Gender differences in risk factors and consequences for alcohol use and problems

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Abstract

Women drink less alcohol and have fewer alcohol-related problems than men. Women appear to be less likely than men to manifest certain risk factors for alcohol use and problems and are more likely to have certain protective factors against these problems: women perceive greater social sanctions for drinking; women are less likely to have characteristics associated with excessive drinking including aggressiveness, drinking to reduce distress, behavioral undercontrol, sensation-seeking and antisociality; and women are more likely to have desirable feminine traits (e.g., nurturance) protective against excessive drinking. In addition, consequences of heavy alcohol use, or alcohol use disorders, appear to be more negative for women than men, at least in some domains: women suffer alcohol-related physical illnesses at lower levels of exposure to alcohol than men, and some studies suggest women suffer more cognitive and motor impairment due to alcohol than men; women may be more likely than men to suffer physical harm and sexual assault when they are using alcohol; heavy alcohol use in women is associated with a range of reproductive problems. Implications of these findings for future research and public health education campaigns are discussed.
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1. Introduction

A robust finding in the mental health literature is that women drink less alcohol than men and have fewer alcohol-related problems than men (SAMHSA, 2002). In this paper, the epidemiology of gender

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differences in alcohol consumption and alcohol-related problems is reviewed. Then, the literature on the predictors and consequences of women’s and men’s alcohol consumption and alcohol-related problems is summarized. This literature is vast; the major themes in this literature are highlighted, and empirical articles that have examined gender differences are reviewed. This review suggests that predictors of heavy drinking and alcohol use disorders are more similar than different in women and men, but women may be less likely than men to carry certain of these risk factors. Gender differences in the consequences of drinking alcohol are large and consistent. Specifically, women appear to suffer serious negative consequences of alcohol consumption earlier and to a greater degree than men. The proximal consequences (e.g., negative effects on cognitive and motor functioning at low doses of alcohol) may discourage most women from excessive alcohol intake, and the distal consequences (e.g., poor reproductive health) may have created selection pressures against heavy alcohol consumption in women, resulting in lower rates of alcohol use disorders or alcohol-related problems in women compared to men.

2. Definitions

Alcohol use disorders are the alcohol-related psychiatric disorders recognized by the DSM-IV-TR (APA, 2000) and its predecessors. These include alcohol abuse, which involves persistent drinking behavior in the face of repeated social, interpersonal, and occupational problems that are due to excessive alcohol consumption. Alcohol dependence includes these psychosocial problems, but can also involve physiological dependence on alcohol, such as tolerance and withdrawal symptoms. This is the syndrome that is often referred to as alcoholism. Heavy drinking and binge drinking are operationalized in different ways across different studies. Indeed, an important debate in recent years has been over the definition of a binge and whether that definition must be different for women and men because of gender differences in the absorption of alcohol (e.g., Wechsler, Dowdall, Davenport, & Rimm, 1995). The guidelines put forward by the National Institute on Alcohol Abuse and Alcoholism define moderate drinking for women to be no more than 1 drink per day, and at-risk drinking to be more than 7 drinks per week or more than 3 drinks per drinking occasion. In contrast, moderate drinking for men is defined as no more than 2 drinks per day, and at-risk drinking is defined as more than 14 drinks per week or more than 4 drinks per occasion. Except where noted, in the studies reviewed here, heavy or binge drinking is operationalized for both men and women as having 4 or more, or 5 or more, drinks per occasion. Alcohol-related problems will be used to refer to scores on (usually continuous) measures of negative psychosocial consequences of excessive alcohol consumption (e.g., arrests for drunken driving). Finally, social drinkers is the label for people who drink alcohol at least occasionally, but do not meet the criteria for alcohol abuse or dependence.

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1 For each section of this paper, computerized database searches were conducted using a combination of three types of key search words: (a) words indexing gender (i.e., gender, sex, women, men), (b) words indexing alcohol (i.e., alcohol, alcoholism, alcohol disorders), and (c) words indexing the predictor or consequence of concern for that section (e.g., genetics, heritability, alcohol sensitivity, gender roles, violence, physical health). All articles and chapters generated by these searches were examined for whether results included comparisons of men and women on mean levels of variables or in the relationships between key variables and alcohol use or problems. In some sections, space limitations prohibited citing all relevant articles or chapters, so a representative sample was cited.
An Institute of Medicine Task Force (IOM, 1990) concluded that the majority of problems accruing to society and to individuals as a result of alcohol were not created by people with alcohol use disorders, but by people with a range of maladaptive alcohol use patterns. Thus, predictors and consequences of both alcohol use disorders and the spectrum of alcohol-related problems and consumption levels will be reviewed. It is possible that the risk factors for alcohol use and the risk factors for alcohol problems or disorders are different (Zucker, 2000). Thus, type of alcohol-related dependent variable of concern from one study to the next will be noted. In addition, although alcohol abuse and dependence are often part of a pattern of multiple substance use, the predictors and consequences of alcohol use will be the focus of this review because alcohol is the most widely used legal substance of abuse.

3. Epidemiology of the gender difference in alcohol use and disorders

Women consistently drink less than men and have more alcohol-related problems than men. Nationwide data show that, at all ages and among Blacks, and Hispanics, and non-Hispanic Whites, men are more likely than women to drink four or more drinks in one sitting (Jackson, William, & Gomberg, 1998). Large age differences are also apparent, with the greatest consumption occurring in the young adult years for both men and women, and in all three racial/ethnic groups.

Gender differences are found for symptoms of alcohol use disorders as well. The National Comorbidity Survey (NCS), which surveyed over 8000 adults under 55 years of age, found that 38.6% of men versus 19.7% of women reported at least one of the criterion symptoms for alcohol dependence from the DSM-III-R (Nelson, Heath, & Kessler, 1998). The NCS estimated that, at some time in their lives, 12.5% of men and 6.4% of women will meet the criteria for alcohol abuse, and that 20.1% of men and 8.2% of women will meet the full criteria for alcohol dependence (Kessler et al., 1994). Similarly, the more recent National Longitudinal Alcoholic Epidemiologic Survey (NLAES), which had a nationally representative sample of 42,862 adults 18 years of age and older, and used DSM-IV criteria to diagnose alcohol dependence, found a lifetime prevalence for alcohol dependence of 18.6% for men and 8.4% for women (Grant, 1997).

Some studies suggest that, in recent decades, the gender difference in drinking and alcohol-related problems has decreased. For example, using retrospective data from the National Comorbidity Survey, Nelson et al., 1998 found that there has been a convergence in recent decades between men and women in their probabilities of alcohol use and problems, with both genders showing earlier onset of drinking and symptoms of alcohol use disorders in more recent cohorts than in cohorts born a few decades ago. Retrospective data from the National Longitudinal Alcohol Epidemiologic Study (Grant, 1997) also suggest a convergence in men’s and women’s alcohol use, although the author does not report significant sex by cohort interactions in the prediction of alcohol consumption. Cross-sectional data from surveys of high school students from 1975 to 2001 suggest that the gender gap in the prevalence of binge drinking (five or more drinks in a row) decreased from 22.6% in 1975 to 12.3% in 2001 (significance of change in the gender gap not reported; Johnston, O’Malley, Hackman, 2002). Although the size of the gender gap in alcohol use and related disorders may be decreasing, girls and women still consume significantly less alcohol and are less likely to manifest alcohol-related psychiatric disorders than boys and men (Grant, 1997; Wallace et al., 2003; Nelson et al., 1998).
4. Risk factors for women’s and men’s alcohol consumption and problems

A number of biological, psychological, and social risk factors for heavy alcohol consumption and alcohol-related problems and disorders have been studied. The focus here will be on those risk factors for which at least some studies have examined gender differences in the prevalence of the risk factor or in its association to alcohol use and problems. Table 1 summarizes the evidence regarding each of the factors.

4.1. Biological factors

Two biological factors in which gender differences have been directly examined are genetics and alcohol reactivity or sensitivity.

4.1.1. Genetics

Family history, adoption, and twin studies all indicate that genetics play a substantial role in at least some forms of alcohol dependence and heavy drinking (Bierut et al., 1998; Crabbe, 2002; Kendler, 2001; Kendler, Davis, & Kessler, 1997; McGue, 1999; Merikangas, Dierker & Szatmari, 1998). Until relatively recently, studies often utilized all male samples, or if they had a female subsample, it tended to be small and gender differences were not analyzed (Wilsnack, 1995). In the last few years, data from mixed-sex samples have been reanalyzed, and large-scale genetic studies of women have been reported.

Some studies have suggested that genetics play a stronger role in alcohol use disorders among men than women (Bierut et al., 1998; Cloninger, Bohman, & Sigvardsson, 1981; Jang, Livesley, & Vernan, 1997; Light, Irvine, & Kjerulf, 1996; McGue & Slutske, 1993). For example, some twin studies find no evidence for a genetic contribution to alcohol dependence in women, or that the genetic contribution for women is less than that for men (Caldwell & Gottesman, 1991; McGue, 1999; McGue, Pickens, & Svikis, 1992; Pickens et al., 1991). Similarly, some adoption studies find a lower association between alcohol dependence in birth parents and alcohol dependence in their adopted-away children in women adoptees compared to men adoptees (Cloninger, Bohman, Sigvardsson, & Von Knorring, 1985).

In contrast, one large twin study found similar heritability for alcohol dependence in women and men (Heath, Bucholz, & Madden, 1997), while another study found modestly higher heritability for women than for men (Prescott & Kendler, 1999; see also Allgulander, Nowak, & Rice, 1992). In addition, at least one large adoption study found that the relationship between alcohol use disorders in birth parents and these disorders in adopted-away children was somewhat greater for female adoptees than for male adoptees (Cadoret et al., 1995).

Heath, Slutske, and Madden (1997) suggest that several of the studies finding that genetics do not contribute to alcoholism in women lacked statistical power, due to relatively small sample sizes and the low rate of alcoholism in the female population (see also Wilsnack, 1995). In addition, some genetic studies rely on records of hospitalization for alcohol use disorders or other social indicators of severe alcohol problems (e.g., drunk-driving arrests) to “diagnose” alcohol use disorders in study participants. Such methods detect only the most severe and perhaps antisocial alcoholics, who are more likely to be men. In addition, women are less likely to seek treatment for alcohol use disorders (Beckman, 1994) and thus may be excluded from these studies.

Heath (1995) reviewed twin studies of the genetic influences on alcohol consumption patterns (rather than alcohol use disorders) and concluded that genetic factors are as important in women as in men for
measures of frequency and quantity of consumption, typical weekly consumption, and frequency of excessive drinking. These conclusions come from large-sample epidemiologic twin studies conducted in Finland (Kaprio et al., 1992; Partanen, Bruun, & Markkanen, 1966), Sweden (Medlund, Cederlof, Floderus-Myrhed, Friberg, & Sorensen, 1977), Australia (Heath & Martin, 1994), the United Kingdom

### Table 1
Summary of findings on gender differences in risk factors for alcohol use and problems

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>Most studies find genetics contribute to alcoholism and alcohol use in both women and men; some studies suggest genetics play a stronger role in alcoholism for men than for women.</td>
</tr>
<tr>
<td>Alcohol reactivity</td>
<td>Studies of men find low alcohol reactivity is associated with a history of familial risk for alcohol use disorders and the development of alcohol use disorders in men. There are only a few small studies of women, but these studies also tend to find an association between familial risk for alcoholism and low alcohol reactivity. It is unknown whether there are gender differences in alcohol reactivity, but other studies find women may be more cognitively and motorically impaired at lower doses of alcohol, suggesting they have greater alcohol reactivity.</td>
</tr>
<tr>
<td>Social sanctions</td>
<td>Social sanctions are perceived to be greater for women drinking than for men drinking. It is unclear whether or not women actually suffer more negative social consequences as a result of heavy drinking than men.</td>
</tr>
<tr>
<td>Gender roles</td>
<td>Feminine traits (e.g., nurturance and warmth) are associated with less use and fewer alcohol problems. Undesirable masculine traits (aggressiveness and overcontrol) are associated with heavy and problematic alcohol use. Socially desirable masculine traits (instrumentality) are associated with fewer drinking problems. Patterns are generally the same for males and females. One study found that gender differences in gender role traits mediated gender differences in alcohol use and problems.</td>
</tr>
<tr>
<td>Coping styles</td>
<td>Avoidant coping is more consistently associated with alcohol consumption and drinking problems in men than in women. It is not clear whether there are gender differences in avoidant coping.</td>
</tr>
<tr>
<td>Motives and expectancies</td>
<td>Drinking to cope with distress and positive expectancies for the outcomes of alcohol consumption (e.g., that it will reduce distress) are associated with alcohol consumption and problem drinking; this relationship tends to be stronger for men than for women. Men tend to be more likely than women to report drinking to cope and positive expectancies for alcohol use.</td>
</tr>
<tr>
<td>Depression/distress</td>
<td>Among social drinkers, some studies show a stronger relationship between distress and drinking for men than women, whereas others show the opposite gender pattern; among alcoholics, the relationship between distress and alcohol use or problems is stronger for women than men.</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>Some evidence suggests that low self-esteem is associated with alcohol-related problems in women more than men, but this result is inconsistent.</td>
</tr>
<tr>
<td>Behavioral undercontrol/</td>
<td>Men score higher than women on measures of behavioral undercontrol, sensation-seeking, and impulsivity. These variables are consistently associated with alcohol use and problems in men, less consistently so in women.</td>
</tr>
<tr>
<td>sensation-seeking/ impulsivity</td>
<td>Males are more likely to show symptoms of antisociality and delinquency than females. Antisociality is associated with alcohol use and disorders in both males and females.</td>
</tr>
<tr>
<td>Antisociality</td>
<td>There are strong similarities between partners in heterosexual couples in drinking patterns. It is not clear whether the effects of a partner on the individual’s drinking are stronger for women or men.</td>
</tr>
<tr>
<td>Interpersonal relationships</td>
<td>A history of sexual assault is associated with problem drinking and alcohol use disorders in both women and men. Women are more likely to have a history of sexual assault.</td>
</tr>
</tbody>
</table>
In sum, the vast majority of studies indicate that genetic factors play a role in alcoholism and alcohol use in women as well as men, although there remains controversy as to the relative strength of this role across the genders.

4.1.2. Alcohol reactivity or sensitivity

Another frequently studied biological predictor of alcohol use disorders is alcohol reactivity (or alcohol sensitivity; Schuckit, 1998; Schuckit & Smith, 1997). The research on alcohol reactivity has focused mostly on men. When given moderate doses of alcohol, sons of alcoholics, who are at increased statistical risk for alcoholism, report a lower subjective sense of intoxication than sons of nonalcoholics (Pollock, 1992). Experimental studies find that sons of alcoholics also show fewer signs of intoxication in their cognitive and motor performance and on some physiological indicators than do the sons of nonalcoholics (Schuckit & Smith, 1996; 1997). This lower reactivity to moderate doses of alcohol among sons of alcoholics may lead them to drink substantially more before they begin to feel drunk; as a result, they may not learn to recognize early signs of intoxication or to quit drinking before they become highly intoxicated. They may develop a high physiological tolerance for alcohol, which leads them to ingest more and more alcohol to achieve a subjective sense of intoxication. Long-term studies of men with low reactivity to moderate doses of alcohol suggest they are significantly more likely to become alcoholics over time than are men with greater reactivity to moderate doses of alcohol (Schuckit, 1998; Schuckit & Smith, 1997). The low-reactivity men are especially likely to develop alcohol-related problems if they encounter significant stress, or have a tendency toward poor behavioral control.

There are only a few studies of alcohol sensitivity in women and most have had small sample sizes or have not directly compared alcohol sensitivity in women and men (Lukas et al., 1989; Lundahl & Lukas, 2001; Nagoshi & Wilson, 1989; Savoie, Emory, & Moody-Thomas, 1988). For example, Lex, Lukas, Greenwald, and Mendelson (1988) administered a 0.56 g/kg dose of alcohol to 6 women with a positive family history of alcoholism (FHP) and six women with no family history of alcoholism (FHN). They found that the FHP women showed lower reactivity to the alcohol on measures of standing steadiness or body sway, but not on subjective feelings of intoxication, compared to the FHN women. In a larger study, Schuckit et al. (2000) compared 38 FHP women with 75 FHP men and 68 FHN men. The FHP women showed a similarly low alcohol reactivity, measured by body sway and subjective feelings of intoxication, as did the FHP men, and both FHP women and men showed lower alcohol reactivity than FHN men. This study also assessed a small group of FHN women (n=11) and found that the FHP women showed lower alcohol reactivity than the FHN women, although the differences were not statistically significant.

Heath et al. (1999) assessed alcohol sensitivity (body sway and subjective intoxication) in approximately 200 women and 200 men, some of whom were identical or fraternal twins. They found that alcohol sensitivity was significantly related to having a genetic risk for alcoholism (as assessed by twin concordance rates) and having a lifetime history of alcohol use disorders in men but not in women. Again, Heath et al. suggest that a relatively low rate of alcoholism among the female twins may have reduced statistical power to find effects. Unfortunately, Heath et al. (1999) did not test for overall gender differences in alcohol reactivity in their sample. As will be described below, however, other studies have found that women show more cognitive and motor impairment than men at low doses of alcohol, which may indicate that women have a higher alcohol sensitivity than men.
In sum, alcohol sensitivity is associated with a history of, and genetic risk for, alcohol-related disorders in men, and in most studies in women, although there are few of these studies.

4.2. Psychosocial factors

A large number of psychosocial factors have been studied in relation to alcohol consumption and alcohol-related problems and disorders in men and women.

4.2.1. Social sanctions against women drinking

It is often argued that the main reason women do not drink more than men is that the social sanctions against drinking are greater for women than for men (e.g., Blume, 1991; Gomberg, 1988). Women perceive that these social sanctions exist. In a national survey, women judged that 50% of other people would strongly disapprove of a woman getting drunk at a party but only 30% of others would strongly disapprove of a drunken man (Wilsnack, 1996). The women themselves also were more disapproving of intoxication in women than in men (65% said they strongly disapproved of a woman getting drunk, whereas 58% strongly disapproved of a man getting drunk). Similarly, a study of adolescents found that girls reported more pressure from their friends against alcohol use than boys (Keefe, 1994). Other studies presenting participants with vignettes of men or women drinking alcohol or cola in a heterosexual dating context find that women drinking alcohol are rated by participants as more sexually available and aggressive than women drinking cola, but similar differences are not consistently found for men (Corcoran & Thomas, 1991; George, Gournic, & McAfee, 1988; George et al., 1995).

The evidence is mixed as to whether women who drink heavily actually suffer more negative social consequences than men who drink heavily. Some studies find that heavy drinking in women is associated with more drinking-related problems, greater social and occupational impairment, and more problems related to fighting with spouses, friends, or family than heavy drinking in men (Dawson, Grant, & Hartford, 1995; Knupfer, 1984; Perkins, 1999; Wilsnack, Wilsnack, & Klassen, 1986). Other studies do not find gender differences in the psychosocial consequences of heavy drinking (Hilton, 1987; Robbins & Martin, 1993). For example, Room, Bondy, and Ferris (1995) analyzed reports from 11,634 Canadians on a variety of types of harm they experienced due to drinking alcohol (e.g., harm to friendships, health, homelife, work, finances). Men reported more problems than women at very low average levels of drinking (less than a third of one drink per month), and, at higher levels of drinking; no gender differences were found at moderate levels of drinking. Women appear to have a less aggressive and more controlled style of drinking than men and may be more likely to drink alone (Robbins & Martin, 1993). This may reduce the number of psychosocial problems they experience as a result of their drinking, relative to what men would experience at similar levels of intoxication (Vogeltanz & Wilsnack, 1997).

4.2.2. Gender roles

Related to the “social sanctions” theory is the theory that alcohol consumption is part of the male gender role, but is discouraged as part of the female gender role (Chassin, Tetzloff, & Hershey, 1985; Landrine, Bardwell, & Dean, 1988; White & Huselid, 1997). Several studies find that people, particularly women, who endorse traditionally feminine traits (nurturance, emotional expressivity) report less quantity and frequency of alcohol use (e.g., Chomak & Collins, 1987; Horwitz & White, 1987; Huselid & Cooper, 1992; Ricciardelli, Connor, Williams, & Young, 2001; Wilsnack & Wilsnack, 1978).
Adolescent girls and young women who hold more traditional gender role attitudes are less likely to drink at all (Parker & Harford, 1992; Zucker, Battistich, & Langer, 1981). Socially undesirable traits associated with the male gender role, such as aggressiveness and overcontrol of emotion, have been consistently associated with heavy and problematic alcohol use in both men and women (Mosher & Sirkin, 1984; Snell, Belk, & Hawkins, 1987; Spence et al., 1979). Socially desirable traits such as instrumentality have been associated with fewer drinking problems (Horwitz & White, 1987; Huselid & Cooper, 1992; Koch-Hattem & Denman, 1987), but not with lower quantity and frequency of alcohol use (Snell et al., 1987). Males who generally hold traditional “macho” beliefs toward male and female roles are more likely to use alcohol and to show heavy drinking and drinking problems (Huselid & Cooper, 1992; Mosher & Sirkin, 1984; Pleck, Sonenstein, & Ku, 1994).

Huselid and Cooper (1992) found that gender-role attributes and ideologies substantially mediated the relationship between gender and measures of alcohol use. Gender roles completely mediated the gender differences in drinking to intoxication, and partially mediated gender differences in quantity consumed, frequency of heavy drinking (five or more drinks per occasion), and drinking problems (see also White & Huselid, 1997). Thus, the theories that differences in gender roles contribute to the gender differences in drinking behavior have been supported in a variety of studies.

4.2.3. Coping styles

A related theory is that heavy drinking is part of a style of coping with stress that involves denying or avoiding one’s negative emotions, and that men are more likely than women to engage in denial or avoidance of emotions (see Cooper et al., 1992). Avoidant coping, measured with responses to stressors such as “I avoided being with people,” and “I daydreamed about better times”, has been related to greater alcohol consumption and problems in some studies (Cooper, Russell, & Frone, 1990, 1992; Laurent, Catanzaro, & Callan, 1992; Moos, Finney, & Gamble, 1982; although, see also Armeli, Carney, Tennen, Affleck, & O’Neil, 2000; Folkman, Bernstein, & Lazarus, 1987).

Avoidant coping is more strongly and consistently related to alcohol consumption and problems in men than in women (Cooper et al., 1992; Frone, Russell, & Cooper 1993). However, gender differences in mean scores on avoidant coping measures are not always found, and some studies show women score higher on these measures than men (e.g., Cooper et al., 1997). This may be due to the fact that measures of avoidant coping sometimes simultaneously include items externalizing of emotions (“I took my feelings out on others”) and internalizing of emotions (“I kept my feelings to myself”); men may score higher on externalizing items and women higher on internalizing items.

In sum, avoidant coping is associated with alcohol-related problems in men more than in women, but the gender differences in the tendency to engage in avoidant coping are not consistent.

4.2.4. Drinking motives and expectancies

Several investigators have examined people’s motives to drink alcohol in order to cope with distress or depression, or to escape from negative feelings (Cooper, Frone, Russell, & Mudar, 1995). Males appear more likely than females to report drinking to escape (Ratliff & Burkhart, 1984), drinking to cope with distress (Nolen-Hoeksema & Harrell, 2002; Park & Levenson, 2002), and drinking to relieve depression (Olenick & Chalmers, 1991). In addition, Nolen-Hoeksema and Harrell (2002) found that drinking to cope with distress predicted increases in alcohol-related problems over 1 year in a community sample of men but not women (see Rutledge & Sher, 2001 for similar results).
Cognitive–personality theories of alcohol use disorders and alcohol-related problems have focused on people’s expectations for the effects of alcohol (Abrams & Niara, 1987; Fromme, Kivlahan, & Marlatt, 1986). Several different types of expectancies have been identified such as the expectancy that alcohol will reduce tension or increase social or physical pleasure, that alcohol will increase sexual enjoyment, and that it will facilitate social interactions (Brown, Goldman, Inn, & Anderson, 1980; Cooper et al., 1990, 1992; Fromme, Stroot, & Kaplan, 1993). Sometimes, these subscales of expectancies are examined separately, but often they are combined into a global positive expectancies scale.

Positive expectancies for the outcome of alcohol consumption are associated with higher average levels of alcohol consumption, reports of drinking to cope with stress, and problem-drinking (Armeli et al., 2000; Cooper et al., 1992, 1995; Fromme et al., 1993; Kushner, Abrams, Thuras, & Hanson, 2000; Kushner, Sher, Wood & Wood, 1994). The relationship between positive expectancies and various measures of alcohol use or problems has been greater in males than in females in several studies (Armeli et al., 2000; Cooper et al., 1992; Johnson & Glassman, 1999; Kidorf & Lang, 1999; Kidorf, Sherman, Johnson, & Bigelow, 1995; Kushner et al., 1994).

Some studies have found that males score higher than females on measures of positive expectancies for alcohol use, particularly on the expectancy that alcohol will reduce tension or negative affect (Bartholow, Sher & Strathman, 2000; Berger & Adesso, 1991; Brown et al., 1980; Park & Levenson, 2002; Rauch & Bryant, 2000; Rohenkow, 1983). Other studies have found no gender differences in positive expectancies (Armeli et al., 2000; Lundahl, Davis, Adesso, & Lukas, 1997; Molina, Pelham, & Lang, 1997), or that females have stronger expectancies than males for alcohol increasing assertiveness (Baldwin, Oei, & Young, 1993).

Laboratory studies have found that women expect alcohol to interfere with their ability to cope with difficult situations, and avoid alcohol when they must deal with stressful situations (Abrams & Wilson, 1979; Sutker, Allain, Brantley, & Randall, 1982). Survey studies have found that heavy drinking is associated with a greater number and variety of conflicted cognitions about their drinking in women compared to men (Bailly, Carman, & Forslund, 1991; Ricciardelli et al., 2001; Thombs, 1993; Williams, Connor, & Ricciardelli, 1998). These cognitions may reflect a conflict between the increased leniency toward women’s drinking and the continuing negative stereotypes of women’s drinking (Leigh, 1990).

In sum, men consistently report stronger motives to drink to escape from or cope with distress than women, and these motives are more strongly associated with alcohol-related problems in men than in women. Positive expectancies for the effects of alcohol are more strongly related to alcohol-related problems in men than in women, but the gender differences in positive expectancies have been inconsistent across studies. Laboratory studies suggest women may avoid alcohol more than men when they must cope with a stressful situation, and survey studies suggest women are more conflicted than men over alcohol consumption.

4.2.5. Depression/distress

There are two contradictory notions about gender differences in the relationship between alcohol consumption and depression or general distress. On the one hand, some researchers argue that women’s drinking is more often the result of an underlying depression than men’s drinking (Fillmore et al., 1997). On the other hand, it is widely believed that alcohol abuse in men often is a mask for depressive symptoms, which they feel they cannot express openly because of social sanctions against men expressing distress and weakness (see Cooper et al., 1997). The relationship between depression or general distress and alcohol consumption and problems is actually quite complex, and the gender
differences in this relationship depend on how distress and alcohol use are measured, and whether the sample being studied is a community sample or a sample of people with alcohol use disorders (Corte & Nolen-Hoeksema, 2004).

4.2.5.1. Community samples. Some studies of samples from the general community, most of whom would be social drinkers if they drank at all, have found a stronger association between negative affect and alcohol use in men compared to women. In a longitudinal study of a community sample of adults, Aneshensel and Huba (1983) found that depressive symptoms predicted more alcohol consumption 4 months later, and that alcohol consumption predicted a decrease in depressive symptoms 4 months later; these effects were stronger for males than females. Similarly, cross-sectional studies using self-report measures have also found that male social drinkers have a stronger relationship between alcohol consumption and negative affects such as depressed mood (Berger & Adesso, 1991; Nolen-Hoeksema & Harrell, 2002; Olenick & Chalmers, 1991; Peirce, Frone, Russell, & Cooper, 1994), and anxiety (Kushner et al., 1994), compared to women social drinkers.

Ecological momentary assessment allows for more detailed examination of the relationship between distress and drinking than cross-sectional or long-term longitudinal studies. Hussong, Hicks, Levy, and Curran (2001) followed 74 college students for 28 days, randomly contacting them by pager three times a day to ask them to rate their moods and to report on their alcohol use. There was a relationship between depressive affect and later alcohol use for the men, but not for the women, in this study (see also Swendsen et al., 2000).

Other studies have found no gender difference in the relationship between distress and alcohol use, or that this relationship is greater in women than in men. In a meta-analysis of eight longitudinal population based studies, Hartka et al. (1991) found that the relationship between depressive symptoms at baseline and quantity of later alcohol use was stronger among females than males (see also Chassin, Pitts, & Prost, 2002; Fillmore et al., 1997). However, the time interval between measurement points ranged from 2 to 10 years across studies—considerably longer than the time intervals in studies using ecological momentary assessment.

Thus, some studies of community samples show a stronger relationship between measures of depression or distress and alcohol use in men versus women. These studies are in line with studies of motives to drink reviewed earlier showed that men were more likely than women to report drinking to cope with or escape from distress. In contrast, longer-term longitudinal studies suggest that there may be stronger link between vulnerability to depressive symptoms and vulnerability to heavy alcohol use in community samples of women than in men.

4.2.5.2. Samples of people with alcohol use disorders. Alcohol use disorders and major depression are often comorbid with each other, and this comorbidity is consistently greater among women than among men (Helzer & Pryzbeck, 1988; Kendler, Heath, Neale, Kessler, & Eaves, 1993; Kessler et al., 1997). This is true even when controlling for the higher base rates of these disorders by gender (Brady & Randall, 1999). In addition, there is consistent evidence that women are more likely to report having developed depression before they developed alcoholism, whereas men are more likely to report having developed alcoholism before they developed depression (Kessler et al., 1997; Sannibale & Hall, 2001).

In a laboratory study of inpatient alcoholics 18–67 years of age, Rubonis et al. (1994) first induced a negative mood state and then asked participants to hold and smell an alcoholic beverage for several minutes. In the presence of a negative mood, women reported stronger urges to drink in response to the
alcoholic beverage cue, whereas men actually reported a reduced urge to drink under the same conditions. This interaction effect suggests that women alcoholics may be more vulnerable to drinking in response to negative affect than men alcoholics.

Olenick and Chalmers (1991) compared 104 social drinkers (56% of whom were female) and 102 persons in outpatient treatment for AUD (43% of whom were female) on their self-reported use of alcohol for the purposes of altering negative mood. The within-gender results showed that more than four times as many alcoholic females (87%) as social drinking females (18%) acknowledged the use of alcohol specifically to change negative mood, whereas the difference for males, while still impressive, was much smaller (77% vs. 43%).

Thus, studies of people with alcohol use disorders consistently show a stronger relationship between depression and other negative moods and alcohol use in women than in men.

4.2.6. Self-esteem

Theorists have long argued that low self-esteem plays an important role in the development of alcohol-related problems in women (Gomberg, 1988). Some studies find that women alcoholics have lower self-esteem than men alcoholics (Beckman, 1978; Marsh & Miller, 1985) and women nonalcoholics (Schlesinger, Susman, & Koenigsberg, 1990; Sorell, Silvia, & Busch-Rossnagel, 1993). One study of a community sample of young men and women found that low self-esteem did not predict future alcohol use in either men or women (Stein, Newcomb, & Bentler, 1987), while another community sample of young adults found that low self-esteem did predict an alcohol use disorder diagnosis in women but not in men (Walitzer & Sher, 1996).

4.2.7. Impulsivity, sensation-seeking, and behavioral undercontrol

Three individual difference characteristics that overlap conceptually and cluster together empirically—impulsivity, sensation-seeking, and behavioral undercontrol—are consistently related to heavy alcohol consumption and alcohol-related problems (Caspi et al., 1997; Cloninger, Sigvardsson, & Bohman, 1988; Sher, 1991; Sher, Trull, Bartholow, & Vieth, 1999; Waldeck & Miller, 1997; Zuckerman & Kuhlman, 2000). Men generally score higher on ratings of impulsivity, sensation-seeking, or behavioral undercontrol than women (Labouvie & McGee, 1986; Miller, 1991; Nagoshi, Wilson, & Rodriguez, 1991; Petry, Kirby & Kranzler, 2002; Waldeck & Miller, 1997; Zuckerman, Eysenck, & Eysenck, 1978; Zuckerman & Kuhlman, 2000).

The evidence as to whether this cluster of characteristics is equally correlated with alcohol-related problems in men and women is mixed. Caspi, Moffitt, Newman, and Silva (1996) found that 3-year-old boys who were rated as having more problems with behavioral control were more likely to have alcohol-related problems at age 21, but this association was not found for girls. Rutledge and Sher (2001) found that behavioral undercontrol was more strongly related to heavy drinking (5+ drinks per occasion) in college men than in college women. In contrast, in a large twin study, Slutske et al. (2002) found that behavioral undercontrol was equally correlated with lifetime history of alcohol use disorders in men and women, and that behavioral undercontrol accounted for significantly more of the genetic risk for alcohol use disorders in women than in men.

4.2.8. Antisociality

Related, but not identical, to the literature on behavioral undercontrol, sensation-seeking, and impulsivity is the literature on antisociality and delinquency as predictors of alcohol use and problems
(Donovan & Jessor, 1985; Jessor & Jessor, 1977). Several studies have found that early alcohol use and alcohol-related problems are often part of a broader syndrome of adolescent problem behavior that includes other drug use, sexual activity, and delinquent and aggressive behavior (Hawkins, Catalano, & Miller, 1992; Zucker, 2000). These adolescents are more likely to come from families in which at least one parent has an alcohol use disorder, and often has an antisocial personality disorder (Jansen, Fitzgerald, Ham, & Zucker, 1995; Zucker, Fitzgerald, & Moses, 1995).

Females are much less likely than males to be diagnosed with a conduct disorder, an antisocial personality disorder, or to show antisocial or delinquent behaviors (Moffitt, Caspi, Rutter, & Silva, 2001). Antisociality is associated with alcohol problems in women as well as in men, however. For example, the Dunedin study (Moffitt et al., 2001), which followed youth from early childhood through young adulthood, found that multivariate ratings of antisociality taken when the participants were young adolescents predicted symptoms of alcohol dependence at age 21 for both the male and female participants. Similarly, both males and females who had been diagnosed with conduct disorder between 11 and 18 years of age were more likely than those not diagnosed with a conduct disorder to have symptoms of alcohol dependence at age 21.

In sum, males are consistently more likely to show antisociality than females, but antisociality and alcohol-related problems are correlated in both males and females.

4.2.9. Interpersonal relationships

Both clinical studies and general population surveys have found strong similarities between women’s levels of drinking and their husbands’ or male partners’ levels of drinking (Corbett, Mora & Ames, 1991; Demers, Bisson, & Palluy, 1999; Jacob & Bremer, 1986; Hammer & Vaglum, 1989; Roberts & Leonard, 1997). Some studies find that men have a stronger influence their women partners’ drinking (Wilsnack & Wilsnack, 1990), where others find that women have a stronger influence on their men partners’ drinking (Cronkite & Moos, 1984), and others find men and women influence their partners equally (Roberts & Leonard, 1997). Women problem-drinkers are more likely to be married to male problem drinkers than male problem drinkers are to be married to women problem-drinkers (Hall, Hesselbrock, & Stabenau, 1983; Roberts & Leonard, 1997). This may be because there are more male problem drinkers than there are female problem drinkers. Some researchers have attributed this to assortative mating: problem-drinkers, especially women problem-drinkers, seek out partners with similar drinking patterns (Jacob & Bremer, 1986), although the evidence for this has been weak (Roberts & Leonard, 1997). When a husband’s and wife’s drinking patterns are discrepant, there is more general discord in the marriage (Mudar, Leonard, & Soltysinski, 2001). A movement toward more similar drinking patterns in a couple may be reinforced by the resolution of marital discord.

A fascinating twin study provided evidence that marriage does affect how women drink: Heath, Jardine, and Martin (1989) found that genetic factors were more strongly related to women’s drinking patterns if they were unmarried than if they were married, suggesting that marriage exerted a significant effect on women’s drinking patterns over and above the effect of their genetic heritage.

4.2.10. Violence and sexual assault

Numerous epidemiological studies have shown that women with a history of childhood or adult sexual assault are at increased risk for problem-drinking and alcohol use disorders (Kilpatrick et al., 2000; Widom, Ireland, & Glynn, 1995; Wilsnack, Vogeltanz, Klassen, & Harriss, 1997). A history of sexual assault is also associated with increased risk of alcohol-related problems in men in some studies.
Sexual assault appears to be a risk factor for several psychological disorders in women, however, and not a specific risk factor for alcohol-related diseases (Bulik, Prescott, & Kendler, 2001; Fergusson & Mullen, 1999). As will be discussed later, alcohol use may also increase a woman’s risk of assault.

4.3. Summary

Table 1 summarizes the findings on the range of biological and psychosocial factors thought to be risk factors for alcohol use and alcohol-related problems in men and women. The bulk of the evidence suggests that relationships between risk factors and alcohol use or problems are more similar than different in women and men. When gender differences are found, it is most often the case that a given risk factor is more strongly or consistently related to alcohol use and problems in men than in women. Most of these risk factors have been associated with alcohol use and problems in women in the majority of studies, however. In addition, the statistical power to detect relationships between risk factor and alcohol problems in women was low in some studies due to the low prevalence of alcohol problems in women and small sample sizes. Men appear to be more likely than women to manifest certain risk factors for alcohol use and problems including fewer perceived social sanctions for drinking, undesirable masculine traits (i.e., aggressiveness), lack of desirable feminine traits (e.g., nurturance), drinking to reduce distress, positive expectancies for alcohol use, behavioral undercontrol, sensation seeking and antisociality. In contrast, women are more likely to manifest the risk factors of negative mood and exposure to sexual assault. Data on gender differences in other risk factors are inconsistent or not available.

5. Gender differences in the consequences of drinking alcohol

Women appear to suffer more negative consequences in a number of domains than men from drinking a given amount of alcohol, as is summarized in Table 2.

5.1. Blood alcohol concentration

After an equivalent dose of alcohol, women have higher blood ethanol levels than men (Jones & Jones, 1976; Lieber, 1997). There are multiple explanations for this. First, women are generally smaller than men so the same dose of alcohol leads to higher blood alcohol levels for women than men. Second, women’s body water content is smaller than men’s per kilogram of body weight. Thus, a dose of ethanol will be distributed in a smaller volume of water in women than in men, leading to somewhat higher concentrations of ethanol in women’s blood (Frezza et al., 1990; Lieber, 1997).

Third, the “first pass” metabolism of alcohol in the stomach may lead to higher blood alcohol levels in women than men. In the stomach, alcohol is metabolized with the enzyme gastric alcohol dehydrogenase (ADH). The stomach thus acts as a barrier against the penetration of alcohol into the body, by retaining and breaking down part of the alcohol (Lieber, 1997). Gastric ADH activity is lower in women than in men; one study found that for a given alcohol dose, men’s ADH levels were two times higher than women’s, and in turn, women’s blood alcohol levels were higher than those of men (Frezza et al., 1990).
This gender difference in metabolism of alcohol appears to hold for younger adults but not older adults. ADH activity decreases with age, particularly for men, leading to similar blood alcohol concentrations in older men and women, or even higher concentrations in older men than older women (Seitz, Egerer, & Simanowski, 1990).

5.2. Alcohol-related physical illness

The increased bioavailability of alcohol in women compared to men in young and middle-adulthood may lead to gender differences in susceptibility to alcohol-related physical diseases. A meta-analysis of 38 studies found that women are more likely than men to report health problems when they have a history of “out of control drinking,” alcoholism, or alcohol abuse (Fillmore et al., 1997). Several studies have found that mortality rates for women are significantly higher than for men among heavy drinkers and those with alcohol dependence (Holman, English, Milne, & Winter, 1996; Lindberg & Agren, 1988; Smith, Cloninger, & Bradford, 1983). For example, one study found that heavy drinking (defined as six or more drinks per day) increased women’s risk of death by 160% compared with light drinking (more than one drink per month but less than one drink per day), whereas heavy drinking increased men’s mortality risk by only 40% over light-drinking (Klatsky, Armstrong, & Friedman, 1992).

Evidence concerning specific alcohol-related disorders also suggests drinking women are more susceptible to these disorders than drinking men. Although men are at least twice as likely as women to die of alcoholic cirrhosis of the liver, probably because they are more likely to be heavy drinkers (Hallen & Krook, 1963), the progression to severe liver injury appears to be accelerated in women heavy drinkers compared to male heavy drinkers (Deal & Gavaler, 1994; Morgan & Sherlock, 1977; Pares, Caballera, Bruguera, Torres, & Rodes, 1986). Women’s greater susceptibility to liver disease may have to do with the negative effects of both endogenous and exogenous female hormones on liver function,
and gender differences in several other biochemicals (e.g., cytochrome P450, hepatic acid binding protein, NA+, K+ ATPase; Kappas, 1967; Lieber, 1997; Saleh & Abd-El-Hay, 1977).

Several studies have found that moderate alcohol use is associated with lowered risk of myocardial infarction or cardiac death in men and in postmenopausal women (e.g., Fuchs et al., 1995; Garg, Wagener, & Madans, 1993; Gordon & Kannel, 1983; Klatsky, 2001; Stampfer et al., 1988). Among younger women and those without other risk factors for heart disease, however, low-to-moderate alcohol use is not consistently associated with cardiac protection. On the other hand, excessive alcohol consumption is associated with a significantly increased risk of cardiac diseases, including cardiomyopathy, dysrhythmia, and hypertension (Klatsky et al., 1992; Linn, Carroll, Johnson, Fulwood, Kalsbeek, & Briefel, 1993; Moushmoush & Mansour, 1991). The level of drinking at which people move from cardiac benefit to cardiac harm is considerably lower for women than for men (Kupari, Koskinen, & Suokas, 1991; Urbano-Marquez et al., 1995). For example, Hanna, Chou, and Grant (1997) analyzed data from a health survey of 43,763 men and women to determine the association between various levels of alcohol consumption and heart disease. Among women, even moderate drinking (defined as more than two drinks per day during their heaviest drinking period in the last year) was associated with a significant increase in risk for heart disease. Among men, heavier drinking (more than five drinks per day in their heaviest drinking period in the last year) was associated with an increased risk for heart disease.

Alcohol intake also influences risk for breast cancer in women (Longnecker, 1994; Singletary & Gapstur, 2001; Smith-Warner et al., 1998; Willett, Stampfer, Colditz, Rosner, Hennekens, & Speizer, 1987). The increase in cancer risk due to alcohol intake may have to do with increases in estrogen and androgen levels, enhanced mammary gland susceptibility to carcinogens, and greater metastatic potential of breast cancer cells (Singletary & Gapstur, 2001).

Finally, studies suggest that alcohol has more toxic effects on the brain, or effects at lower doses, for women compared to men (Ammendola et al., 2000; Schweinsburg et al., 2003). Hommer, Momenan, Kaiser, and Rawlings (2001) compared the brain volumes of alcoholic and nonalcoholic men and women. Alcoholic women showed smaller volumes of gray and white matter than nonalcoholic women, and these differences were greater than those between the alcoholic and nonalcoholic men, indicating greater sensitivity to alcohol neurotoxicity among women.

5.3. Reproductive health consequences

Women with alcohol use disorders are more likely than women without alcohol use disorders to experience sexual dysfunctions, amenorrhea, anovulatory cycles, luteal phase dysfunction, and early menopause (Blume & Russell, 2001; Klassen & Wilsnack, 1986). Several studies have found that moderate to heavy alcohol use is associated with lower fertility in women, although several studies have failed to find such an association (see review by Gill, 2000).

Heavy drinking by pregnant women is associated with fetal alcohol syndrome, which is characterized by growth deficiency, altered structural development, and central nervous system dysfunction due to the exposure of a fetus to alcohol in the womb (Jones & Smith, 1973). Studies of moderate maternal drinking on reproductive outcomes such as birth weight, gestational age, rate of miscarriage or stillbirth, congenital abnormalities, and social and cognitive development, suggest that even low to moderate levels of drinking during pregnancy are associated with subtle alcohol-related birth defects (Jacobson & Jacobson, 2000; Kelly, Day, & Streissguth, 2000; Olson, Feldman, Streissguth, Sampson, & Bookstein,
1998). For example, longitudinal studies of children exposed to alcohol prenatally show negative effects on growth at 6 years of age, and on learning and memory skills at 10 years of age (Cornelius, Goldschmidt, Day, & Larkby, 2002). These results held even after controlling for correlates of prenatal alcohol use, including income, and tobacco and marijuana use.

The results across studies are inconsistent, however, due in part to the fact that moderate drinking is defined variously across studies, from a few drinks per week to up to four or more per day. Most studies have focused on average levels of drinking per day or week, but a woman’s pattern of drinking may have more effects on fetal development than her average amount of drinking (Coles, Kable, Drews-Botsch, & Falek, 2000; Day, 1992). Timing of alcohol consumption during fetal development may also be a critical variable, as may the interaction between alcohol consumption and race, socioeconomic status, and smoking status (Coles & Platzman, 1993; Passaro & Little, 1997).

Alcohol clearly interferes with testicular function in males (Anderson et al., 1989), but whether it affects reproductive outcomes or infant development is unclear. Some animal studies suggest it does, while others suggest it does not (Passaro & Little, 1997). Two studies of humans produced conflicting results, with one finding paternal drinking in the month of conception to be associated with reduced infant birth weight (Little & Sing, 1987), and another finding no effects of men’s drinking during their partner’s pregnancy on birth outcomes (Savitz et al., 1992).

5.4. Cognitive and motor performance

Alcohol may have greater negative effects on cognitive and motor functioning in women than in men (Nixon, 1994). Studies using standardized problem-solving and neuropsychological tests show that alcoholics perform more poorly than nonalcoholics in both genders, but suggest that women alcoholics show greater impairment in functioning than men alcoholics (Acker, 1986; Mann, Batra, Gunthner, & Schroth, 1992; Niaura, Nathan, Frankenstein, Shapiro, & Brick, 1987; Nixon, 1994). Other studies find no overall differences in neuropsychological functioning in women versus men alcoholics, but the women alcoholics in these studies typically report shorter or less-severe alcoholic drinking patterns than the men (Bergman, 1987; Glenn et al., 1993; Parsons, 1998). This may mean that lower severity of alcoholism leads to significant impairment in women than in men.

Dougherty, Bjork, and Bennett (1998) report evidence that the time course of cognitive and motor impairment due to alcohol intake may be different in women and men. They recruited 10 male and 10 female social drinkers for a laboratory study in which they first consumed either three placebo beverages or three beverages laced with alcohol on each of 6 consecutive days. The dosage of alcohol for the females was titrated to achieve the same breath alcohol content (BAC) levels as the males achieved. After consumption of the beverages, participants performed a rotary pursuit task in which they were instructed to maintain the tip of a wand they held over a circling light source shone through a glass top as long as possible without the tip of the wand contacting the glass top. Alcohol impaired the performance of the women more than the men on the rotary pursuit task, despite similar BAC levels. Across days in which they consumed alcohol, men tended to develop some tolerance to the deleterious effect of alcohol on performance whereas women became more sensitive to the effect of alcohol on performance. There also was evidence that women were aware of their greater sensitivity to the effects of alcohol over time: men reported feeling less intoxicated on the second day they consumed alcoholic beverages compared to the first day they consumed alcohol, but women reported feeling more intoxicated on the second day compared to the first.
Mulvhill, Skilling, and Vogel-Sprott (1997) assessed the performance of men and women on a go–stop task that measured cognitive control of response inhibition. One-third of the men and women were given moderate doses of alcohol (titrated for women to result in similar BACs to the men’s), one-third were given a placebo beverage, and one-third were given no beverage. Alcohol impaired inhibitory control equally in the men and the women.

Results from Dougherty et al. (1998) indicate, however, that greater gender differences in cognitive impairment may be found with more long-term ingestion of alcohol (e.g., moderate doses on several subsequent days) than with administration of a single moderate dose of alcohol (see also Schuckit et al., 2000). This suggests that women may not suffer more than men cognitively from a single dose of alcohol, but frequent moderate use may lead to more cognitive and motor impairment in women than in men. In turn, greater cognitive and motor impairment in women due to alcohol intake may account for recent findings that even low levels of alcohol intake are associated with a greater risk of injury in women compared to men (Stockwell et al., 2002).

5.5. Violence

Sexual and physical assault may not only be risk factors for problem-drinking in women; heavy drinking may also increase a woman’s risk of assault. Women who abuse alcohol (or other drugs) are more likely than nonabusing women to be the victims of sexual and physical violence (Kaufman Kantor & Asdigian, 1997). More generally, being under the influence of alcohol appears to increase a woman’s risk of assault (Amaro, Fried, Cabral, & Zuckerman, 1990; Frieze & Schafer, 1984; Miller, Downs, & Gondoli, 1989). Abbey, Ross, McDuffie, and McAuslan (1996) found that over half of serious sexual assaults reported by a sample of 1160 women involved alcohol; in almost all these cases, the man had been drinking; in the majority of cases, both the man and woman had been drinking. Observational studies show that alcohol consumption by husbands, or by husbands and wives together, increases negative interactions between the couple, particularly when the husband has aggressive or antisocial tendencies (Haber & Jacob, 1997; Jacob, Leonard, & Haber, 2001; Leonard & Roberts, 1998).

5.6. Risky sexual behavior

Both men and women expect alcohol to increase their subjective sexual experience, although heavy alcohol consumption decreases physiological sexual arousal in both men and women (Klassen & Wilsnack, 1986; Wilsnack, 1995). General population surveys suggest that adults who use more alcohol are more likely to report liberal attitudes toward sex (more sexual assertiveness, becoming less choosy about partners) and to report participating in risky sexual activity (i.e., unprotected sex, sex with multiple partners, or with partners at high risk for sexually transmitted diseases) (Anderson & Dahlberg, 1992; Cooper, 1992; Leigh, Temple, & Trocki, 1994; McEwan, McCallum, Bhopal, & Madhok, 1992; Parker, Harford, & Rosenstock, 1994; Wilsnack et al., 1997). Similarly, survey studies of adolescents and young adults have linked alcohol use with risky sexual behavior (Biglan, Metzler, Wirt, & Ary, 1990; Cooper, Peirce, & Huselid, 1994; Hingson, Strunin, Berlin, & Heeren, 1990; Zucker et al., 1981).

Not all studies find an association between alcohol consumption and risky sexual behavior in women and adolescent girls, however. In a community study of adolescents, Cooper and Orcutt (1997) found
that the likelihood of sexual intercourse or heavy petting on a first date increased when the male, but not his female partner, drank alcohol. Indeed, the likelihood of intercourse on the first date decreased when the female consumed alcohol, suggesting alcohol inhibits girls’ willingness to engage in sex with male acquaintances. Cooper and Orcutt argue that this pattern results because girls and boys experience qualitatively different kinds of conflict over the perceived costs and benefits of sexual activity, so that alcohol has an inhibitory effect on sexual activity for girls but a disinhibitory effect for boys.

Similarly, experiments using the “balanced placebo design” suggest that women may sometimes become more cautious in heterosexual encounters when they are drinking (Caudill, Wilson, & Abrams, 1987; Crowe & George, 1989; Leigh, 1990; Wilson, 1981). In these experiments, women and men are told they would receive a placebo or an alcoholic beverage; this manipulation is crossed with the actual receipt of an alcoholic or placebo beverage, creating four groups. Participants are then asked about their levels of sexual arousal, or asked to interact with an opposite sex partner or to respond to sexually explicit materials. These studies generally find that men who believe they have consumed alcohol become more sexually aroused and forward in their interactions with women, regardless of whether they have actually consumed alcohol. In contrast, women participants do not show consistent expectancy effects, and sometimes show suppression of sexual arousal and interactions with male partners.

The relationships between alcohol consumption and risky sexual behavior in men and women found in survey studies may be due to a third variable of sensation-seeking or a general tendency toward risky behavior (Cooper, 1992). Moreover, risky sexual behavior may occur primarily after heavy alcohol consumption. In contrast, low-to-moderate alcohol intake in the context of heterosexual interactions may actually lead many women to be more cautious and controlled (Robbins & Martin, 1993).

5.7. Summary

Consequences of heavy alcohol use, or alcohol use disorders, appear to be more negative for women than men, at least in some domains. Women suffer alcohol-related physical illnesses at lower levels of exposure to alcohol than men, and experience a range of reproductive health problems due to heavy alcohol use. Some studies suggest women suffer more cognitive and motor impairment due to alcohol than men. Women may be more likely than men to suffer physical harm and sexual assault when they are using alcohol. Survey studies suggest that both men and women who use alcohol heavily engage in more risky sexual behavior, although laboratory studies suggest women may actually become more cautious in some heterosexual situations when they have consumed low amounts of alcohol.

6. Conclusions

Women may drink less than men and may be less likely to develop alcohol-related problems because they are less likely to carry several risk factors for these behaviors or these risk factors are less potent for women than for men. Specifically, a genetic predisposition to alcoholism may have a weaker effect among women than among men, although studies are not completely consistent. The few existing studies of alcohol sensitivity suggest that women are less likely than men to manifest low alcohol sensitivity, which is a risk factor for the development of alcoholism. Women appear less likely than men to manifest undesirable personality traits associated with heavy drinking (aggressiveness, behavioral undercontrol, sensation-seeking) and to be less motivated to drink to reduce distress (at least among social drinkers).
and less likely to expect alcohol consumption to have positive outcomes. On the other hand, women may carry certain protective factors against the development of alcohol-related problems more than men, such as perceiving greater social sanctions for drinking and being more nurturant toward others.

Significant inconsistencies exist in the literatures on each of these risk factors, however. Although some studies have found gender differences in the strength of relationships between risk factors and alcohol use or problems, other studies of the same risk factors have not found gender differences (e.g., in the domain of genetics). In addition, significant gender differences in the presence or level of risk factors are not always found (e.g., positive expectancies for alcohol use). These inconsistencies are probably due in part to variations in the assessment of alcohol use and problems, small sample sizes of women, and the relatively low prevalence of drinking problems in women. In addition, predictors of alcohol use and problems in women versus men may vary by ethnicity or race, but this has not been examined adequately in any of the literatures reviewed.

More research is needed which specifically focuses on the sources of gender differences in drinking patterns, and examines more than one risk factor at a time. Many of the risk factors reviewed here are probably strongly related to each other (e.g., self-esteem and depression, gender role adherence, coping styles, and marital interaction styles). In addition, some risk factors are likely to be more important than others in predicting women’s drinking, and in explaining the gender differences in alcohol use, but since they tend to be studied one at a time, this is currently unknown. It will be important in future research to include multiple risk factors to determine how they cluster together and to determine the relative amount of variance in drinking behavior each one explains. Such research will also hold important implications for the design of gender-specific interventions for women, and men, with problematic alcohol use behaviors.

Evidence regarding gender differences in the consequences of alcohol consumption suggests that women suffer alcohol-related physical illnesses at lower levels of exposure to alcohol than men, and heavy alcohol use is associated with several reproductive problems in women. Women may be more likely to suffer more cognitive and motor impairment due to alcohol than men may and may be more likely to suffer physical harm and sexual assault when they are using alcohol. In contrast, the relationship between risky sexual behavior and alcohol use in women is inconsistent.

Taken together, this pattern of results suggests that women’s lower levels of drinking and fewer alcohol-related problems compared to men may be due both to the absence of risk factors for alcohol use and abuse in women and to women’s sensitivity to the negative consequences they will suffer from alcohol consumption. Women appear less likely to carry many of the risk factors for the initiation of heavy alcohol use compared to men; when they do use alcohol, women may notice they are becoming intoxicated at a much earlier stage of intoxication than men, and may be more likely to find these effects aversive or frightening, leading them to inhibit their alcohol consumption. This, in turn, protects women from developing tolerance to high doses of alcohol, and alcohol-related social and occupational problems.

An evolutionary argument can also be made for why women would be more sensitive or averse than men to the early negative effects of alcohol. If alcohol consumption reduces women’s reproductive capacity, and leads them to produce offspring that are less likely to survive and to produce their own offspring, then there would be selection pressures against alcohol consumption in women. Women who were more sensitive and averse to the early negative effects of alcohol on their functioning might be less likely to develop alcohol-related physical diseases and more likely to produce healthy offspring than women who were less sensitive and averse to the effects of alcohol.
The cultural differences in women’s drinking patterns and in the size of the gender difference in drinking and alcohol-related problems indicate that social factors also play a role (Gilbert & Collins, 1997). For example, Hispanics and African American women generally drink less than non-Hispanic White women (Caetano, 1994; Helzer & Canino, 1992; Jackson et al., 1998). In addition, greater acculturation among Hispanic women is associated with greater alcohol consumption (Caetano, 1994; Gilbert, 1993). Asian–American women generally have low levels of alcohol consumption, but substantial variation is found across subgroups (e.g., Korean–Americans, Japanese–Americans, Chinese–Americans; Gilbert & Collins, 1997). The sources of differences across racial/ethnic groups may have to do with cultural and religious norms, education, socioeconomic status, group differences in gender roles and social activities, and a number of other social factors. In addition, these sources may vary by historical cohort and age (Gilbert & Collins, 1997). Currently, little is known about the contributors to culture-by-gender interactions in drinking patterns, so this is an important area for future research.

The increasing evidence that even relatively low levels of alcohol consumption are associated with elevated risk for some physical illnesses in women suggest that there is a rather narrow window of “safe drinking” for women. The media’s coverage of studies showing beneficial effects of moderate drinking on health has failed to note that these effects may be more true for men than for women, and that harmful effects for women begin to accrue at quite low levels of alcohol intake. This will be an important focus for health education campaigns in the future. It also points to the importance of developing more effective interventions for women who are abusing alcohol, to improve both their psychological well-being and to protect their physical health.

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