ($n=23$ items on the questionnaire); work/financial affairs ($n=13$ items); health ($n=5$ items); and legal issues ($n=4$ items). Each participant was instructed to make personal judgments on the stress value for each event listed on a rating scale, ranging from 0 (*least upsetting*) to 20 (*most upsetting*), with an assumption of equal intervals and no fixed values in any event. Events were specified in detail, including both positive and negative life experiences such as "promotion," "jail sentence," "increased arguments with fiancé(e) or boyfriend/girlfriend," and "minor physical illness (requiring doctor's attention)." After the subject completed perceived stress ratings for all items, he/she was instructed to indicate which events he or she had personally experienced during the last year. Each reported event was multiplied by its perceived stress rating score and summed to yield a weighted total score and four subscale scores.

2.2.3. *Mood states*

To assess affective status, subjects completed the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Spielberger Trait Anxiety Inventory (STAI; Spielberger, Gornich, & Lushene, 1969). The BDI is a 21-item self-report questionnaire that assesses current (past 7 days) depressive symptomatology and has been validated in both psychiatric (Beck et al., 1961) and normal healthy samples (Blumberry, Oliver, & McCure, 1987). The STAI is a reliable and valid 40-item self-report questionnaire that measures trait anxiety symptoms.

2.2.4. Personality

Subjects completed the EPQ (Eysenck & Eysenck, 1975), a 90-item true–false questionnaire that measures three personality traits: neuroticism, psychoticism, and extroversion. The EPQ also contains a lie scale designed to detect the tendency to “fake good.” This questionnaire has been shown to possess high reliability and validity (Eysenck & Eysenck, 1970, 1971, 1973, 1975; Verma & Eysenck, 1973).

2.3. Statistical analyses

Questionnaire data were summarized and converted to *t* scores (STAI) or subscale scores (SLE and EPQ scales) when necessary. For the two main demographic variables, age and education, separate 2 (gender: male, female) × 3 (group: ALC, PD, LD) analyses of variance (ANOVAs) were conducted. Significant main effects of group were found for both variables; therefore, subsequent analyses employed analyses of covariance (ANCOVA), with age and education as the covariates, and gender and group as the between-subject factors. Where appropriate, post hoc Newman–Keuls (NK) tests were conducted to examine significant main effects and/or interactions. Pearson correlation and stepwise multiple regression analyses were conducted to examine psychosocial factors associated with the continuum of alcohol drinking levels (i.e., QFI score) as a function of gender. All analyses were conducted using STATISTICA software (Tulsa, OK).

3. Results

3.1. Demographic

Table 1 displays the general demographic characteristics of the groups. Although ethnic composition was similar across groups, there were significant main effects of group on age and education levels [$F(2,147) \leq 4.11$, P 's < .05]. The ALCs were older and had less years of education compared to the LDs, with the PDs intermediate ($P < .05$). In order to control for these differences, subsequent analyses used both age and education as covariates (see Table 1).

Examination of average alcohol consumption patterns (QFI scores) revealed the expected main effect of group [$F(2,148) = 72.34$, $P < .0001$; ALC > LD; PD > LD]. Interestingly, the drinking patterns for males and females in each of the three alcohol consumption groups was nearly identical.

3.2. Stressful life events

Analyses of the total stressful life events score revealed a significant main effect of group [$F(2,144) = 24.80$, $P < .0001$] and gender [$F(1,144) = 7.18$, $P < .01$] (Table 2). The ALC group reported significantly greater stressful life events than LDs (group effect) with PDs intermediate (NK P 's < .01; ALC > PD > LD). Females reported more stressful events

Table 1
Demographic and psychosocial comparisons across groups

	ALC		PD		LD		Post hoc result ^a
	Male	Female	Male	Female	Male	Female	
<i>Demographic</i>							
Age (years)	36.5 (7.1)	36.6 (6.1)	35.1 (9.3)	33.5 (7.9)	32.9 (5.9)	32.6 (7.4)	*a=b>e=f
Education (years)	12.2 (1.7)	12.5 (1.7)	13.6 (1.9)	13.8 (2.6)	13.6 (2.1)	14.4 (2.1)	*a=b<e=f
Race (% Caucasian)	85.0	66.7	64.7	64.3	65.4	63.3	NS
QFI (oz/day)	13.5 (10.2)	13.3 (8.6)	2.3 (0.8)	1.8 (0.9)	0.2 (0.3)	0.2 (0.2)	*a=b>e=f *c=d>e=f
<i>Psychosocial</i>							
Depression	8.2 (7.3)	17.4 (11.2)	3.2 (4.0)	10.6 (9.8)	4.0 (4.5)	2.9 (3.9)	*b>all other
Trait anxiety	63.8 (10.5)	70.7 (12.3)	51.0 (10.6)	56.7 (16.7)	49.8 (10.4)	46.4 (8.5)	*a=b>c= d>e=f
<i>EPQ</i>							
Neuroticism	6.9 (6.8)	19.2 (2.9)	9.2 (4.7)	10.6 (6.7)	8.0 (5.8)	7.7 (4.6)	*b>all other
Psychoticism	3.8 (2.9)	4.8 (3.9)	2.8 (2.3)	3.0 (1.4)	3.5 (3.1)	3.4 (2.9)	NS
Extroversion	10.9 (5.7)	9.7 (4.7)	13.4 (3.4)	11.0 (5.9)	12.6 (4.3)	14.0 (3.7)	NS
Lie	5.6 (4.0)	6.3 (4.6)	6.7 (3.7)	7.2 (2.4)	8.8 (4.5)	8.0 (4.3)	*a=b<e=f

Results shown are mean (S.D.). ALC: male, $n=40$, female, $n=27$; PD: male, $n=17$, female, $n=14$; LD: male, $n=26$, female, $n=30$.

QFI=quantity–frequency index of 100% ethanol consumed per day (past 6 months); Trait anxiety expressed as t scores on the STAI; EPQ=Eysenck Personality Questionnaire.

^a Post hoc NKs significant group differences expressed with codes as follows: a = male ALC; b = female ALC; c = male PD; d = female PD; e = male LD; f = female LD.

compared to their male counterparts, particularly in ALC and PD groups, but not in the light drinker group, although the interaction was not significant ($P>.05$).

Significant main effects of group were found for the stressful events categories, including health and family [group: $F_s(2,145) \geq 7.61$, P 's < .0001; ALC>LD; PD>LD] and work and legal problems [group: $F_s(2,145) \geq 11.49$, P 's < .0001; ALC>PD>LD]. Although females were directionally higher on most of these categories, there were no significant main effects of gender except for a trend for a significant Group×Gender interaction on the health category [$F(2,145)=2.91$, $P=.057$], with female PDs reporting greater health-related stress compared to their male counterparts (female PD>male PD, $P<.005$; see Fig. 1). In fact, female PDs reported health-related problems at levels similar to the female and male ALCs, while the male PDs more closely resembled the female and male LDs. There were no other significant main effects of gender or interactions on these life stress categories.

3.3. Affective status

Analysis of depressive symptoms assessed by the BDI revealed significant main effects of group [$F(2,145)=17.97$, $P<.0001$] and gender [$F(1,145)=17.46$, $P<.0001$], and a Group×Gender interaction [$F(2,145)=7.60$, $P<.001$; see Fig. 2]. As expected, alcoholics

Table 2
Stressful events comparisons across groups

	ALC		PD		LD		Post hoc result ^a
	Male	Female	Male	Female	Male	Female	
<i>Total</i>							
Stressful life events score	137.7 (78.4)	177.9 (85.3)	75.7 (45.7)	118.8 (81.1)	60.3 (36.8)	67.5 (43.9)	*a=b>c=d>e=f
<i>Categories</i>							
Health	11.8 (10.6)	18.4 (12.5)	1.9 (5.0)	13.6 (15.7)	2.5 (4.9)	5.4 (8.8)	*b=d>c=e=f *a>c=e=f
Family/home	39.8 (36.9)	44.1 (36.9)	15.2 (13.6)	24.6 (24.7)	17.3 (20.1)	18.8 (20.0)	*a=b>c=d>e=f
Work	43.7 (30.0)	51.4 (35.5)	36.0 (26.7)	35.4 (38.7)	20.5 (15.1)	24.3 (19.7)	*a=b>c=d>e=f
Legal	18.9 (18.9)	18.1 (21.4)	2.9 (7.5)	4.4 (7.7)	0.6 (0.8)	0.7 (2.2)	*a=b>c=d>e=f

Results shown are mean (S.D.). ALC: male, $n=40$, female, $n=27$; PD: male, $n=17$, female, $n=14$; LD: male, $n=26$, female, $n=30$.

^a Post hoc NKs significant group differences expressed with codes as follows: a= male ALC; b= female ALC; c= male PD; d= female PD; e= male LD; f= female LD.

reported the highest level of depression (group effect) and females reported higher levels of depression than males (gender effect). The interaction revealed that these gender effects (female>male) were apparent in both the ALC and PD groups, but not the LDs. It is interesting to note that in PD males, reported symptoms of depression were as low as those found in all LDs, but in PD females, depression was high, again approximating the levels observed in ALC women.

With respect to anxiety, analysis of the STAI revealed a significant effect of Group [$F(2,143)=30.40$, $P<.0001$; ALC>PD>LD; Fig. 2] and a Gender×Group interaction [$F(2,144)=3.11$, $P<.05$]. The female ALC group reported significantly greater anxiety compared to their male counterparts, as well as compared to all other groups (female ALC>PD>LD, P 's<.05).

3.4. Personality characteristics

Significant personality differences were found on the EPQ-Neuroticism (EPQ-N) scale [group: $F(2,117)=11.03$, $P<.0001$; gender: $F(1,117)=13.69$, $P<.001$, ALC>PD=LD; Group×Gender interaction: $F(2,117)=17.73$, $P<.0001$]. Similar to the findings for anxiety, the female ALC group had significantly greater levels of neuroticism, compared to their male counterparts and to all other groups (NK P 's<.001). No gender differences were apparent for the PDs or LDs. There were no significant effects observed on the other EPQ subscales, with the exception of the EPQ-Lie (EPQ-L) scale [group: $F(2,117)=3.59$, $P<.05$; ALC<LD]. The ALC had lower scores on EPQ-L than LDs, with PD intermediate, on this measure of defensiveness or “faking good.” We have found similar results in previous

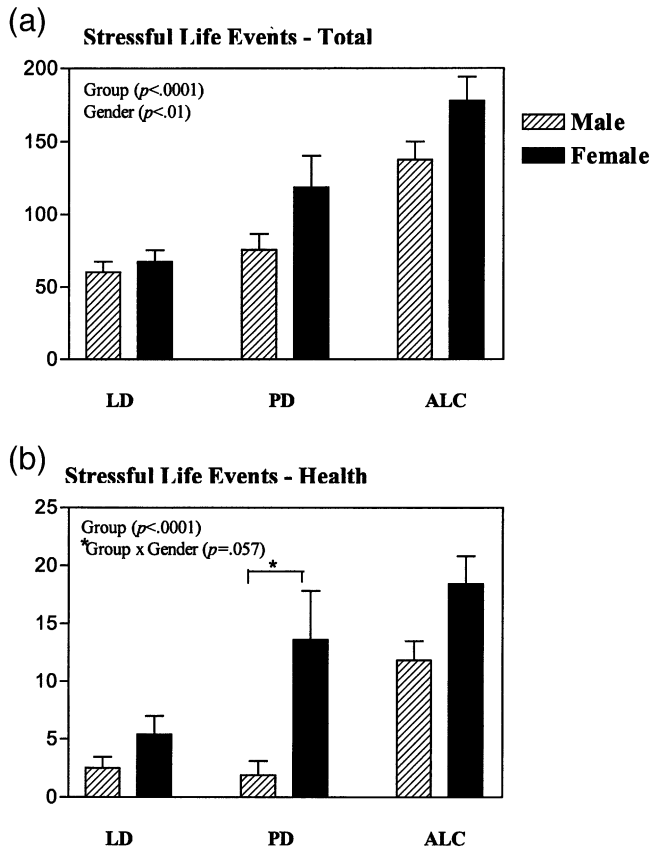


Fig. 1. (a) Stressful life events total for LDs, PDs, and ALCs. (b) Stressful life events — health category for LDs, PDs, and ALCs.

studies (King et al., 1995), and this may be due to recent treatment completion (i.e., less tendency to appear defensive or “fake good”).

3.5. Relationship between psychosocial variables and drinking levels

Correlation analyses revealed that age and education levels were not associated with alcohol drinking (r 's $< .25$, P 's = ns). In males, stressful life events, anxiety, and depression were all positively correlated with drinking levels [r 's(82) $\geq .29$, P 's $< .01$]. In females, stressful events, anxiety, and depression, as well as EPQ-N, showed even greater positive associations to heavier drinking [r 's(41) $\geq .54$, P 's $< .001$]. Since some variables showed expected high levels of intercorrelation, we performed stepwise multiple regression analyses to examine the unique predictive value of heavy drinking in males and females. Results of the regression analyses are presented in Table 3. Among the men, a three-variable model emerged to predict increasing alcohol drinking levels, in the following sequence: anxiety, EPQ-N (in the negative direction), and stressful events [$F(3,79) = 8.84$, $P < .0001$]. Taken to-

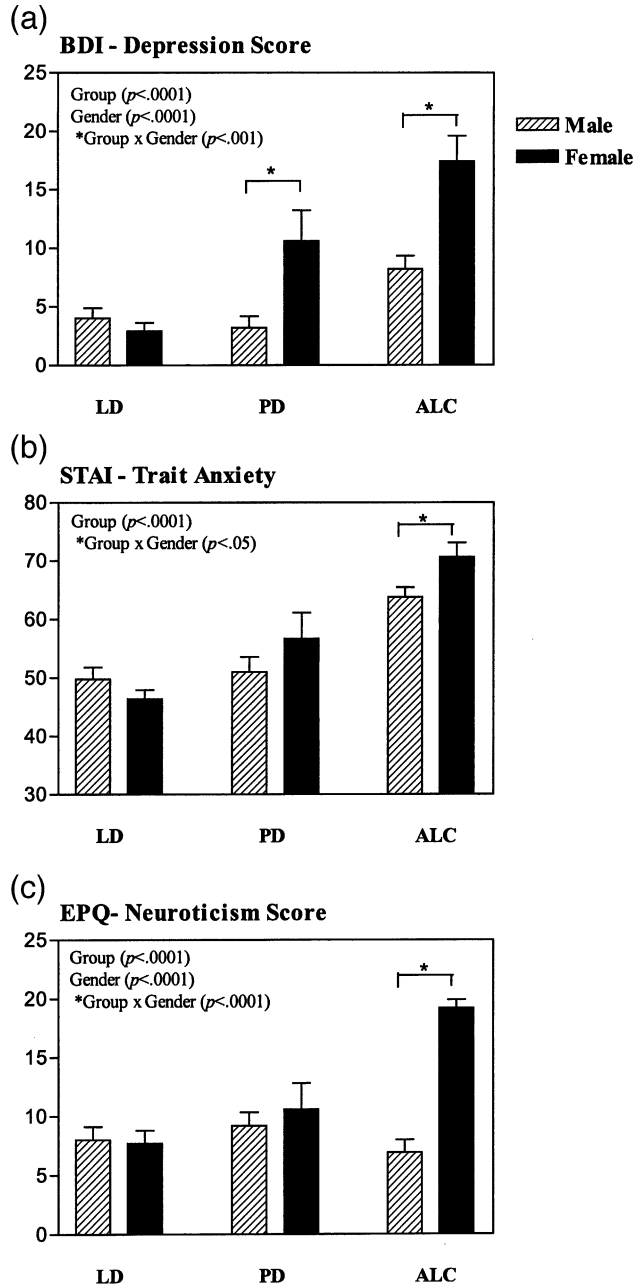


Fig. 2. (a) BDI scores for LDs, PD, and ALC. (b) STAI scores for LDs, PDs, and ALCs. (c). EPQ-N scores for LDs, PDs, and ALCs.

gether, these variables accounted for a modest 25% of the variance in men’s drinking. In contrast, in females, a two-variable model emerged, including EPQ-N and depression (both in the

Table 3

Pearson correlations among psychosocial factors and drinking levels for males and females						
Variable	BDI	STAI	EPQ-N	SLE		
<i>Males</i>						
QFI	+.29**	+.39***	±.20			+.37**
BDI		+.70***	+.14			+.40***
STAI			+.15			+.46***
EPQ-N						+.19
<i>Females</i>						
QFI	+.60***	+.54***	+.61***			+.59***
BDI		+.82***	+.73***			+.71***
STAI			+.83***			+.64***
EPQ-N						+.72***
Stepwise multiple regression summary: model predicting QFI by gender						
Variable	<i>B</i>	β	S.E. β	<i>R</i> ²	<i>t</i> (40)	<i>P</i>
<i>Males</i>						
STAI	.28	.37	.10	.12	3.56	<.001
EPQ-N	-.46	-.30	.10	.05	-2.97	<.01
SLE	.36	.19	.10	.14	1.78	.08
Three-variable model: $F(3,79) = 8.84, P < .0001; R^2 = .25$						
<i>Females</i>						
EPQ-N	.47	.37	.18	.54	2.06	<.05
BDI	.28	.33	.18	.54	1.85	.07
Two-variable model: $F(2,40) = 14.58, P < .0001; R^2 = .42$						

** $P < .01$.*** $P < .001$.

positive direction) that significantly predicted heavier drinking [$F(2,40) = 14.58, P < .0001$]. These two variables together accounted for 42% of the variance in women's drinking. Although stressful events was significantly related to heavier drinking in females, depressive symptoms and neuroticism were more powerful predictors of women's heavier drinking levels, and once the effects of these two variables were taken into account, stressful life events did not enter the overall prediction model.

4. Discussion

The present study compared relationships between stressful events, affective disturbance, and personality characteristics in males and females at various levels of alcohol drinking patterns. Although participants were excluded from the study if they had been diagnosed with comorbid psychopathology, there were consistent subthreshold increases in female alcoholics' mood disturbance, neurotic personality, and heightened stressful events compared to

their male counterparts. Moreover, women at the intermediate level of drinking (i.e., problem drinkers), also reported heightened mood disturbance and health-related stressful events relative to male problem drinkers. Among lifetime light social drinkers, no gender differences were apparent on any of these dimensions. These results suggest that in females, crossing a lower threshold of chronic, heavy alcohol intake is associated with more mood symptomatology, impact of stressful events, and neurotic personality style than in males at the same level of drinking.

Our inability to show a gender difference in stress, affective status, or personality, at the social drinking level is counter to prior studies, which indicate that general samples of nonclinical females report more perceived stress and negative affect than males (Bjork et al., 1999; Davis, Matthews, & Twamley, 1999; Mirowsky & Ross, 1995; Porter & Stone, 1995). This discrepancy may be due to our careful characterization of lifetime drinking patterns. We may have more accurately assessed these psychosocial factors in chronic light drinkers whereas prior studies of stress and gender potentially included individuals with a history of binge drinking or considerable variability in drinking. In addition, the lack of gender differences in our light social drinkers suggests that the significant elevations in female alcoholic and problem drinker groups are not a function of a pervasive or general female reporting bias but represent true interactions of alcohol drinking and gender.

Another important finding was that after the effects of depression and neuroticism were taken into account, stressful events did not enter the prediction equation for women's drinking levels. Depression and neuroticism were more powerful independent predictors of alcohol drinking in females, accounting for approximately 42% of the variance in women's drinking and underlying the individual correlation between women's stressful events and drinking. This suggests that psychological factors may be more strongly associated with increased risk for hazardous drinking in females than are stress-related risk factors, which is supported by household survey data showing psychiatric impairment at a two to three times greater rate in female problem drinkers than in males (Cochran, Goering, & Lancee, 1992). In contrast, for men, the model predicting alcohol consumption included both psychological and environmental risk factors: greater stressful events and depression and lower levels of neuroticism, accounting for much less (25%) of the variance in drinking levels. These results are similar to other findings in male drinkers (Cooper et al., 1992; Gottlieb & Green, 1984; Harlow et al., 1986) and suggest that other risk factors, not assessed in the current study, may be important in predicting likelihood of problem drinking among men. There are discrepancies in the field on the association of stress and drinking as a function of gender and these studies vary widely in terms of subject selection factors, questionnaires and measured employed, and additional psychological diagnoses considered to account for the stress–alcohol relationship. Although our data indicated that stressful events were correlated to both men's and women's drinking, in the latter group, the relationship was largely accounted for by internal psychological factors, i.e., depression and neurotic personality. However, many of the other studies addressing these factors have not addressed these psychosocial constructs or ruled out persons with antisocial personality disorder. Also, our range of drinking patterns was potentially more comprehensive than studies that have employed short surveys or interviews or did not assess both genders in their study (Cooke & Allan, 1984).

The variance in men's drinking may be better accounted for by factors such as adaptive coping, expectancies, and genetic vulnerability. In terms of the latter, adoption and twin studies have generally indicated stronger genetic links to alcohol dependence in males compared to females (for review, see Prescott & Kendler, 1995). Moreover, factors such as "distress" (i.e., an affective response) and adaptive coping, may moderate the impact of stress on drinking behavior differently in men compared to women (Breslin, O'Keefe, Burrell, Ratliff-Crain, & Baum, 1995; Gomberg, 1989). For example, one study showed that male alcoholics reported less negative association of stressful events in childhood than female alcoholics (Cooke & Allan, 1984). Another study indicated that avoidant coping style and positive alcohol expectancies, along with stressful events, related significantly to men's heavy drinking levels (Cooper et al., 1992). We may speculate that the lower neuroticism in our male alcoholics may represent a premorbid personality trait or an exacerbation of avoidant coping tendencies, which then may perpetuate the cycle of hazardous drinking in men.

There are several caveats and limitations of the present study. First, our study was cross-sectional in nature, so the direction of the associations and more sophisticated modeling of these relationships (e.g., discerning whether stress and mood problems either precede or are the result of heightened drinking) cannot be determined. The stepwise multiple regression techniques used in the present study may potentially over-fit sample-specific characteristics so future studies may consider the use of alternative modeling, in addition to longitudinal or intensive time series methodology, to elucidate the etiology and progression of psychosocial stress factors and alcohol drinking as either a coping mechanism or a premorbid condition, or both, in males compared to females. Indeed, it has been suggested that future studies should examine the temporal dynamics and inherent fluctuating processes of these factors (Tennen, Affleck, Armeli, & Carney, 2000), although such methods are time and labor-intensive. Second, we examined various psychosocial factors in persons who did not meet criteria for any other mental disorder (besides alcohol dependence) in order to assess the influence of mood, stress, and personality differences along the alcohol drinking continuum independent of differential gender-based comorbid disorders. Although offering an advantage over prior studies that could not rule out this factor as a potential confound, eliminating comorbid alcoholics in this study may also restrict the generalizability of the results, since the rate of comorbid disorders (i.e., 30–50%) is relatively high in alcoholics. Future studies examining a subgroup of comorbidly diagnosed patients as a comparison may be warranted. A third limitation of the study is the reliance on self-report and retrospective inventories. The addition of collateral reports or real-time assessment of mood changes and stressful events is suggested in future investigation of factors associated with the continuum of alcohol drinking patterns.

Despite these inherent limitations, the present findings are of potential importance for several reasons. First, the gender differences we found have implications for treatment planning and may serve as prognostic indicators. Continued affective disturbance, anxiety or worry, and elevated stress may be of great importance since women may have greater difficulty in maintaining sobriety after treatment (Mercer & Khavari, 1990). Women with addictions also have more stigma and barriers to seeking treatment (Gomberg, 1988; Hagen, Finnegan, & Nelson-Zlupko, 1994), and it is possible that the elevations observed in

psychosocial variables in the present study may be even greater in women who are reluctant to discuss drinking behaviors or seek appropriate intervention. Also, prior research has indicated that the harmful effects of alcohol appear after a shorter duration of exposure in women than men, suggesting a more rapid or “telescoped” progression of complications in female drinkers (Ashley et al., 1977; Blume, 1986; Hill, 1984; Morgan & Sherlock, 1977). Our findings support this “telescoping” concept with a lower threshold of chronic heavy alcohol intake associated with greater disturbed mood, general and health-related stress, and neurotic personality in female alcoholics and problem drinkers than in their male counterparts. Continued examination of these factors and the progression of heavy intake in female and male drinkers may help us to determine and ultimately ameliorate significant alcohol-related psychological and physiological consequences and early mortality.

References

- Allan, C. A., & Cooke, D. J. (1985). Stressful life events and alcohol misuse in women: a critical review. *Journal of Studies on Alcohol*, *46*, 147–152.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., revised). Washington, DC: Author.
- Ashley, M. J., Olin, J. S., le Riche, W. H., Kornaczewski, A., Schmidt, W., & Rankin, J. G. (1977). Morbidity in alcoholics. *Archives of Internal Medicine*, *137*, 883–887.
- Babor, T. F. (1996). The classification of alcoholics. *Alcohol Health and Research World*, *20*, 6–13.
- Babor, T. F., Hofman, M., Del Boca, F., Hesselbrock, V., Meyer, R., Dolinsky, Z., & Rounsaville, B. (1992). Types of alcoholics: I. Evidence for an empirically derived typology based on indicators of vulnerability and severity. *Archives of General Psychiatry*, *49*, 599–608.
- Beck, A. T., Ward, C. H., Mendelson, M., Mock, J. E., & Erbaugh, J. K. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561–571.
- Bernardy, N. C., King, A. C., Parsons, O. A., & Lovallo, W. R. (1996). Altered cortisol response in sober alcoholics: an examination of contributing factors. *Alcohol*, *13*, 493–498.
- Birnbaum, I. M., Taylor, T. H., & Parker, E. S. (1983). Alcohol and sober mood state in female social drinkers. *Alcoholism: Clinical and Experimental Research*, *7*, 362–368.
- Bjork, J. M., Dougherty, D. M., & Moeller, F. G. (1999). Symptomatology of depression and anxiety in female “social drinkers”. *American Journal of Drug and Alcohol Abuse*, *25*, 173–182.
- Blumberg, W., Oliver, J. M., & McCure, J. N. (1987). Validation of the Beck Depression Inventory in a university population using psychiatric estimate as the criterion. *Journal of Consulting and Clinical Psychology*, *46*, 150–155.
- Blume, S. B. (1986). Women and alcohol: a review. *JAMA, the Journal of the American Medical Association*, *256*, 1467–1470.
- Breslin, F. C., O’Keefe, M. K., Burrell, L., Ratliff-Crain, J., & Baum, A. (1995). The effects of stress and coping on daily alcohol use in women. *Addictive Behaviors*, *20*, 141–147.
- Cahalan, V., Cisin, I., & Crossley, H. M. (1969). *American drinking practices*. New Brunswick, NJ: Rutgers Center for Alcohol Studies.
- Cappell, H., & Greeley, J. (1987). Alcohol and tension reduction: an update on research and theory. In H. T. Blane, & K. E. Leonard (Eds.), *Psychological theories of drinking and alcoholism* (p. 15). New York: Guilford Press.
- Cloninger, C. R., Bohman, M., & Sigvardsson, S. (1988). Inheritance of alcohol abuse: cross-fostering analysis of adopted men. *Archives of General Psychiatry*, *38*, 861–868.
- Cochran, J. J., Goering, P., & Lancee, W. (1992). Gender differences in the manifestations of problem drinking in a community sample. *Journal of Substance Abuse*, *4*, 247–254.

- Cooke, D. J., & Allan, C. A. (1984). Stressful life events and alcohol abuse in women: a general population study. *British Journal of Addiction, 79*, 425–430.
- Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and alcohol use: moderating effects of gender, coping and alcohol expectancies. *Journal of Abnormal Psychology, 101*, 139–152.
- Cronkite, R. C., & Moos, R. H. (1984). Determinants of the posttreatment functioning of alcoholic patients: a conceptual framework. *Journal of Consulting and Clinical Psychology, 48*, 305–316.
- Davis, M. C., Matthews, K. A., & Twamley, E. W. (1999). Is life more difficult on Mars or Venus? A meta-analytic review of sex differences in major and minor life events. *Annals of Behavioral Medicine, 21*, 83–97.
- Dawson, D. A. (1996). Gender differences in the risk of alcohol dependence: United States, 1992. *Addiction, 91*, 1831–1842.
- Dawson, D. A., & Archer, L. (1992). Gender effects in alcohol consumption: effects of measurement. *British Journal of Addiction, 87*, 119–123.
- Dawson, D. A., Grant, B. F., & Chou, S. P. (1995). Gender differences in alcohol intake. *Stress, gender, and alcohol-seeking behavior, NIAAA Research Monograph, vol. 29* (pp. 3–21). Rockville, MD: NIAAA.
- Eysenck, H. J. (1967). *The biological basis of personality* Springfield, IL: Charles C. Thomas.
- Eysenck, H. J., & Eysenck, S. B. (1970). Crime and personality: an empirical study of the three-factor theory. *British Journal of Criminology, 9*, 241–250.
- Eysenck, H. J., & Eysenck, S. B. (1971). The orthogonality of psychoticism and neuroticism: a factorial study. *Perceptual and Motor Skills, 33*, 461–462.
- Eysenck, H. J., & Eysenck, S. B. (1973). The personality of female prisoners. *British Journal of Psychiatry, 122*, 125–130.
- Eysenck, H. J., & Eysenck, S. B. (1975). *Manual for the Eysenck Personality Questionnaire* San Diego, CA: Educational and Industrial Testing Service.
- Goldman, M. S., Brown, S. A., & Christiansen, B. A. (1987). Expectancy theory: thinking about drinking. In H.T. Blane, & K.E. Leonard (Eds.), *Psychological theories of drinking and alcoholism* (pp. 181–226) New York: Guilford Press.
- Gomberg, E. L. (1988). Alcoholic women in treatment: the question of stigma and age. *Alcohol and Alcoholism, 23*, 507–514.
- Gomberg, E. S. (1989). Alcoholic women in treatment: early histories and early problem behaviors. *Advances in Alcohol and Substance Abuse, 8*, 133–147.
- Gottlieb, N. H., & Green, L. W. (1984). Life events, social network, life-style, and health: an analysis of the 1979 national survey of personal health practices and consequences. *Health Education Quarterly, 11*, 91–105.
- Hagen, T. A., Finnegan, L. P., & Nelson-Zlupko, L. (1994). Impediments to comprehensive treatment models for substance-dependent women: treatment and research questions. *Journal of Psychoactive Drugs, 26*, 163–171.
- Harlow, L. L., Newcomb, M. D., & Bentler, P. M. (1986). Depression, self-derogation, substance use, and suicide ideation: lack of purpose in life as a mediational factor. *Journal of Clinical Psychology, 42*, 5–21.
- Hill, S. Y. (1984). Vulnerability to the biomedical consequences of alcoholism and alcohol-related problems among women. In S. Wilksack, & L. Beckman (Eds.), *Alcohol problems in women. Antecedents, consequences, and intervention* (pp. 121–154). New York: Guilford Press.
- Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research, 11*, 213–218.
- Jacobs, S. C., Prusoff, B. A., & Paykel, E. S. (1974). Recent life events in schizophrenia and depression. *Psychological Medicine, 4*, 444–453.
- Johnston, L. D., O'Malley, P. M., & Bachman, J. G. (1999). *National survey results from the monitoring the future study, 1975–1998: Vol. II. College students and young adults* Rockville, MD: U.S. Department of Health and Human Services, National Institute on Drug Abuse.
- Kessler, R. C., Crum, R. M., Warner, L. A., Nelson, C. B., Schulenberg, J., & Anthony, J. C. (1997). Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the national comorbidity survey. *Archives of General Psychiatry, 54*, 313–321.

- King, A. C., Errico, A. L., & Parsons, O. A. (1995). Eysenck's personality dimensions and sex steroids in male abstinent alcoholics and nonalcoholics: an exploratory study. *Biological Psychology*, *39*, 103–113.
- King, A. C., Lovallo, W. R., Bernardy, N. C., & Parsons, O. A. (1994). Drinking history is related to persistent blood pressure dysregulation in postwithdrawal alcoholics. *Alcoholism: Clinical and Experimental Research*, *18*, 1172–1176.
- Kreek, M. J. (1992). Rationale for maintenance pharmacotherapy of opiate dependence. In C.P. O'Brien, & J.H. Jaffe (Eds.), *Addictive states* (pp. 205–230). New York: Raven Press.
- Leigh, B. C. (1989). Confirmatory factor analysis of alcohol expectancy scales. *Journal of Studies on Alcohol*, *50*, 268–277.
- Li, T. K., Lumeng, L., & Thomasson, H. (1995). Genetic and gender differences in alcohol consumption and metabolism. *Stress, gender, and alcohol-seeking behavior; NIAAA Monograph*, vol. 29 (pp. 87–99). Washington, DC: U.S. Department of Health and Human Services.
- Mercer, P. W., & Khavari, K. A. (1990). Are women drinking more like men? An empirical examination of the convergence hypothesis. *Alcoholism: Clinical and Experimental Research*, *14*, 461–466.
- Mirowsky, J., & Ross, C. E. (1995). Sex differences in distress: real or artifact? *American Sociological Review*, *60*, 449–468.
- Morgan, M. Y., & Sherlock, S. (1977). Sex-related differences among 100 patients with alcoholic liver disease. *British Medical Journal*, *1*, 939–941.
- Neuringer, C. (1982). Affect configurations and changes in women who threaten suicide following a crisis. *Journal of Consulting and Clinical Psychology*, *50*, 182–186.
- Orford, J. (1976). A study of the personalities of excessive drinkers and their wives using approaches of Leary and Eysenck. *Journal of Consulting and Clinical Psychology*, *44*, 534–545.
- Paykel, E. S., McGuiness, B., & Gomez, J. (1976). An Anglo-American comparison of the scaling of life events. *British Journal of Medical Psychology*, *49*, 237–247.
- Paykel, E. S., Myers, J. K., Dienelt, M. N., Klerman, G. L., Lindenthal, J. J., & Pepper, M. P. (1969). Life events and depression: a controlled study. *Archives of General Psychiatry*, *21*, 753–760.
- Paykel, E. S., Prusoff, B. A., & Myers, J. K. (1975). Suicide attempts and recent life events: a controlled comparison. *Archives of General Psychiatry*, *32*, 327–347.
- Paykel, E. S., Prusoff, B. A., & Uhlenhuth, E. H. (1971). Scaling of life events. *Archives of General Psychiatry*, *25*, 340–347.
- Polich, J. M., & Orvis, B. R. (1979). *Alcohol problems: patterns and prevalence in the U.S. Air Force* [Report No. R-2308-AF]. Santa Monica, CA: Rand.
- Porter, L. S., & Stone, A. A. (1995). Are there really gender differences in coping? A reconsideration of previous data and results from a daily study. *Journal of Social and Clinical Psychology*, *14*, 184–202.
- Prescott, C. A., & Kendler, K. S. (1995). Gender and genetic vulnerability to alcoholism. *Stress, gender, and alcohol-seeking behavior; NIAAA Monograph*, vol. 29 (pp. 23–46). Washington, DC: U.S. Department of Health and Human Services.
- Preuss, U. W., & Wong, W. M. (2000). Comorbidity. In G. Zernig, A. Saria, M. Kurz, & S.S. O'Malley (Eds.), *Handbook of alcoholism* (pp. 287–303). Boca Raton, FL: CRC Press.
- Rankin, H., Stockwell, T., & Hodgson, R. (1982). Personality and alcohol dependence. *Personality and Individual Differences*, *3*, 145–151.
- Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *JAMA, the Journal of the American Medical Association*, *264*, 2511–2518.
- Robins, L. N., Helzer, J. E., & Weissman, M. M. (1984). Lifetime prevalence of specific psychiatric disorders in three sites. *Archives of General Psychiatry*, *41*, 949–958.
- Schuckit, M. A., Tipp, J. E., Bucholz, K. K., Nurnberger, J. I., Hesselbrock, V. M., Crowe, R. R., & Kramer, J. (1997). The life-time rates of three major mood disorders and four major anxiety disorders in alcoholics and controls. *Addiction*, *92*, 1289–1304.
- Spielberger, C. D., Gornich, K. L., & Lushene, R. E. (1969). *STAI manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: California Consulting Psychologists Press.

- Spitzer, R. L., Williams, J. B. W., Gibbon, M., & First, M. B. (1990). *Structured clinical interview for DSM-III-R, patient edition/non-patient edition (SCID-P/SCID-NP)* Washington, DC: American Psychiatric Press.
- Tennen, H., Affleck, G., Armeli, S., & Carney, M. A. (2000). A daily process approach to coping: linking theory, research, and practice. *American Psychologist*, 55, 626–636.
- Timmer, S. G., Veroff, J., & Colten, M. E. (1985). Life stress, helplessness, and the use of alcohol and drugs to cope: an analysis of national survey data. In S. Schiffman, & T.A. Wills (Eds.), *Coping and substance use* (pp. 171–198). New York: Academic Press.
- Verma, R. M., & Eysenck, H. J. (1973). Severity and type of psychotic illness as a function of personality. *British Journal of Psychiatry*, 122, 573–585.
- Wallen, J. (1992). A comparison of male and female clients in substance abuse treatment. *Journal of Substance Abuse Treatment*, 9, 243–248.