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A sample of 1,003 women, age 22 in 1983-84 and age 27 in 1988-89, were selected from the National Longitudinal Survey of Youth. Personal, familial, and geopolitical predictors of alcohol consumption were evaluated at each time period and longitudinally. The study integrated macro- and micro-level influences to determine their influence on individual alcohol consumption. Personal and familial were most influential. Availability of alcohol and political economy had little effect on consumption. Mother's history of alcohol abuse was more important than father's. At age 22 education, being married, and having children reduced consumption, as did a prior affiliation with a religion that proscribed the use of alcohol reduced consumption. At age 27 education, being married, and children decreased consumption, but religious affiliation and parent's consumption were not significant. While marital status at age 22 reduced drinking at that age, it lead to greater consumption at age 27.

Women's Alcohol Consumption: Personal, Familial, and Geopolitical Dimensions

by

Kathryn W. Goetz

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Kathryn W. Goetz

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Introduction

This research explored factors that influenced levels of alcohol consumption and changes in alcohol use by women between age 22 and age 27. It developed an integrated, longitudinal model that conceptualized alcohol consumption as a behavior that was influenced by both ecological and sociocultural factors. Macro-level measures of the state control of alcohol and county political economic factors were merged with individual and family factors to explore the influence of ecological structures on individual behavior.

Historically, drinking alcohol has been a common activity in America. Alcohol abuse and alcoholism have often been the subject of public debates (Ewing & Rouse, 1978; Furnas, 1965; Lender & Martin, 1982; Smith & Hanham, 1982; Straus & Bacon, 1953). Although men have traditionally consumed alcohol at higher rates then women (Calahan, Cisin, & Crossley, 1969; Lisansky, 1957; Wilsneck & Beckman, 1984), this does not mean that alcohol consumption by women is not a problem or has never been of concern. Since the early 1800's, alcohol consumption has been recognized as a threat to the health and well-being of women and to the safety and stability of their families (Furnas, 1965; Lender & Martin, 1982; Levine, 1985). However, because women have fewer alcohol related problems than men (Cloninger, Christensen, Reich & Gottsman, 1978), alcohol abuse is often perceived to be a "man's" problem (Beckman, 1975; Lindbeck, 1972; Lisansky, 1957; Martin & Casswell, 1988; Wilsneck

& Beckman, 1984). Therefore, little research has been done on the use of alcohol by women (Lindbeck, 1972).

Although this study is concerned with levels of alcohol consumption by women, it also reviewed studies that primarily focused on problem drinking, alcohol abuse, and alcoholism by both men and women, to develop a better understanding of the factors that contribute to high levels of consumption. Information on alcohol consumption is frequently imbedded in studies of alcoholism and problem drinking and it was necessary to explore these studies to understand the work that has been done in the area of alcohol consumption.

Alcoholics are defined as individuals who are addicted to alcohol, unable to quit drinking before becoming intoxicated, and suffering from physical, emotional, or financial problems related to drinking (Keller, 1960; Keller, 1982; Paredes, Hood, Seymour, & Gollob, 1973; Schuckit, 1973; Schuckit, 1985). There is ample evidence that over-consumption of alcohol is the root-cause of the physical, emotional, mental, and social problems resulting from alcoholism. According to White (1982), individuals who regularly drink six or more drinks a day (10 centiliters of alcohol) are in danger of developing serious physical, emotional, and personal problems.

Researchers have proposed a variety of models for understanding current levels of alcohol consumption and alcohol abuse (Holder, 1988; McCord, McCord, & Gudeman, 1959; Rabow & Watts, 1982; Smith & Hanham, 1982; White, 1982). Some have posited that alcoholism is a genetically transmitted disease (Bohman, 1978; Goodwin, 1971; Goodwin, 1985). Others have suggested that it is a family problem (Cotton, 1979; Peele, 1986; White, 1982), perhaps learned from drinking parents (Barnes & Welte, 1990; Narusk, 1991). Age and the transition to adulthood have also

been identified as being important factors in the use of alcohol by adolescents and young adults (Grant, Harford, & Grigson, 1988; Jessor & Jessor, 1975).

Bales (1946) identified cultural norms toward drinking alcohol as a factor in developing compulsive drinking. Schmidt and Popham (1978), Smith (1989) and Whitehead (1975) proposed that the availability of alcohol is a factor contributing to levels of consumption while Glicksman and Rush (1986) found that local economic factors contributed to levels of alcohol consumption.

Theoretical Perspective

This study explored women's consumption of alcohol within a framework that integrated a life course perspective with concepts from human ecology theory. The life course perspective, which provides a structure for integrating micro- and macro-level components, was a particularly appropriate paradigm for conceptualizing alcohol consumption.

Life Course Perspective

According to Elder (1978), "The life course refers to pathways through the age-differentiated life span, to social patterns in the timing, duration, spacing, and order of events; the timing of an event may be as consequential for life experience as whether the event occurs and the degree or type of change (pg. 21)." Hareven (1978) identified three levels of time that are important in a life course analysis: Ontogenetic (personal) time, generational (family) time, and historical time. Alcohol consumption can be related to each of these temporal dimensions. Drinking patterns are not static over a person's life. They usually develop during adolescence (Jessor & Jessor, 1975) and may change dramatically over the individuals life-time. Certain periods may

be marked by high levels of alcohol use while at other times the person may completely abstain from drinking (Grant, Harford, & Grigson, 1988). Bengtson and Allen (1993) stated,

> The life course perspective involves a contextual, processual, and dynamic approach to the study of change in the lives of individual family members over time, and of families as social units as they change over historical periods. It thus involves both the micro- and macro-social levels of analysis . . . In sum, a life course perspective emphasizes the importance of time, context, process, and meaning on human development and family life (pg. 469-471).

This perspective integrates well with human ecology theory to provide a framework for exploring the issue of alcohol consumption within a social-environmental context.

Human Ecology Theory

Bubolz and Sontag (1993) defined human ecology theory as " . . . unique in its focus on humans as both biological organisms and social beings in interaction with their environment (pg. 419)." This paradigm focuses on the importance of the ecological environment to the developing individual (Salkind, 1985) and the relevance of ecological transitions that involve changing roles and expectations (Bronfenbrenner, 1979). According to Bronfenbrenner (1979), ecological transitions, such as entering college, marrying, becoming a parent, and entering the labor force influence individual behaviors because they " . . . almost invariably involve a change in role, that is, in the expectations for behavior associated with particular positions in society (pg. 6)." Family transitions, which often involve changes in roles and responsibilities, may demarcate periods of drinking. Attending college and growing independent may be a time of heavy drinking for some young adults. As time passes and these individuals move on to the roles of spouse, parent, and employee, drinking levels may decrease.

Although much of the work in human ecology has focused on human development, the theory also provides a useful model for understanding the relationship of the individual to the surrounding social-ecological environment and for developing an integrated micro- and macro-level model (Bronfenbrenner, 1986) of alcohol consumption. The ecological environment was defined by Bronfenbrenner (1979) as a series of interacting, nested systems. The innermost, which contains the individual interacting with family and friends, is the microsystem. Next the mesosystem links the various settings immediately surrounding the developing person. This level focuses on interrelationships in the immediate environment, for example the interaction of family with community. The final system in his ecological scheme is the macrosystem, which includes the " . . . patterns of ideology and organization of the social institutions common to a particular culture or subculture (pg. 8)." The individual is viewed as interacting dynamically with these various systems. It is relevant to consider alcohol consumption as a behavior that reflects the individual's interaction with both the immediate surroundings of home and family and with the larger structures of community, country, and culture. To understand this behavior, it is necessary to develop a model that integrates both macro- and micro-levels of variables within the concept of dynamic change over time.

Because alcohol consumption is a behavior that changes over time, it is particularly suited to being conceptualized within a life course perspective. In addition, because this issue encompasses individual, family, community, state, and cultural domains, it is useful to incorporate the concepts of ecological transitions and environmental influences on behavior from human ecology theory. An integrated model of alcohol consumption using both these theoretical perspective provides a

conceptual framework for analyzing factors that contribute to women's alcohol consumption.

Literature Review

Alcohol consumption is a behavior that has serious implications for women and their families. The social cost of alcohol use, especially at problem levels, is high. In addition to causing illness, injury, and death, alcohol abuse may lead to the destruction of love relationships and the disintegration of families (Schuckit, 1985).

When women's alcohol problems are addressed, they are often conceptualized as fundamentally different from men's, although women may drink for essentially the same reasons that men do. Women have been assumed to drink excessively for a variety of physical, psychological and social reasons, including menstruation, menopause, depression, low self-esteem, personality disorganization, sexual dysfunction, and a failure to adjust to the feminine role (Belfer, Shader, Carroll, & Harmatz, 1971; Hewitt, 1943; Levine, 1955; Lisansky, 1957; Lolli, 1949). According to McConville (1985), the female drunkard has historically been the object of scorn, because traditionally women were assigned the role of keepers of hearth, home, family, and morality. Women alcoholics are still considered more abnormal then men drinkers and the prospects of successful treatment of alcoholism or problem drinking are judged to be less likely for women than men (Lindbeck, 1972; McConville, 1985). Although women have always used alcohol, information on the factors specifically influencing women's consumption levels is scarce.

History

The history of alcohol consumption is also the history of the attempt to control the availability and use of alcohol. Many of today's regulations on the sale and consumption of alcohol are rooted in the country's history of alcohol consumption and

efforts to curtail alcohol abuse (Lender & Martin, 1982; Levine, 1985; Smith & Hanham, 1982). A variety of approaches have been used historically to discourage the use of alcoholic beverages and prevent alcohol related problems. Some of these early attempts to control alcohol consumption were apparently very successful, reducing historically high levels of consumption to today's more modest ones (Gusfield, 1963; Lender & Martin, 1982). Although modern per capita rates of consumption are lower than some historic levels, these overall rates may mask high levels of consumption by specific groups, especially young adults. Drunkenness, alcoholism, and deaths from alcohol related diseases and accidents are still of serious concern (Wilkinson, 1987).

The Colonial Era

Beverage alcohol was commonly consumed by men, women, and children in colonial America. Traditionally, the early colonists primarily drank beer, cider, ale, and wine rather than distilled spirits. However, by the early 1800's, Americans were consuming large quantities of distilled spirits, especially rum and whiskey, leading to an increasing problem with drunkenness. At this time, most Americans did not consider the use of alcohol a problem and there were no legal restrictions on its manufacture, sale, or use (Furnas, 1965; Lender & Martin, 1982; Levine, 1978; Park, 1985; Straus & Bacon, 1953).

Temperance

By the early 1800's, a few concerned individuals were beginning to speak out against drinking distilled spirits. Eventually, these individuals united to form the social crusade known as temperance. The temperance movement did not seek to legally

control the manufacture, distribution, or consumption of alcohol. Temperance workers sought to control inebriety by pointing out that it was immoral and unhealthy to become intoxicated. They taught that drinking distilled liquor inevitably led to alcohol addiction. Individuals were encouraged to "take the pledge" and to abstain from drinking spirits (Ewing & Rouse, 1978; Furnas, 1965; Gusfield, 1963; Lender & Martin, 1982; Levine, 1978).

Although their primarily concern was the use of distilled spirits, the effect of the temperance movement on the overall consumption of alcohol in America was impressive. In 1830, according to Lender and Martin (1982), the consumption of alcohol was 7.10 gallons of absolute alcohol per capita. This dropped to 3.10 gallons per capita by 1840. Temperance was successful at lowering alcohol consumption because it used many of the emotional appeals of a religious revival. Meetings were held, often in tents, and the crowd was exhorted to "take the pledge" and never again drink. Women who attended these meetings (and already may have had temperance leanings) often decided to forbid the use of alcohol in their homes and not to associate with men who drank. Men were also moved by the emotional appeal of Temperance meetings. Many of them took the pledge and apparently were able to maintain their commitment to abstain from further drinking (Furnas, 1965; Gusfield, 1963; Lender & Martin, 1982).

The per capita consumption of alcohol in America, which is now approximately 2.7 gallons per capita, has never returned to the pre-temperance levels of the early 1800's (Lender & Martin, 1982). Although temperance was successful at reducing the overall amount of alcohol Americans were consuming, the changing economic and social structures of the late 1800's brought new pressures to completely ban the

manufacture and use of alcohol. Temperance, with its moral appeal against drunkenness, was eventually replaced by the prohibition movement, which sought to legally control access to alcohol (Furnas, 1965; Lender & Martin, 1982; Levine, 1985).

Prohibition

The goal of the prohibition movement was a total ban on the manufacture, distribution, and consumption of all alcoholic beverages. Fueled by the desire for a sober workforce and a dry country, prohibitionists fought for passage of a constitutional amendment against the manufacture and sale of beverage alcohol. In 1919, the 18th amendment was ratified and on January 20, 1920 the country became officially dry. Prohibition banned the manufacture, distribution, and sale of all alcoholic beverages. It did not ban the consumption of alcohol that individuals had in their possession. Prohibition was apparently successful at further reducing alcohol consumption. Lender and Martin (1982) estimate that yearly per capita consumption of absolute alcohol dropped to less than a gallon during the decade of the 1920's. Although originally popular, support for prohibition soon declined because of changing social and economic conditions. In addition, the costs of enforcing the law and the growth of crime attributed to it were substantial. By 1933, prohibition was repealed and the country was once again "wet" (Lender & Martin, 1982; Levine, 1978; Levine, 1985; Schmidt & Popham, 1978).

The Modern Era

Ambivalence probably best describes the post-prohibition attitude toward the use of alcohol in America. Drinking is the norm, although many individuals abstain from using alcohol or drink sparingly. Consumption rose at the end of prohibition, but

has never reached pre-temperance levels. During the 1940's, per capita consumption ranged from 1.20 to 2.06 gallons of absolute alcohol. The following decades saw a gradual increase in consumption to 2.82 gallons absolute alcohol by the late 1970's. This fell to 2.10 gallons by 1984. Since 1984, alcohol consumption in the United States has continued to fluctuate within this range, but it has never returned to the high levels of the pre-prohibition era (Distilled Industry Council of The United States, 1983, 1984, 1988, & 1989; Lender & Martin, 1982).

The old absolutes about drinking alcohol were discarded but few new ideas have taken their place. Temperance teachings were unequivocal, alcohol use was immoral and inevitably led to addiction, ruin, and death for anyone who drank. Prohibitionists did not argue with these moral absolutes, they simply went farther and demanded that the use of beverage alcohol be banned, for the good of everyone. Modern Americans do not have a consistent set of attitudes toward the use of alcohol, although most disapprove of heavy drinking and drunkenness. It is accepted that alcohol is abused by some individuals, but there is little sentiment to consider it inevitably addicting. It is also apparent that many people drink but do not develop problems, while others become severely addicted and drink lethal quantities. In order to explain this phenomenon, a medical model of alcoholism has been posited. This model, which became popular after the end of prohibition, placed the problem of addiction within the individual, rather than with the substance. It became the foundation for the disease theory of alcoholism (Lender & Martin, 1982; Levine, 1985; Peele, 1986).

The Disease Theory of Alcoholism

The problem of alcohol addiction, according to the disease theory of alcoholism, was an individual allergy or biologic intolerance to alcohol (Lender & Martin, 1982). This concept of alcoholism, which was also called the medical model of alcoholism, was based on the assumption that the distribution of alcohol consumption in a population was bimodal. The majority of individuals were at the low end of the distribution. Those people drank moderately and had few alcohol problems. A second group was clustered at the high end of the distribution. These few were unable to drink moderately because they were addicted to alcohol. Although high levels of consumption are usually identified as the cause of alcoholism, the medical model provided a different perspective.

According to Schmidt and Popham (1978), the medical model of alcoholism defined alcoholics as fundamentally different from non-alcoholics. They suffered from the disease of alcoholism and were addicted to alcohol. High consumption of alcohol was a symptom of their disease, not the cause. Because alcoholism was not caused by over-consumption, controlling alcohol consumption in the general population would have few beneficial effects. Alcohol control would only inconvenience the majority of drinkers, who consumed at harmless social levels.

From this perspective, the prevention of alcoholism is probably not possible. Those who are susceptible to alcohol addiction will drink, in spite of society's attempts to control their alcohol consumption. The medical model is widely accepted as an explanation for individual alcohol abuse and is the theoretical foundation of the popular treatment program, Alcoholics Anonymous (Baur, 1982; Ewing & Rouse, 1978; Lender & Martin, 1982; Levine, 1978). It has also received strong support from both the

medical community and the alcohol beverage industry (Bucholz & Robbins, 1989; Smith & Hanham, 1982).

Although the medical model assumes that consumption is not a problem, other theoretical perspectives take the view that alcohol consumption is causally related to alcohol abuse and that changing consumption patterns or controlling the amount individuals consume are viable ways to decrease alcoholism and other alcohol related difficulties (Bucholz & Robbins, 1989; Smith & Hanham, 1982; White, 1982).

Alcohol Consumption

An early study of drinking patterns of American adults was conducted by National Opinion Research Center of The University of Denver for Rutgers University. The results of this survey were analyzed by Riley and Marden (1947), who found 65% of adults (21 years or older) reported drinking some alcoholic beverages. Hilton (1991a), examined data from the 1984 National Alcohol Survey and reported the proportion of drinkers was 69%. However, this did not mean that a large proportion of Americans were heavy drinkers. Calahan, Cisin, and Crossley (1969) analyzed another national probability sample of 2,746 respondents, representative of adults (age 21 and over) living in households. They reported that, if occasional drinkers and abstainers were added together, the ratio of drinkers to non-drinkers was nearly even. Only 53% of adults reported drinking at least once a month, while 47% drank less than once a month or not at all.

Between 71% and 79% of American men admit they drink alcohol. The rate for women is lower, with an estimated range from 51% to 64% (Calahan & Cisin, 1968; Hilton, 1990a; Maxell, 1952; Mulford, 1964; Riley & Marden, 1947). No study has

reported the prevalence or amount of women's drinking to equal or exceed that of men (Cloninger, Christiansen, Reich, & Gottesman, 1978). Hilton (1991a), found 36% of the women in his sample abstained from drinking while only 24% of the men were abstainers. Men also were more apt to be classified as alcoholics or problem drinkers (Martin & Casswell, 1988; Single & Wortley, 1993).

Mulford (1964) compared his modified random sample of 1,515 respondents with the earlier study by Riley and Marden (1947) and noted that the rate of alcohol consumption among women seemed to be increasing. If women's drinking has continued to increase, this should be of concern to health care providers, social workers, and social policy makers. Alcohol problems are not confined to men. Women who drink are also susceptible to a variety of alcohol related accidents and diseases, including death from cirrhosis. In addition, women's consumption of alcohol may also result in physical, emotional, and economic harm to their children (Williams & Klerman, 1984). Alcohol consumption during pregnancy is of special concern. Alcohol damage to the unborn infant is both devastating and irreversible. The resulting condition, fetal alcohol syndrome, may cause a variety of distinct physical deformities, especially to the facial area. In addition, these babies are often born retarded. Fetal alcohol syndrome is reported to be the most common cause of mental retardation in this country (Anderson & Grant, 1984; Marbury, Linn, Monson, Schoenbaum, Stubblefield, & Ryan, 1983; Roman, 1988; Warren & Bast, 1988).

Age

A variety of factors have been hypothesized to contribute to levels of drinking, however, age has been found by many studies to be the most consistent predictor of

alcohol consumption, for both men and women (Bucholz & Robins, 1989). The relationship between age and alcohol use is so strong that Fillmore (1987a,b) termed it an "organizing principle." Hilton (1991a) also reported that age was a strong predictor of consumption, with drinking most prevalent among young adults.

Grant, Harford, and Grigson (1988) found consumption to be highest among young adults, age 18 through 25. This cohort drank more than youths, age 12 through 17, and adults, over 25 years old. The prevalence of consumption increased with age for both genders, but appeared to peak at age 22 or 23. Heavy drinking also increased with age, but tended to peak at age 22 for women, slightly earlier than men's peak at age 23. They hypothesized that increases in drinking during young adulthood were linked to the need to establish independence and adult status. "Drinking is just one of numerous behaviors that signal increasing levels of independence and adulthood (pg. 258)." Drinking may start to decline after age 22 because by this age many young adults are taking on the responsibilities of marriage, family, and a job. These activities tend to discourage drinking, at least at heavier levels.

The transition to adulthood was also hypothesized by Jessor and Jessor (1975) to be an important factor in alcohol use by adolescents. They posited that alcohol consumption was related to this age-related transition because, in this society, alcohol use was symbolically associated with becoming an adult.

Although these studies suggested that the transition to adulthood was an important factor in the consumption of alcohol, most focused on the earliest stage of the process, the period when adolescents are seeking recognition as adults. Little research has examined the later stage of this process, the changes that occur during the early to mid-twenties. This is a time when most individuals have navigated the

changes of adolescence and many are taking on a variety of new responsibilities, often including marriage and parenthood.

Presence of Children

A number of studies have examined the effect of alcohol consumption on children, both their own consumption and that of their parents, however, little work has been done on whether the presence of children in the household has an effect on the drinking patterns of adults. Koski-Jannes (1991) reported on the role of children in drinking behavior and alcohol treatment. The study examined 130 Finnish alcoholics who were clients of an inpatient alcohol treatment program. The presence of children in the household was found to significantly improve treatment results. Adults with children in the household remained in treatment longer and "living with children was the best background predictor of recovery in this sample (pg. 639)."

Marital Status

In a national study, Calahan and Cisin (1976) found single and divorced individuals were most likely to be heavy drinkers. This finding was replicated by Weschler, Demone, and Gottleib (1976) in a study of the Boston area. They reported that single, divorced, and separated persons had a higher probability of heavy drinking. Stack and Wasserman (1993) reported "nonmarried persons have a higher-than-average risk of alcoholism (pg. 1021)." Horwitz and White (1991) also stated that married individuals reported fewer alcohol problems.

Miller-Tutzauer, Leonard and Windle (1991) examined alcohol consumption data from three years of the National Longitudinal Survey of Youth to determine whether marital stability had an effect on consumption. They reported that individuals

reduced their alcohol consumption levels before marriage and continued to reduce consumption for the first year of marriage.

Family Transmission of Alcohol Problems

A number of studies have reported that alcoholism, an indicator of high levels of consumption, is a problem that is transmitted within families (Cotton, 1979; Goodwin, 1971; Goodwin, 1985; Pandina & Johnson, 1989; Penick, Powell, Bingham, Liskow, Miller, & Read, 1987). Because alcohol abuse has been considered mostly a male problem (Cloninger, Christiansen, Reich, & Gottsman, 1978), most of the studies of the genetic transmission of alcoholism have focused on men. Only a few have included women or been primarily interested in women alcoholics (Glenn & Parsons, 1989).

Genetic Transmission

Early adoption studies of the children of alcoholics generally found a significantly elevated risk of alcoholism (or problem related drinking) among the sons and daughters of alcoholics (Webster, Harburb, Gleiberman, Schork, & DiFranceisco, 1989). According to Goodwin, Schulsinger, Hermansden, Guze, and Winokur (1973), sons of alcoholics were four times more likely to suffer from the disease than sons of non-alcoholics. The sample for this study included only men raised apart from their biological families, who had a parent hospitalized primarily for alcoholism. Women were excluded because of their supposed lower risk of alcoholism. Goodwin, Schulsinger, Moller, Hermansden, Winokur, and Guze (1974) also examined a second sample, which consisted of the brothers of the first sample. These individuals had continued to live at home and were raised by the alcoholic parent. They found no

significant difference in the rate of alcoholism for these two groups. Living with an alcoholic parent did not appear to increase the child's risk of developing the disease. This work supported the hypothesis that alcoholism was a genetically transmitted problem.

Bohman, Sigvardsson, & Cloninger (1981), examined a sample of 913 Swedish women adoptees, using discriminant function analysis, for indications of an inherited risk of alcoholism. They found evidence that alcoholism was an inherited problem. Unfortunately, this study was flawed by a vague definition of parental alcoholism. The women's parents were judged to be alcoholic based on entries in "the Criminal Register" (a registry of fines imposed for intemperance), supervision by the temperance board, and time spent in institutions for alcoholics. Criminality and occupational status were additional criteria for categorizing parents as alcoholics. A criminal sentence was recorded if the individual received more than 60 fines (apparently for intemperance). They reported that

> Discrimination between the two groups of daughters was significantly enhanced by combining information on alcohol abuse, criminality, and occupational status in both biological parents . . . Among the alcoholic mothers, only those who had low occupational status and minimal incarceration for criminal offenses increased their daughters' risk of alcohol abuse (pg. 967).

This study does not appear to adequately distinguish between parents who had serious alcohol problems and those who simply came to the frequent attention of local authorities and were publicly punished for misbehavior. Defining alcoholism is at best problematic and dividing a sample by a poorly measured criteria of parental alcoholism seems especially questionable.

Genetic studies of alcoholism have failed to explain different rates of alcoholism observed between the genders and among various social, ethnic, and racial groups. According to Peele, (1985), "Although hopes are high for genetic models of alcoholism, recent discoveries have not provided uniform support for any genetic proposition (pg. 65)." This echoed an earlier statement by Goodwin (1979), "At this point we are not certain that anything is inherited. Perhaps the strongest evidence for a genetic factor in alcoholism is the evidence that alcoholism strongly runs in families (pg. 60)." Although these studies provided some indications that compulsive drinking may be an inherited trait, they failed to provide conclusive evidence of the genetic transmission of alcoholism. As Goodwin (1971) pointed out, " . . . familial does not necessarily mean hereditary (pg. 545)." There is strong evidence that alcohol abuse may be a family problem that is transmitted between the generations, but it is not necessarily an inherited one.

Family History of Alcohol Problems

Because of the difficulties involved in identifying a specific, inherited cause of alcoholism, research in this area has shifted from a limited focus on genetics to a more general view of family transmission of alcohol problems. These studies recognize that some part of the problem is most probably inherited, however, they acknowledge that, at this time it is unclear just what is inherited (Cotton, 1979; Pandina & Johnson, 1989).

Cotton (1979), reviewed the literature on the incidence of alcoholism in families and reported that drinking problems did tend to cluster in certain families. She reported that if one family member had a problem with alcohol, the probability of at least one other family member with a drinking problem was high. This includes both

primary and secondary relatives. In addition, she found that women alcoholics were more likely then men to report relatives with alcohol problems and suggested that future research should focus on the sex of both the alcoholic and the afflicted family members.

Women's alcohol consumption levels were found by Webster, Harburg, Gleiberman, Schork, and DiFranceisco (1989) to be directly related to levels of parental drinking. This study, which examined drinking patterns in adulthood, found that individuals raised by abstentious parents were more apt to be abstainers themselves. They also found that men's drinking was affected equally by the drinking patterns of their fathers', friends', and spouses'. Women were likely to be heavy drinkers if one or both parents were heavy drinkers, however, spouse and peer drinking had an even stronger effect.

Schuckit (1984) also found the risk of alcoholism elevated among those individuals who had a positive family history of alcohol abuse. He carefully distinguished between primary and secondary relatives and found that brothers of alcoholics were more apt to be alcoholics themselves if the father, rather than the mother, was reported to have an alcohol problem. The risk of alcoholism for sisters was not affected by the sex of the alcoholic parent. More than 25% of the alcoholic individuals in Schuckit's sample reported alcohol abuse only by secondary relatives. He concluded that the absence of first-degree relatives with alcohol problems does not protect an individual from a genetic predisposition to alcoholism. This finding could also be interpreted as weakening the argument that alcoholism is genetically transmitted, since there is often little genetic connection between individuals and their secondary relatives.

Some studies did not support the hypothesis that a positive family history was related to increased consumption or a greater risk of developing alcohol problems. Harwood and Leonard (1989) found no evidence that a family history of alcoholism was significantly related to the quantity-frequency of alcohol consumed. The results of their study may be questioned, however, because they used a small sample of men (n=137), who were primarily first-time DWI (driving while intoxicated) offenders. Pandina and Johnson (1989) reported no difference in the use of alcohol between individuals with a family history of alcohol abuse and those with no family history of alcohol problems. However, they did find a significantly higher use of alcohol for males than females, regardless of family history. Engs (1990) also failed to find an association between alcohol consumption patterns and family background. She concluded that a positive family history of alcohol problems was not associated with the level of alcohol consumed by her sample.

Many of these studies, when combined with studies on the genetic transmission of alcoholism, do tend to support the hypothesis that heavy drinking is a problem that afflicts certain families, although the findings are not conclusive. Several studies have supported the familial transmission of alcohol problems, unfortunately, many of these used small, poorly selected samples and problematic definitions of parental alcoholism. Alcoholism does appear to be a familial problem, but the genetic transmission of alcoholism is still an open question. More work is needed in this area, using large probability samples and clear definitions of alcoholism, problem drinking, and alcohol consumption. In addition, as Goodwin (1985) pointed out, "Whatever biologic vulnerability may be present, the development of drinking problems is

obviously influenced by sociocultural factors . . . Any ultimate explanation of alcoholism will include the interaction of sociocultural and biologic factors (pg. 174)."

Cultural Norms

Cultural norms regulating the use of alcohol have been a focus of alcohol research since the 1940's. Several models have been posited to explain the influence of cultural norms on drinking patterns. The early work of Bales (1946) resulted in a sociocultural model of alcohol consumption that emphasized the role of social structures, cultural norms, culturally induced stress, and sociodemographic variables in drinking patterns. He hypothesized that rates of alcoholism were influenced by the culture's ability to alleviate stress, combined with the culture's drinking norms and the extent to which the society allowed alternative forms of satisfaction. For example, individuals may become heavy drinkers if they are subject to high levels of repressed aggression or sexuality, in a culture that does not condemn inebriety, and does not provide easy access to substitute forms of satisfaction such as narcotic drugs, coffee, tea, or cigarettes.

Bales contrasted the Irish, with their reputation for public drunkenness, with the Jews, who drank but rarely appeared to be intoxicated. He suggested that these cultures had different norms for drinking. The Jews engaged in ritual drinking, closely tied to their religion, while the Irish used alcohol as a means to alleviate stress and had few religious prohibitions against drunkenness. Because excessive drinking was poorly controlled in Irish society, he suggested that the Irish were more prone to alcoholism and drunkenness. The Jews, who disapproved of inebriety, culturally controlled excessive drinking. The strong religious doctrines of the Jewish faith

against public inebriation were contrasted with the more tolerant attitudes of Catholic church as an explanation for this apparent difference in drinking practices. Although a tolerance for inebriation may explain the apparently high rate of public drunkenness among the Irish, it does little to explain their overall use of alcohol. The Irish may have a reputation for drinking to excess, however, their per capita alcohol consumption is lower than the United States and is among the lowest of the European nations (Schuckit, 1985; Smith & Hanham, 1982; White, 1982).

Religious Affiliation

Religious affiliation was found by Bock, Cochran, and Beegley (1987), to influence both the prevalence of abstinence and the amount of alcohol consumed. They examined alcohol consumption by affiliation with the major American religious denominations. Catholics, Jews, Liberal Protestants, Conservative Protestants, and the nonaffiliated were compared for abstinence, prevalence of drinking, and levels of consumption. The Protestant denominations were collapsed into the two categories, Liberal and Conservative. Episcopalians, Lutherans, and Presbyterians were classified as "Liberal Protestant" and Methodists, Baptists, and other Protestant sects were categorized as "Conservative Protestant." This study found that individuals who were affiliated with the Conservative Protestant religious organizations were less likely to consume alcohol than those belonging to Liberal Protestant groups, Catholics, or Jews. This supported an earlier finding by Mulford (1959) that Catholics and liberal Protestants had a higher prevalence of alcohol consumption. Calahan and Cisin (1968) also found that membership in more conservative Protestant religious denominations was related to a lower prevalence of drinking, but among those who

drank, the rate of heavy drinking was higher. Jews were reported to have a high prevalence of drinking but few alcohol related problems. Drinking was most common for those individuals who expressed no religious preference.

Hilton (1991a) also examined the relationship of religious affiliation to drinking practices. Protestant denominations were categorized as Liberal and Conservative Protestant.[1] He found that drinking and heavy drinking were most common for Catholics, while Jews reported a high prevalence of drinking but low rate of heavy drinking. Liberal Protestants had a lower prevalence than Catholics but higher then Conservative Protestants. These findings were consistent for both men and women.

Skolnick (1958) tested the hypothesis that religious affiliation was a predictor of alcohol use. He found that affiliation with a religious organization that proscribed the use of alcohol was a strong predictor of both abstinence and problem levels of drinking. "The abstinence orientation to drinking seems prone to encourage problem drinking in those who reject the norm of total abstinence (pg. 466)." Skolnick found that religious affiliation influenced drinking more than the level of participation in religious activities. Religious affiliation does appear to influence individuals to abstain from using alcohol, however, for those who choose to drink it may not prevent heavy consumption.

Skolnick's 1958 study was re-examined by Nusbaumer (1981) for changes in the influence of religious affiliation on abstinence. He found that the relationship had

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[1] The denominations that were included in the Conservative category were: Baptist, Pentecostal, Assembly of God, Church of God, Nazarene, Holiness, Apostolic, Evangelical, Sanctified, Disciples of Christ, Christian Reformed, Jehovah's Witness, Seventh Day Adventists, Mormon, Brethren, Spiritual, and Salvation Army. All other Protestant denominations were considered Liberal.

weakened during the 15 years between the studies. Religious affiliation did not influence abstinence in 1978 as strongly as it had in 1963. He associated this finding with a general decline in the influence of religion in America.

Since cultural norms enforced by religious teachings have been found to influence alcohol consumption of adults, then the influence of early religious indoctrination may also have an effect on alcohol consumption. Studies indicate that belonging to a religious organization that strongly disapproves of the use of alcohol may influence individuals to remain abstinent, however, there does not appear to be strong support for the assumption that religious belief, or a high level of religiosity prevents individuals who drink from doing so at high levels. At the macro-level, regions with a high proportion of Conservative Protestant residents, specifically the south and mid-west regions, are reported by some researchers to have lower levels of per capita consumption (Hilton, 1991b; Smith & Hanham, 1982). Hilton, (1991b), also pointed out that these regions tended to have more restrictive laws regulating the sale of alcohol.

Availability of Alcohol

Since the end of prohibition, states have enacted a variety of laws and regulations intended to restrict access to beverage alcohol and curtail alcohol related problems. These laws are based on the assumption that if alcohol is widely available, people will drink more and increased consumption leads to an increase in alcohol-related problems (Smith, 1989). Controlling the availability of alcohol is commonly believed to be an effective method for preventing alcohol abuse. Analysis of the effectiveness of laws restricting the sale and consumption of alcohol is primarily based

on a distribution of consumption model which assumes that the rate of problem drinking in a population is related to the overall rate of alcohol consumption in that population.

Distribution of Consumption Model

The distribution of consumption model, developed by Ledermann (cited in: Miller & Agnew, 1974; Parker & Harman, 1978; Schmidt & Popham, 1978; Whitehead, 1975), posits that the distribution of alcohol consumption, in a population, conforms to a logarithmetic normal curve and is stable across cultures. The curve is unimodal, smooth and continuous. Most drinkers are at the low end of the curve, a few fall into the middle range, and fewer still are at the high end. This is in contrast with the bimodal distribution of the medical model, with a large cluster of drinkers at the low end and another smaller cluster of heavy drinkers at the high end.

The Ledermann model suggests that, since the shape of the curve is stable, it is necessary to shift the entire curve to decrease levels of problem drinking (located at the high end of the curve). According to Whitehead (1979),

> Programs aimed at reducing the consumption of only those whose level is high will likely fail, since these efforts would (a) attempt to lower the alcohol intake of those who seem to derive the most satisfaction from it, (b) rearrange the who-drinks-more-than-whom order in the society; and most important (c), probably necessitate the distribution of alcohol consumption taking on a shape that it is not known to have anywhere else in the world - a very unlikely occurrence (pg. 434).

Lowering the per capita consumption of alcohol shifts the entire curve and may reduce the incidence of alcoholism, if the number of heavy drinkers is a stable percent of the total number of drinkers in the society (Whitehead, 1975).

Availability Hypothesis

The availability hypothesis, based on the distribution of consumption model, posits that the level of per capita alcohol consumption is directly related to the availability of alcohol. One way to control alcohol consumption is to limit access to beverage alcohol. Prohibition, which legally banned the manufacture and sale of alcohol, was a national effort to deny everyone access to all alcoholic beverages (Lender & Martin, 1982; Levine, 1985).

Many states attempt to decrease consumption and correspondingly, decrease rates of alcoholism by limiting access to alcoholic beverages. States may regulate the hours that alcohol can be sold, the number of on- and off-premise outlets, advertising, and consumer credit. In addition, some states have a complete alcohol monopoly, selling all alcohol through a chain of state-owned liquor stores, while others sell only distilled beverages in state controlled outlets. These measures are explicitly intended to restrict access to alcohol and discourage excessive drinking (Blose & Holder, 1987).

Colon (1981) analyzed the correlation between deaths from cirrhosis and nine state-level alcohol control measures. These included the number of on-premise outlets per capita, hours the on-premise outlets could serve alcohol, whether billboard advertising of liquor was allowed, whether the state allowed specific counties to forbid the sale of alcohol (dry counties), the level of state taxes on alcoholic beverages, minimum age an individual could purchase alcohol, whether liquor outlets were state run or privately owned, and whether credit to customers was allowed. He created two factors, one for on-premise availability, which included on-premise licenses, on-premise hours, billboard advertising, county-level prohibition, and state taxes. The other factor was defined as retail availability and included retail outlets, minimum

purchase age, state monopoly of distribution and credit to customers. He found a significant correlation between on-premise availability and cirrhosis death rates, however, retail availability was not significantly related to deaths from alcohol.

Rush, Glicksman and Brook (1986) examined government restrictions on the sale of alcohol and found a significant relationship between the retail availability of alcohol and per capita consumption. They developed a latent factor, availability, using on-premise and off-premise alcohol outlets per 1,000 adults. Their findings supported the hypothesis that government restrictions on alcohol availability had an impact on the overall level of consumption. Glicksman and Rush (1986) continued their earlier study by expanding their model to include area income, urbanism, and unemployment. Including these factors significantly improved the fit of the model. Although this model worked well at the macro level, they suggested that work needed to be done at the level of the individual consumer.

Harford, Parker, Pautler, and Wolz (1979) hypothesized that most heavy drinking occurred in bars and, therefore, the number of bars should be directly related to rates of alcoholism. They found the number of on-premise outlets (bars and taverns) were significantly related to rates of alcoholism. However, an over-all availability index was not significantly related to high levels of consumption. They suggested that, "More attention should be given to the development of a comprehensive model of alcohol availability (pg. 1057)."

The work on alcohol availability has primarily focused on per capita consumption levels of alcohol, alcoholism rates, and deaths from cirrhosis (Parker & Harman, 1978; Whitehead, 1975). Studies that relate alcohol availability to alcoholism and cirrhosis deaths are relevant to the study of individual consumption levels

because alcoholism or death from cirrhosis usually results from high alcohol consumption (Schmidt & DeLint, 1970; Colon, 1981). If restricting alcohol availability is related to reducing per capita deaths from over-consumption, then it seems appropriate to examine whether it is also related to lowering the consumption levels for both those who abuse alcohol and those who do not drink heavily enough to suffer from alcohol related problems.

Summary

Consuming alcohol is such a common activity in American society that to speak of "drinking" means drinking beverage alcohol. In spite of nearly 200 years of moral persuasion against drinking alcohol and laws restricting its availability, the majority of Americans acknowledge that they drink, at least occasionally. Alcohol consumption is influenced by a variety of factors, however, age and gender are particularly important. Men drink more than women and younger adults drink more, on average, than older ones. Because alcohol abuse has been traditionally considered a man's problem little research has focused on the drinking patterns of young women. This is unfortunate because, like men, young women who drink may suffer alcohol related emotional, social, and health problems.

This study integrated two theoretical paradigms, a life course perspective and human ecology theory, to develop a model of alcohol consumption for young women. Alcohol consumption was conceptualized as having two dimensions, the total amount consumed during a month and the number of times 6 or more drinks were consumed at one time (heavy drinking). The life course perspective was used as a framework to understand how family and individual changes influenced the dimensions of

consumption and the factors that precipitated changing levels of alcohol use. This was particularly appropriate because drinking is not a static behavior, it may change many times over the life course.

Human ecology theory provided a strategy for understanding the interaction of the individual with their social environment, at both macro- and micro-levels. Since individuals do not exist in isolation, it was important to develop a conceptual model that acknowledged the influence of family and community on individual behavior. This theory allowed the integration of both macro- and micro-level variables to help clarify which factors influenced individuals to use alcohol. Together, human ecology theory and the life course perspective provided a structure to develop an integrated model that acknowledged the impact of the social environment on human behavior and the importance of change over time.

This study examined both macro- and micro-level variables to determine their influence on alcohol consumption and changing levels of alcohol use. State-level variables included the number of drinking places per 1,000 population, restrictions on the sale of distilled beverages, and per capita consumption. In addition, three county-level variables were examined, per capita income, unemployment rate, and urban/rural designation. Several micro-level variables were also included in this analysis. Two variables measured parental alcohol abuse, mother's alcoholism and father's alcoholism. The personal/family variables of education, marital status, presence of children in the household, and an adolescent affiliation with a religious organization that proscribed the use of alcohol were also examined for their effect on alcohol consumption and changes in drinking behavior.

The study addressed two main issues, 1) what factors influenced levels of alcohol consumption and the incidence of heavy drinking for young women and 2) which of these factors had the most influence on changing levels of alcohol use between age 22 and age 27? The factors were conceptualized in four domains, 1) state-level availability, 2) county-level political economy, 3) family transmission of alcohol problems, and 4) personal/family influences. The two dimensions of consumption, amount consumed and incidence of heavy drinking, were first examined separately then they were used as indicators of a latent factor to provide a more holistic measure of alcohol use.

Research Question 1

Previous research suggested that the availability of alcohol, at the state level, influenced levels of per capita consumption. Do state restrictions that explicitly intend to limit access to alcohol have any effect on individual levels of consumption? What effect does living in an area where drinking is popular, as measured by per capita consumption, have on personal levels of alcohol use? Do those who live in states where per capita consumption is high, drinking places numerous, and state restrictions on the sale of distilled beverages lax drink more than those who live in areas where drinking is less common, drinking places less frequent, and state restrictions greater? If the state-level restrictions on drinking change, for example if the individual moves from one state to another, does she change her consumption to correspond with the new circumstances, or does she tend to continue to drink at her accustomed level?

Hypothesis 1: Individuals who live in areas where drinking alcohol is more popular, as measured by per capita consumption, will drink more than those who live where drinking is less common.

Hypothesis 2: A drop in per capita consumption, between Time-One (1983/1984) and Time-Two (1988/1989) will be accompanied by a drop in individual consumption.

Hypothesis 3: Individuals who live in states that restrict the number of drinking places will consume less alcohol.

Hypothesis 4: If the number of drinking places per 1,000 population decreases individuals living in those areas will drink less alcohol.

Hypothesis 5: Strong state restrictions on the sale of distilled beverages will cause individuals to drink less.

Hypothesis 6: If state restrictions increase, thereby causing alcohol to be more difficult to purchase, individuals will drink less alcohol.

Research Question 2

Urban areas with low per capita incomes and high unemployment provide a stressful environment that may result in higher alcohol consumption. Do individuals who live in these areas drink more due to the surrounding social/economic pressures? Do they increase their drinking if these measures of social stress increase over time?

Hypothesis 7: Those who live in counties where the per capita income (adjusted for inflation) is low will drink more alcohol then those who live in more affluent areas.

Hypothesis 8: If the adjusted per capita income falls, relative to other areas, then individuals will drink more.

Hypothesis 9. Individuals living in areas of high unemployment will consume more than those living where jobs are more plentiful.

Hypothesis 10: A rise in unemployment, relative to other places, will influence individuals in those areas will drink more.

Hypothesis 11: The stress of urban living will influence individuals to consume more alcohol than those living in rural areas.

Hypothesis 12: Individuals who move to urban areas will drink more than those who remain in or move to a rural area.

Research Question 3

Alcohol abuse has been identified in the literature as a problem that may be transmitted from parents to their children. Do individuals who have a history of parental alcoholism drink more than those who have no family history of alcohol abuse? Does the level of alcohol use by young adults with a history of parental alcoholism remain stable, an indicator that alcoholism is genetically transmitted, or do these individuals, as they mature and distance themselves from their parents, decrease their consumption?

Hypotheses 13: Individuals who have either an alcoholic mother or alcoholic father will consume more than those with no history of parental alcohol abuse.

Hypothesis 14: Because alcoholism is a genetically transmitted problem, those with alcoholic parents will continue to drink more heavily than those who do not

have parents who abuse alcohol. They will not decrease their consumption as they age.

Research Question 4

The transition to adulthood has also been identified as a possible important factor in the use of alcohol by young adults. This transition, which often initiates new roles and responsibilities for the individual, may be marked by educational attainment, marriage, or becoming a parent. Do these personal factors influence alcohol consumption and changing levels of alcohol use?

Hypothesis 15: Education will have a negative influence on alcohol consumption. For each year of education, alcohol consumption will decrease.

Hypothesis 16: Married individuals will consume less alcohol than those who are not married.

Hypothesis 17: Children in the household will be related to lower levels of alcohol consumption.

Research Question 5

Many churches discourage the use of alcohol by their members. The literature suggested that members of these organizations drink, on average, less alcohol. Do individuals who belonged to these organizations when they were adolescents drink less at age 22? What effect does an adolescent religious indoctrination against the use of alcohol have on drinking at age 27?

Hypothesis 18: Individuals who report an adolescent affiliation with a conservative (with respect to alcohol) religious organization will drink less than those with a more liberal background.

Hypothesis 19: This training will continue to influence their use of alcohol over time. Therefore, those individuals from a conservative background will continue to drink less, even at age 27.

Methods

The research design was longitudinal because longitudinal studies provide an opportunity to observe change, establish temporal order and facilitate establishing causation (Menard, 1991). This study integrated macro- and micro-level factors within a paradigm that recognized the importance of social context in human behavior.

Data Sources

The National Longitudinal Survey of Youth (NLSY), a data set gathered yearly by the U.S. Bureau of Labor Statistics since 1979, was the primary data source for this research. This data set provided information on alcohol consumption, marital status, presence of children in the household, education, religious affiliation, urban/rural residence, and family history of alcoholism for the sample of young women (n=1,003). In addition to the NLSY data, this study integrated state and county level data taken from six other sources to provide information on the availability of alcoholic beverages and local area political economy. Information from the Distilled Spirits Council of the United States was used to determine the availability of alcohol at the state level. County Business Patterns, data provided by the U.S. Bureau of the Census, lists all retail establishments by state and was used to determine the number of drinking places (bars and taverns) and liquor stores. The Statistical Abstract of the United States 1993 (U.S. Bureau of the Census, 1993) provided state population figures as well as the consumer price index used to adjust per capita incomes to the 1982-84 base year. Costat4 and STF3C, also provided by the U.S. Bureau of the Census, were the source of the county level economic variables, per capita income and unemployment rate.

It was possible to merge these variables with individual cases because the NLSY staff provided a special data set that was geo-referenced with FIPS codes at both the state and county level, making it possible to match state laws, regulations, the number of liquor outlets, county per capita income and the county unemployment rate with individual cases. This was an important advantage for a study that intended, in part, to examine how macro-level factors influence individual behaviors.

In addition to integrating these data with the NLSY data set, two separate macro-level data sets were constructed for the states and counties were the respondents lived. One set of data contained the state-level variables that measured state restrictions on the sales of distilled spirits, number of drinking places per 1,000 population, and per capita consumption of alcohol. A second separate data set that included the county-level per capita income, unemployment rate, and urban/rural designation was also constructed. These data were used to describe and compare the respondent's respective states and counties.

Dependent Variables

Four dependent variables, total consumption at age 22, the incidence of heavy drinking at age 22 (6 or more drinks at one time), total consumption at age 27, and the incidence of heavy drinking at age 27 were examined. Two dimensions of alcohol consumption were operationalized: (1) the total amount consumed over a 30 day period and (2) the incidence of heavy drinking, which measured the frequency of episodes of heavy drinking (6 or more drinks at one time).

Alcohol Consumption

At Time-One (1983/1984), respondents were asked a series of questions to determine how many days, during the past month, they had consumed one drink, two drinks, three drinks, four drinks, five drinks, and six or more drinks. The first alcohol question in the Time-Two (1988/1989) surveys asked respondents to estimate the average amount they drank, on days they drank alcohol. At both Time-One (age 22) and Time-Two (age 27), respondents were also asked the number of days they drank alcohol during the previous month and how often they had consumed 6 or more drinks at one time.

The change in the wording of the questions used to determine amount consumed was problematic. It was necessary to compute an amount consumed for both Time-One (age 22) and Time-Two (age 27) and then test whether the wording change significantly affected the reported levels of alcohol consumption at these two time periods. An analysis was done to determine whether reported alcohol consumption was significantly influenced by this change in the wording of the alcohol consumption questions between Time-One (1983/1984), when these respondents were age 22, and Time-Two (1988/1989), when they were age 27. A general linear model was used to determine whether the year the questions were asked (1983, 1984, 1988, or 1989) or the change in wording between Time-One (1983/1984) and Time-Two (1988/1989) significantly predicted total alcohol consumption. This analysis indicated that neither the year the questions were asked (1983, 1984, 1988, or 1989) nor the change in the wording between Time-One (1983/1984) and Time-Two (1988/1989) significantly predicted the amount of alcohol consumed. Therefore, it was

decided that the change of wording did not introduce an unacceptable bias into this study. Appendix A presents a more detailed explanation of this analysis.

Incidence of Episodes of Heavy Drinking.

In addition to the total amount consumed in a month, this study also examined how often these respondents reported drinking 6 or more drinks at one time (incidence of heavy drinking). This question was asked consistently at both Time-One (1983/1984) and Time-Two (1988/1989) and was coded as follows: Those who reported no instances of heavy drinking during the previous month were coded 0, a single episode of heavy drinking was coded 1, two or three instances of heavy drinking were coded 2, four or five times were coded 3, six or seven times were coded 4, eight or nine times were coded 5, and 10 or more times were coded 6.

Independent Variables

The independent variables in this study were conceptualized in the following domains: 1) state-level availability of alcohol, 2) county-level political economic factors, 3) family transmission of alcoholism, 4) personal/family influences. The availability of alcohol included an index of the state control on sales of distilled spirits, the number of drinking places per 1,000 population, and per capita alcohol consumption. County-level measures of per capita income, unemployment rate, and urban/rural designation were included in the political economy domain. The family transmission of alcoholism domain included two variables that measured parental alcohol problems, mother's alcoholism and father's alcoholism. The final domain,

personal/family influences included marital status, presence of children in the household, educational attainment, and whether the individual reported an adolescent affiliation with a religious organization that proscribed the use of alcohol.

Availability Of Alcohol.

The availability of alcohol in each state was measured at both Time-One (1983/1984) and Time-Two (1988/1989) using the following state-level variables: The number of drinking places per 1,000 population, an index of state restrictions on the sale of distilled spirits, and the per capita consumption of absolute alcohol. Per capita consumption measures alcohol consumption from all kinds of alcoholic beverages. It is not limited to the consumption of distilled spirits, nor is it limited to either women or 22 year olds.

The index of state control on sales of distilled beverages was constructed to measured the degree to which states attempted to control access to alcohol by restricting sales of distilled spirits. This index included the following measures: Whether billboard advertising of distilled spirits was allowed (coded 0=no, 1=yes), whether distilled spirits could be sold in grocery stores (coded 0=no, 1=yes), and whether the state had a monopoly on the sales of distilled spirits (coded 0=no, 1=yes). In addition, the index included a dichotomous variable that was constructed to indicate whether the number of liquor stores per 1,000 population in each state was above or below the mean for all the states in the study. This variable was coded 0=below the mean, 1=above the mean. The index of sales of distilled spirits was then constructed by summing the number of restrictions (variables coded 1) that each state used to restrict sales of distilled spirits. For example, if the number of liquor stores per 1,000

population was above average, billboard advertising was allowed, spirits were sold in grocery stores, and the state did not have a monopoly on the sale of distilled spirits, the score would equal 4 (the maximum score possible), an indicator that this state has few restrictions on the sales of distilled spirits. Conversely, a state that scored 0 on each of these variables has many restrictions on the sales of distilled spirits.

Political Economy

Per capita income (adjusted for inflation), unemployment rate, and urban/rural status were county level variables that measured the economic prosperity of the respondent's county of residence. These variables were included to test whether there was a relationship between macro-level economic stress and individual-level alcohol consumption. Per capita income, unemployment rate, and urban/rural status were measured at both Time-One (1983/1984) and Time-Two (1988/1989).

Personal/Familial Variables

The questions about family drinking problems were asked only once, in 1988. These questions were retrospective, asking whether the respondent felt that specific relatives had ever had a problem with alcohol. Two dichotomous variables were created to measure whether either of the respondent's parents had a history of alcoholism or problem drinking. For this study, if the respondent reported that either parent had ever had a problem with alcohol, the corresponding parent variable was coded 1, else that variable was coded 0. For example, if the respondent had an alcoholic father, the variable for father's alcoholism was coded 1. These variables were included in this study because they provided an opportunity to examine the

relationship between parental alcohol problems (alcoholic mother and alcoholic father) and the respondent's alcohol consumption.

A dichotomous variable, marital status, was constructed for both Time-One (age 22) and Time-Two (age 27) from a created variable in the NLSY data set that categorized respondents as never married, married - spouse present, or other. For this study, the NLSY variable was collapsed. The categories never married and other (e.g., divorced) were combined into one category, not married. Respondents were categorizes as married - spouse present or not married. Married respondents were coded 1 and non-married ones were coded 0.

The presence of the respondent's biological children in the household was also measured at both Time-One (age 22) and Time-Two (age 27) using a constructed NLSY variable. For this study, households with children present were coded 1 and those that did not have children were coded 0. The years of education were also reported by the respondent at both Time-One (age 22) and Time-Two (age 27).

Religious affiliation was asked only in 1979, when these respondents were adolescents. Religious denominations were categorized by whether they disapproved of drinking beverage alcohol. The literature identified the following Protestant churches as having a more liberal attitude toward alcohol use: Lutheran, Presbyterian, Episcopalian, and Congregational (Hilton,1991; Skolnick, 1958). All other Protestant churches were classified as having a conservative attitude toward drinking. Catholics, Jews, and the non-affiliated were also classified as having a more liberal attitude toward alcohol consumption. No other religions were represented by the women in this sample. Adolescent religious affiliation was coded 0 for a liberal attitude toward alcohol and 1 for a conservative attitude. This variable was included to determine

whether an adolescent affiliation with a religion that proscribes the use of alcohol influenced alcohol consumption in adulthood.

Sample Characteristics

The sample for this study was 1,003 young women selected from respondents to the National Longitudinal Survey of Youth. The National Longitudinal Survey of Youth has been conducted every year since 1979. In the first year personal interviews were used to survey 6,283 young women. In all but two of the following years, personal interviews were used whenever possible. Phone interviews were only used to reach respondents who had refused, but then relented and agreed to participate by phone. The women selected for this sample were interviewed in all of the following years: 1979, 1983, 1984, 1988, and 1989. The sample was selected in the following manner. Of the 6,283 young women in the full NLSY sample, only 1,533 were 22 years old in either 1983 or 1984. In 1988 and 1989 there were 1,352 women who were 27. Because the interview dates varied from year to year, it was possible for a respondent to be age 22 at both 1983 and 1984 or to be age 27 at both 1988 and 1989. For example, it was possible for a respondent to be interviewed right after her 22nd birthday in 1983 and again right before her 23rd birthday in 1984. She would have been 22 at the time of both interviews. In order to avoid double counting these individuals, they were arbitrarily assigned to the earlier year. This reduced the sample by 27 individuals in Time-One (1983/1984), leaving a sub-sample of 1,506 who were 22 years old, and by 81 Time-Two (1988/1989) individuals, reducing the number of 27 year olds to 1,352. Additionally, only respondents who were age 22 at Time-One (1983/1984) and were also age 27 at Time-Two (1988/1989) were included in this

study. There were 1,047 respondents who fit this criteria. Finally, only those who answered the questions regarding alcohol consumption, marital status, educational level, presence of their children in the household, identified their religious affiliation in 1979, and were coded for their state and county of residence were included in this study. Missing values on these variables reduced the study sample to its final size, 1,003. It is important to stress that only 44 cases were lost because of missing data.

In addition to the main data set drawn from the National Longitudinal Survey of Youth, two additional data sets were constructed to provide macro-level data on the states and counties where the respondents lived at Time-One (1983/1984) and Time-Two (1988/1989) respectively. These macro-level data sets were intended to provide a picture of alcohol use in the respective states and counties and to furnish a framework for understanding the interface between the macro- and micro-levels. At Time-One (1983/1984), the respondents lived in a total of 354 counties in 44 states, respectively. The majority of those states (n=37) were included in both Time-One years (1983 and 1984). One state was represented in 1983 and not in 1984, while six states were include in 1984 that did not have respondents living in them in 1983. Just 33.9% (n=119) of the Time-One (1983/1984) counties were included in both 1983 and 1984. By Time-Two (1988/1989), respondents were living in 46 states and 372 counties. Only those states with respondents living in them were included in the macro-level portion of this study and each state was represented only once, regardless of the number of respondents in residence.

Means and standard deviations for the state-level variables measuring state control of distilled liquor (availability) are summarized in Table 1. The first variable, an index of state restrictions on the sales of spirits, was the sum of the following four

Table 1. Means and standard deviations of macro-level (state) availability variables, Time-One (1983/1984) and Time-Two (1988/1989). *

	Time-One (1983/1984) (n=44)	**Time-Two (1988/1989) (n=46)**
	Mean (sd)	**Mean (sd)**
Index of Restrictions on Sales of Spirits	2.475 (1.329)	2.421 (1.234)
Number of Drinking Places	0.263 (0.173)	0.216 (0.147)
Per Capita Consumption of Alcohol (In gallons of absolute alcohol)	2.079 (0.600)	1.878 (0.495)

* State level variables represent only those states with respondents living in them at Time-One (1983/1984) or Time-Two (1988/1989). Each state is represented only once, regardless of the number of respondents in residence.

measures: 1). Whether billboard advertising was allowed (0=no, 1=yes), 2). whether grocery store sales of spirits was allowed (0=no, 1=yes), 3). whether the number of liquor stores per 1,000 population was more than or less than the mean for all of the states (0=less than the mean, 1=more than the mean), and 4). whether sales of spirits were controlled by a Liquor Control Commission (control state) or a Liquor Licensing Board (license state), coded 0=control state, 1=license state. Slightly more than one-third (34.1%) of the states (n=15) were control states. These states control the sale of distilled spirits with a state monopoly. As Table 1 shows, there was little change between the Time-One (1983/1984) index of restrictions on sales of spirits, mean=2.48 (sd=1.33) and the corresponding Time-Two (1988/1989) index, mean=2.42 (sd=1.23). In addition, as Table 1 indicates, the mean number of drinking places per 1,000 population was similar between Time-One (1983/1984), mean=0.26 (sd=0.17) and Time-Two (1988/1989), mean=0.22 (sd=0.15). Per capita consumption, the apparent consumption in gallons of absolute alcohol from all types of alcoholic beverages, decreased slightly between Time-One (1983/1984) and Time-Two (1988/1989). The Time-One (1983/1984) mean for the 44 states was 2.08 gallons (sd=0.66), one-fifth (.20) of a gallon lower than the Time-Two (1988/1989) mean of 1.88 gallons, (sd=0.50).

A second data set was constructed that contained only the county-level measures of per capita income (adjusted for inflation), unemployment rate, and whether the county was designated urban or rural. Table 2 reports the percent of counties that were categorized as urban as well as the mean unemployment rates for the various counties that had respondents living in them at Time-One (1983/1984) and Time-Two (1988/1989), respectively. This table also presents information on county

Table 2. Percent of counties designated urban, county-level mean unemployment rates, and median adjusted per capita income, Time-One (1983/1984) and Time-Two (1988/1989).*

	Time-One (1983/1984)	**Time-Two (1988/1989)**
	%	**%**
Urban Counties	68.6 n=243)	66.9 (n=249)
	Mean	**Mean**
Unemployment Rate For All Counties	8.90% (sd=3.86) (n=354)	5.90% (sd=2.82) (n=372)
Urban County Unemployment Rate	8.29% (sd=3.89) (n=243)	5.55% (sd=2.50) (n=249)
Rural County Unemployment Rate	10.26% (sd=4.46) (n=111)	6.63% (sd=3.27) (n=123)
	Median	**Median**
Per Capita Income For All Counties	$11,224.25 (n=354)	$11,936.47 (n=372)
Urban County Per Capita Income	$12,051.65 (n=243)	$12,750.64 (n=249)
Rural County Per Capita Income	$9,834.46 (n=111)	$10,415.05 (n=123)

* Only counties that had respondents living in them at either Time-One (1983/1984) or Time-Two (1988/1989) are included. Each county is represented only once regardless of the number of respondents in residence.

per capita income. It also divides the counties by urban/rural status to report urban and rural unemployment rates and per capita income, for both Time-One (1983/1984) and Time-Two (1988/1989). Because these means are intended to provide a method for comparing the various counties in the study, each county is represented only once in each time period, regardless of the number of respondents in residence. At Time-One (1983/1984) 243 counties (68.6%) were designated as urban, by Time-Two (1988/1989) 249 counties (66.9%) in the study were urban.

Table 2 indicates that the mean unemployment rate for all of the counties in Time-One (1983/1984) was 8.9% (sd=3.86). The employment picture improved somewhat by Time-Two (1988/1989), with county unemployment rates declining to an average of 5.9% (sd=2.82). When the counties were divided into urban and rural categories, urban prosperity was apparent from these data. Unemployment was consistently lower for the urban counties, in both Time-One (1983/1984) and Time-Two (1988/1989). At Time-One (1983/1984), the mean unemployment rate for the urban counties was 8.29% (sd=3.89). The Time-One (1983/1984) rural counties averaged 10.26% (sd=4.46) unemployment. By Time-Two (1988/1989), the unemployment rate in the urban counties had dropped to an average of 5.55% (sd=2.50), while the rural counties had a mean unemployment rate of 6.63% (sd=3.27).

Per capita incomes for these counties at both Time-One (1983/1984) and Time-Two (1988/1989) are also reported in Table 2. County per capita incomes were adjusted for inflation using the 1982-84 adjustment provided by the U.S. Bureau of the Census. After adjusting for inflation, there was little change in the median per capita income of these counties between Time-One (1983/1984) and Time-Two (1988/1989). The adjusted median for all the counties at Time-Two (1988/1989), $11,936.47, was

only slightly higher than the adjusted median for Time-One (1983/1984), $11,224.25. The economic disparity between the urban and rural counties was apparent in the difference between urban county per capita income and rural county per capita income. Those counties that were classified urban by census definition had a higher median per capita income. The adjusted median per capita income for urban counties in Time-One (1983/1984) was $12,051.65 while the rural adjusted median per capita income at the same time was only $9,834.46. The adjusted median per capita income for the urban counties rose to $12,750.64 by Time-Two (1988/1989). However, the rural counties adjusted per capita income reached only $10,415.05 by Time-Two (1988/1989), $1,636.60 less than the Time-One (1983/1984) median for the urban counties.

Table 3 presents the sample characteristics for the respondents (n=1,003) at both Time-One (1983/1984), when they were age 22 and Time-Two (1988/1989), when they were age 27. At Time-One (age 22), 41.4% had their own children living in the household. By age 27 (Time-Two), this had increased to 59.3%. Slightly more than one-third (35.6%) of these respondents were married and living with a spouse at age 22 (Time-One), however, by age 27 (Time-Two) slightly more than one-half (51.5%) of them were married with a spouse present. The sample was nearly equally divided between those who had been affiliated with a conservative (with respect to alcohol) religion (51.7%) and those who had a more liberal background (48.3%).

The percent of respondents classified as abstainers (0 consumption for the previous month), alcohol consumption, and incidence of heavy drinking are reported in Table 4. At age 22 (Time-One), more than one-third of these young women (38.0%) reported they had consumed no alcohol during the previous month. This increased

Table 3. Personal characteristics including percent with children present in the household, marital status, and adolescent religious affiliation, Time-One (age 22) and Time-Two (age 27).

	Time-One (Age 22)	**Time-Two (Age 27)**
	%	**%**
Children Present in Household	41.4% (n=415)	59.3% (n=595)
Married - Spouse Present	35.6% (n=357)	51.5% (n=517)
Conservative Religious Affiliation (This variable measured only once, in 1979)	51.7% (n=519)	51.7% (n=519)

Table 4. Reported alcohol consumption, Time-One (age 22) and Time-Two (age 27).

	Time-One (Age 22)	Time-Two (Age 27)
	%	%
Abstainers (No alcohol consumed during the previous month)	38.0 (n=381)	41.9 (n=420)
Drank 6 or more drinks at one time during the previous month	27.2 (n=273)	23.4* (n=235)
	Mean	**Mean**
Total Number of Drinks Consumed During Previous Month	10.032 (sd=18.67) (n=1003)	8.242* (sd=17.89) (n=1003)
Incidence of Heavy Drinking (6 or more drinks at one time) during previous month	0.596 (sd=1.21) (n=1003)	0.494* (sd=1.07) (n=1003)

* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$

Significance computed between Time-One (age 22) and Time-Two (age 27). For example, a significantly higher percentage of the Time-One (age 22) respondents drank 6 or more drinks during the previous month than the Time-Two (age 27) respondents.

slightly by age 27 (Time-Two), with 41.9% abstaining from drinking during the previous 30 days. The mean number of drinks consumed during the previous month also deceased between age 22 (Time-One) and age 27 (Time-Two). At age 22 (Time-One) these women reported consuming an average of 10.03 (sd=18.67) drinks during the previous month. This was significantly ($p \leq 0.05$) more than their Time-Two (age 27) consumption, which had dropped to 8.24 (sd=17.89) drinks. Drinking 6 or more drinks at least once during the survey month was reported by 27.2% of the sample at age 22 (Time-One), also significantly ($p \leq 0.05$) more than the 23.4% who reported heavy drinking at age 27 (Time-Two).

Table 5 divides the sample by the categories in the personal/family domain and provides the means for the total amount consumed at Time-One (age 22) and Time-Two (age 27) by those categories. The categories include marital status, presence of children in the household, and religious affiliation. At the micro-level (personal/family), respondents who were not married at Time-One (age 22) had a mean alcohol consumption of 12.26 (sd=21.27) drinks, double the Time-One (age 22) mean of 6.00 (sd=11.64) drinks for those who were married, with a spouse present ($p \leq 0.01$). The Time-Two (age 27) mean of 11.97 (sd=23.93) drinks for the unmarried respondents was slightly higher than the corresponding Time-One (age 22) mean and was significantly ($p \leq 0.01$) higher than the Time-Two (age 27) mean, 4.73 (sd=9.07) drinks, for married respondents.

The presence of children in the household also affected the level of adult drinking at both time periods, as shown in Table 5. Time-One (age 22) respondents, who did not have children in the household, reported drinking 12.25 (sd=19.65) drinks

Table 5. Means and standard deviations for family and personal influences on total consumption (total number of drinks consumed during previous month), Time-One (age 22) and Time-Two (age 27).

	Time-One (Age 22)	Time-Two (Age 27)
	Mean	**Mean**
Not Married	12.26 (sd=21.27) (n=646)	11.97 (sd=23.39) (n=486)
Married	6.00*** (sd=11.638) (n=357)	4.73*** (sd=9.07) (n=517)
No Children Present in Household	12.25 (sd=19.65) (n=588)	10.94 (sd=19.53) (n=408)
One or More Children Present in Household	6.89*** (sd=16.70) (n=415)	6.39*** (sd=16.44) (n=595)
Liberal Religious Affiliation	12.20 (sd=20.70) (n=484)	8.46 (sd=14.19) (n=484)
Conservative Religious Affiliation	8.01*** (sd=16.31) (n=519)	8.03 (sd=20.76) (n=519)

* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$

Significance computed for each time period separately, not across time. For example the married Time-One (age 22) respondents had a significantly higher mean total consumption than those who were not married at Time-One (age 22) .

on average, while those with one or more children present averaged only slightly half that amount, 6.89 (sd=16.70) drinks, a significantly ($p \leq 0.01$) lower amount.

Adolescent affiliation with a conservative (with respect to alcohol) religious organization also was significantly related to the total number of drinks consumed, at Time-One (age 22). Respondents who identified an adolescent affiliation with such an organization reported consuming, on average, 8.01 (sd=16.31) drinks during the previous month. This was significantly ($p \leq 0.01$) less than those with a more liberal background, who averaged 12.20 (sd=20.70) drinks. However, by Time-Two (age 27), this adolescent religious affiliation was no longer significantly related to the number of drinks consumed.

The incidence of heavy drinking was also related to the variables in the personal/family domain. Unmarried respondents had a slightly higher incidence of heavy drinking than married respondents, as shown in Table 6. This table presents the means and standard deviations for the incidence of heavy drinking by the categories of marital status, presence of children in the household, and an adolescent affiliation with a liberal or conservative religious organization (with respect to alcohol). On average, the unmarried women in Time-One (age 22) drank heavily (6 or more drinks at one time) 0.68 (sd=1.31) times, while the Time-One (age 22) married respondents averaged only 0.43 (sd=0.98) times ($p \leq 0.01$). This pattern was even stronger in Time-Two (age 27), with the married individuals averaging 0.70 (sd=1.28) episodes of heavy drinking compared ($p \leq 0.01$) to the unmarried who averaged only 0.30 (sd=0.79).

Children in the household were also significantly related to a lower incidence of heavy drinking, at both Time-One (age 22) and Time-Two (age 27). Respondents with

Table 6. Means and standard deviations for family and personal influences on incidence of heavy drinking (number of times consumed 6 or more drinks at one time), Time-One (age 22) and Time-Two (age 27).

	Time-One (Age 22)	**Time-Two (Age 27)**
	Mean	**Mean**
Not Married	0.68 (sd=1.31) (n=646)	0.70 (sd=1.28) (n=486)
Married	0.43*** (sd=0.98) (n=357)	0.30*** (sd=0.79) (n=517)
No Children Present in Household	0.68 (sd=1.27) (n=588)	0.59 (sd=1.17) (n=408)
One or More Children Present in Household	0.48** (sd=1.12) (n=415)	0.43* (sd=0.99) (n=595)
Liberal Religious Affiliation	0.070 (sd=1.29) (n=484)	0.54 (sd=1.02) (n=484)
Conservative Religious Affiliation	0.50** (sd=1.23) (n=519)	0.45 (sd=1.11) (n=519)

* $p \leq 0.05$
** $p \leq 0.01$
*** $p \leq 0.001$

Significance computed for each time period separately, not across time. For example the married Time-One (age 22) respondents had a significantly higher mean incidence of heavy drinking than those who were not married at Time-One (age 22) .

children reported a mean incidence of heavy drinking of 0.48 (sd=1.12), significantly ($p \leq 0.01$) less than the mean of those with no children present, 0.68 (sd=1.27). The mean incidence of heavy drinking at Time-Two (age 27) was also significantly less ($p \leq 0.05$) for those with children present, 0.43 (sd=0.99) than those with no children, 0.59 (sd=1.17).

A conservative religious affiliation was also related to a lower mean incidence of heavy drinking at Time-One (age 22) but not at Time-Two (age 27). The mean incidence of heavy drinking for those respondents who were affiliated as adolescents with a religious organization that proscribed the use of alcohol was 0.05 (sd=1.23), significantly ($p \leq 0.01$) less than the mean for those with a more liberal background.

Table 7 reports consumption patterns only for those respondents who reported having a parent who abused alcohol (family transmission of alcoholism). Mean alcohol consumption and the incidence of heavy drinking for those respondents with a family history of alcohol abuse (n=268) is presented for both Time-One (age 22) and Time-Two (age 27) in this table. Alcoholic fathers were reported by 21.8% of these young women (n=219) but only 4.9% (n=49) had mothers who were problem drinkers. At age 22 (Time-One) those with a maternal history of alcohol abuse drank, on average, 20.06 (sd=33.98) drinks per month while those who reported their father had an alcohol problem had a mean alcohol consumption of 13.53 (sd=25.70) drinks. Drinking decreased by age 27 (Time-Two) for all of these individuals. In Time-Two (age 27) those with a maternal history of alcohol problems reported drinking an average of 12.55 (sd=20.36) drinks a month while those with paternal alcohol problems averaged 11.08 (sd=23.97) drinks per month. This decrease in consumption was also reflected in number of times these individuals reported drinking 6 or more drinks at one time.

Table 7. Total consumption and incidence of heavy drinking by history of parental alcoholism, Time-One (age 22) and Time-Two (age 27).

	Time-One (Age 22)	Time-Two (Age 27)
	Mean	**Mean**
Total Number of Drinks Consumed During Previous Month		
Maternal History of Alcoholism	20.06 (sd=33.98) (n=49)	12.55 (sd=20.36) (n=49)
Paternal History of Alcoholism	13.53 (sd=25.70) (n=219)	11.08 (sd=23.97) (n=219)
Incidence of Heavy Drinking (6 Or More Drinks At One Time)		
Maternal History of Alcoholism	1.00 (sd=1.72) (n=49)	0.79 (sd=1.22) (n=49)
Paternal History of Alcoholism	0.80 (sd=1.47) (n=219)	0.58 (sd=1.17) (n=219)

Means for the incidence of heavy drinking (6 or more drinks at one time) are also reported in Table 7. At Time-One (age 22) those with alcoholic mothers averaged 1.00 (sd=1.72) incidences of heavy drinking. The women who reported having an alcoholic father had a mean of 0.80 (sd=1.47) incidences of heavy drinking at Time-One (age 22). The mean for the incidence of heavy drinking decreased to 0.79 (sd=1.22) at Time-Two (age 27) for those with alcoholic mothers and 0.58 (sd=1.17) for respondents with alcoholic fathers.

Parental alcoholism was related to higher levels of consumption for our respondents at both Time-One (age 22) and Time-Two (age 27). Although only 4.9% (n=49) reported their mothers had alcohol problems, the Time-One (age 22) mean consumption for these respondents, as reported previously (Table 7), was 20.06 (sd=33.98) drinks for the month. An examination of the distribution for this variable revealed that this high figure may, at least in part, be attributed to a small number of cases who reported very high levels of consumption. At Time-One (age 22), 16.0% (n=8) of these 49 respondents had consumed more than 30 drinks during the previous month. Three individuals reported consuming 100 or more drinks in that period of time. By Time-Two (age 27), the percent of heavy drinkers (more than 30 drinks in the previous month) among these 49 women had dropped to 10.1% (n=5). In addition, only one individual reported having consumed in excess of 100 drinks in Time-Two (age 27). The number of respondents with a history of maternal alcohol abuse who reported abstaining from alcohol also rose dramatically between Time-One (age 22) and Time-Two (age 27). Abstainers accounted for 26.5% (n=13) of these cases in Time-One (age 22), while in Time-Two (age 27) abstainers were 40.8% (n=20) of the 49 women with alcoholic mothers.

Results

The literature on alcohol consumption suggested that a variety of factors influenced levels of drinking. This study explored alcohol consumption as a behavior that included both the total amount consumed and frequency of heavy drinking. The analysis was done in three phases. First, the correlations among the macro- and micro-level variables were explored. Next, the effects of the independent variables on the number of drinks consumed in a month and incidence of heavy drinking were examined in separate cross-sectional regression analyses. Finally, both dimensions of alcohol use, number of drinks consumed and incidence of heavy drinking, were conceptualized as two latent constructs, Time-One (age 22) and Time-Two (age 27) alcohol use. These were analyzed using a longitudinal structural equation model.

The independent variables in this study were conceptualized in the following domains: State availability of alcohol (macro-level), county political economic indicators (macro-level), family transmission of alcohol problems (micro-level), and personal/family influences (micro-level). The first step in the analysis was to examine the correlations among these variables. In order to present them in a simple and clear manner, the correlations among the macro-levels are presented separately in Table 8 (state-level) and Table 9 (county-level). Tables 10 through 13 present the correlations of the macro- and micro-level variables with the dependent variables, number of drinks consumed during the previous month and incidence of heavy drinking (6 or more drinks consumed at one time).

The first step in the analysis was to make comparisons among the states included in this study. Correlations were computed using the macro-level variables for each state at both Time-One (1983/1984) and Time-Two (1988/1989). As previously

stated, for these comparisons, each state was represented only once in each time period, regardless of the number of respondents in residence. Table 8 shows the Time-One (1983/1984) number of drinking places and the Time-One (1983/1984) index of restrictions on sales of distilled spirits were not significantly correlated. In addition, the number of drinking places per 1,000 population was not correlated with the per capita consumption of alcohol at this time.

At Time-Two (1988/1989), also reported in Table 8, neither the relationship between the state restrictions on sales of distilled spirits and per capita consumption of alcohol nor the relationship between the number of drinking places per 1,000 population and per capita consumption of alcohol was statistically significant, at the .05 level. This indicated that restricting the sale of distilled spirits was not related to lower per capita alcohol consumption rates in Time-One (1983/1984). Although the literature suggested there was a relationship between the state control of distilled spirits and per capita consumption, these data did not support that assumption at the macro-level. There does not appear to be a significant relationship between state efforts to restrict access to distilled beverages and overall alcohol use.

The next step in the analysis was to examine the correlations among the county-level variables. These correlations were computed for the 354 Time-One (1983/1984) and 372 Time-Two (1988/1989) counties included in the study. Each county was represented only once at each time period regardless of the number of respondents in residence. Correlations are reported in Table 9. Three county level economic indicators were included in this analysis - county per capita income (adjusted for inflation), unemployment rate, and whether the county was urban or rural by census definition. Per capita income and unemployment rate were continuous variables.

Table 8. Correlations of restrictions on the sale of spirits, number of drinking places, and the state per capita consumption of alcohol, Time-One (1983/1984) and Time-Two (1988/1989).*

	Time-One (1983/1984) (n=44)		
	Index of Restrictions on Sales of Spirits	Number of Drinking Places Per 1,000 Pop.	State Per Capita Consumption of Alcohol
Index of Restrictions on Sales of Spirits	1.000		
Number of Drinking Places Per 1,000 Pop.	0.176 (p=0.252)	1.000	
State Per Capita Consumption of Alcohol	0.252 (p=0.099)	0.127 (p=0.411)	1.000
	Time-Two (1988/1989) (n=46)		
	Index of Restrictions on Sales of Spirits	Number of Drinking Places Per 1,000 Pop.	State Per Capita Consumption of Alcohol
Index of Restrictions on Sales of Spirits	1.000		
Number of Drinking Places Per 1,000 Pop.	0.283 (p=0.057)	1.000	
Per Capita Consumption of Alcohol	0.282 (p=0.058)	0.099 (p=0.514)	1.000

* State level variables represent only those states with respondents living in them at Time-One (1983/1984) or Time-Two (1988/1989). Each state is represented only once, regardless of the number or respondents in residence.

Table 9. Correlations of county-level per capita income, unemployment rate, and urban/rural designation, Time-One (1983/1984) and Time-Two (1988/1989).*

	Time-One (1983/1984) (n=354)		
	Per Capita Income	Unemployment Rate	Urban/Rural
Per Capita Income	1.000		
Unemployment Rate	-0.461 (0.001)	1.000	
Urban/Rural	0.452 (0.001)	-0.236 (0.001)	1.000

	Time-Two (1988/1989) (n=372)		
	Per Capita Income	Unemployment Rate	Urban/Rural
Per Capita Income	1.000		
Unemployment Rate	-0.533 (0.001)	1.000	
Urban/Rural	0.340 (0.001)	-0.181 (0.001)	1.000

* Only counties that had respondents living in them at either Time-One (1983/1984) or Time-Two (1988/1989) are included. Each county is represented only once regardless of the number of respondents in residence.

Urban/rural designation was a dichotomous variable that was coded 0 for rural and 1 for urban. These variables were measured at both Time-One (1983/1984) and Time-Two (1988/1989) for each county.

At Time-One (1983/1984), there was a negative correlation between county per capita income and the county unemployment rate ($r = -0.461$, $p \leq 0.01$). It was not surprising to find that high unemployment rates were related to low per capita incomes, since income is usually dependent on employment. Urban/rural designation was also correlated ($r = 0.452$, $p \leq 0.01$) with per capita income. Urban counties tended to have higher per capita incomes than rural counties. In addition, the Time-One (1983/1984) correlation between urban classification and the unemployment rate ($r = -0.236$, $p \leq 0.01$) was significant. Urban counties had lower rates of unemployment.

Table 9 also shows that the Time-Two (1988/1989) correlation between per capita income and unemployment rate was significant ($r = -0.533$, $p \leq 0.01$). These correlations confirmed that when the unemployment rate for a county was high, the per capita income was low, at both Time-One (1983/1984) and Time-Two (1988/1989). At Time-Two (1988/1989), urban/rural status was also significantly correlated with county per capita income ($r = 0.340$, $p \leq 0.01$) and the county unemployment rate ($r = -0.181$, $p \leq 0.01$). Overall, these correlations showed that the urban counties had lower rates of unemployment and correspondingly higher per capita incomes than the rural counties.

After examining the correlations within each of the macro-level domains, the next step in the analysis was to examine the correlations of the macro-level domains, state-level availability and county-level political economy, with the dependent

variables, number of drinks consumed and incidence of heavy drinking. Although the macro-level variables appeared to relate to each other in a logical pattern, they did not consistently correlate with the two micro-level, dependent variables - number of drinks consumed and incidence of heavy drinking. Table 10 shows that neither the number of drinks consumed nor the incidence of heavy drinking by these respondents was significantly related to the index of state controls on sales of distilled spirits at Time-One (1983/1984). However, the number of drinking places per 1,000 population was significantly correlated with both the total number of drinks consumed ($r = 0.109$, $p \leq 0.01$) and the incidence of heavy drinking ($r = 0.107$, $p \leq 0.01$). State per capita consumption was not related to total number of drinks consumed at Time-One (age 22) nor with the incidence of heavy drinking. Living in an area of high alcohol consumption did not appear to be related to higher levels of personal consumption for our respondents, according to these correlations.

Table 11, which summarizes the correlations among the state-level variables and the dependent variables for Time-Two (1988/1989), shows that most of the macro-level variables were not significantly related to either the number of drinks consumed or the incidence of heavy drinking with one exception. The number of drinking places per 1,000 population was significantly related to the incidence of heavy drinking ($r = 0.083$, $p \leq 0.01$), at Time-Two (1988/1989).

Contrary to macro-level trends which showed that state per capita consumption of alcohol was not related to the number of drinking places per 1,000 population (shown previously in Table 8), the number of drinks consumed by these young women did appear to be influenced by the number of drinking places, in Time-One (1983/1984). Those who lived in areas with a high density of bars and taverns

Table 10. Correlations of macro-level (state-level) availability variables with micro-level (personal-level) alcohol consumption variables, Time-One (1983/1984).

	Time-One (1983/1984) (n=1003)	
	Number of Drinks Consumed	Incidence of Heavy Drinking (6 or More Drinks At One Time)
Number of Drinks Consumed	1.000	
Incidence of Heavy Drinking (6 or More Drinks At One Time)	0.745 (p=0.001)	1.000
Index of Restrictions on Sales of Spirits	0.042 (p=0.165)	0.018 (p=0.567)
Number of Drinking Places Per 1,000 Population	0.109 (p=0.001)	0.107 (p=0.001)
State Per Capita Consumption (Gallons of Absolute Alcohol)	0.051 (p=0.110)	0.033 (p=0.298)

Table 11. Correlations of macro-level (state-level) availability variables with micro-level (personal-level) alcohol consumption variables, Time-Two (1988/1989).

	Time-Two (1988/1989) (n=1003)	
	Number of Drinks Consumed	Incidence of Heavy Drinking (6 or More Drinks At One Time)
Number of Drinks Consumed	1.000	
Incidence of Heavy Drinking (6 or More Drinks At One Time)	0.671 (p=0.001)	1.000
Index of Restrictions on Sales of Spirits	0.018 (p=0.560)	0.038 (p=0.235)
Number of Drinking Places Per 1,000 Population	0.048 (p=0.131)	0.083 (p=0.009)
State Per Capita Consumption (Gallons Absolute Alcohol)	0.026 (p=0.417)	0.005 (p=0.868)

consumed more drinks and had a higher incidence of heavy drinking. However, the number of drinks consumed by the young women in our sample appeared to have been relatively uninfluenced by the level of state control of distilled spirits, at either age 22 (Time-One) or age 27 (Time-Two). This suggests that the state control of distilled spirits does not have much influence on drinking levels of young women, but limiting the number of drinking places could help reduce their alcohol consumption and incidence of heavy drinking.

The correlations among the county-level political economic indicators and the dependent variables, number of drinks consumed and incidence of heavy drinking, suggested that some changes may have taken place between Time-One (1983/1984), when these respondents were age 22, and Time-Two (1988/1989), when they were age 27. As Table 12 indicates, the Time-One (1983/1984) number of drinks consumed was marginally related to both county per capita income ($r = 0.069$, $p \leq 0.03$) and the county unemployment rate ($r = -0.063$, $p \leq 0.05$). In addition, living in an urban county was weakly, positively related to both the number of drinks consumed ($r = 0.065$, $p \leq 0.04$) and to the incidence of heavy drinking ($r = 0.045$, $p \leq 0.02$). These correlations indicated that respondents, who lived in urban areas where the per capita income was high and the unemployment rate was low, drank more and were more apt to drink heavily. By Time-Two (1988/1989), when these individuals were 27 years old, county per capita income, county unemployment rate, and living in an urban county were no longer significantly related to either the total number of drinks they consumed or how often they drank heavily. None of these variables were significantly correlated with either number of drinks consumed or the incidence of heavy drinking.

Table 12. Correlations of county-level political economic indicators with dependent variables, number of drinks consumed and incidence of heavy drinking, Time-One (1983/1984) and Time-Two (1988/1989).

	Time-One (1983/1984) (n=1003)	
	Number of Drinks Consumed	Incidence of Heavy Drinking
Number of Drinks Consumed	1.000	
Incidence of Heavy Drinking	0.745 (p=0.001)	1.000
County Per Capita Income (adjusted for inflation)	0.069 (p=0.030)	0.014 (p=0.669)
County Unemployment Rate	-0.063 (p=0.048)	-0.019 (p=0.551)
Urban County	0.065 (p=0.041)	0.045 (p=0.016)
	Time-Two (1988/1989) (n=1003)	
	Number of Drinks Consumed	Incidence of Heavy Drinking
Number of Drinks Consumed	1.000	
Incidence of Heavy Drinking	0.671 (p=0.001)	1.000
County Per Capita Income (adjusted for inflation)	0.022 (p=0.479)	-0.010 (p=0.757)
County Unemployment Rate	-0.019 (p=0.538)	0.011 (p=0.737)
Urban County	0.0579 (p=0.067)	0.037 (p=0.242)

This study also examined the relationship of the personal/family variables to the amount of alcohol consumed. First, the family transmission of alcoholism was explored. The literature identified heavy consumption of alcohol as a problem that may be passed from parents to children. Although it is debatable whether the nature of this transmission is biological (genetic) or social, it is widely accepted that alcoholism is a familial trait. Table 7, which was discussed previously, indicated that those respondents who reported a history of parental alcohol abuse drank more, on average, and had a higher average incidence of heavy drinking (6 or more drinks at one time) than those who did not have an alcoholic parent.

The correlations among the dependent variables, number of drinks consumed and incidence of heavy drinking, and the independent variables, mother's alcoholism and father's alcoholism, are shown in Table 13. Mother's alcohol problems and the number of drinks consumed by the respondent were significantly related ($r = 0.122$, $p \leq 0.01$) in Time-One (age 22). Father's alcohol problems were also weakly related to respondent's number of drinks consumed ($r = 0.099$, $p \leq 0.01$), at Time-One (age 22). The incidence of heavy drinking by these respondents was marginally correlated to a maternal history of alcoholism ($r = 0.076$, $p \leq 0.02$), at Time-One (age 22) and Time-One (age 22) paternal alcoholism ($r = 0.091$, $p \leq 0.01$). By Time-Two (age 27), mother's alcohol problems were no longer significantly correlated to the number of drinks these young women consumed, although it was still related to their incidence of heavy drinking ($r = 0.064$, $p \leq 0.04$). However, the Time-Two (age 27) number of drinks was still significantly correlated with paternal alcoholism ($r = 0.084$, $p \leq 0.01$).

Table 13. Correlations among micro-level (personal-level) indicators of family alcohol problems and the dependent variables, number of drinks consumed and incidence of heavy drinking, Time-One (1983/1984) and Time-Two (1988/1989).

	Time-One (Age 22) (n=1003)			
	Number of Drinks Consumed	Incidence of Heavy Drinking	Mother's Alcoholism	Father's Alcoholism
Number of Drinks Consumed	1.000			
Incidence of Heavy Drinking	0.745 (p=0.001)	1.000		
Mother's Alcoholism	0.122 (p=0.001)	0.076 (p=0.017)	1.000	
Father's Alcoholism	0.099 (p=0.002)	0.091 (p=0.004)	0.082 (p=0.010)	1.000
	Time-Two (Age 27) (n=1003)			
	Number of Drinks Consumed	Incidence of Heavy Drinking	Mother's Alcoholism	Father's Alcoholism
Number of Drinks Consumed	1.000			
Incidence of Heavy Drinking	0.671 (p=0.001)	1.000		
Mother's Alcoholism	0.055 (p=0.084)	0.064 (p=0.043)	1.000	
Father's Alcoholism	0.084 (p=0.008)	0.043 (p=0.177)	0.082 (p=0.010)	1.000

Although it is apparent from these data that heavy parental drinking, by either parent, is weakly related to both the number of drinks consumed and the incidence of heavy drinking, this influence tends to decrease over time. It is especially interesting that nearly all of the respondents who reported maternal alcoholism and high personal levels of alcohol consumption during Time-One (1983/1984), when they were 22 years old, had reduced their consumption to more modest levels by Time-Two (1988/1989), when they were 27 years old. This suggested that drinking behavior was related to social factors, such as conditions in the family of origin or modeling by the drinking parent, that may diminish as the individual matures.

Tables 14 and 15, which present the correlations among the micro-level personal/familial variables, provide some further support for this speculation. Nearly all of the variables in the personal/family domain were significantly correlated with the number of drinks consumed and the incidence of heavy drinking at both time periods. Table 14 summarizes the correlations among the micro-level variables at Time-One (age 22). As this table shows, Time-One (age 22), marital status was negatively correlated with the number of drinks consumed ($r = -0.161$, $p \leq 0.01$) and was also significantly negatively related to the incidence of heavy drinking ($r = -0.098$, $p \leq 0.01$). The presence of children in the household was significantly correlated with total consumption ($r = -0.131$, $p \leq 0.01$) at Time-One (age 22) and was also related to the Time-One (age 22) incidence of heavy drinking ($r = -0.087$, $p \leq 0.01$). Educational level was not significantly related to the number of drinks consumed at Time-One (age 22), however it was significantly related to the Time-One (age 22) incidence of heavy drinking ($r = -0.102$, $p \leq 0.01$). Affiliation with a religious organization that disapproved of the use of alcohol was also significantly related to both Time-One (age 22) number

Table 14. Correlations among micro-level personal/family variables and the dependent variables, number of drinks consumed and incidence of heavy drinking, Time-One (age 22).

	Time-One (Age 22) (n=1003)					
	Number of Drinks Consum-ed	Incidence of Heavy Drinking	Marital Status	Presence of Children	Education	Religious Affiliation
Number of Drinks Consum-ed	1.000					
Incidence of Heavy Drinking	0.745 (p=0.001)	1.000				
Marital Status	-0.161 (p=0.001)	-0.098 (p=0.002)	1.000			
Presence of Children	-0.131 (p=0.001)	-0.087 (p=0.006)	0.131 (p=0.001)	1.000		
Education	-0.015 (p=0.640)	-0.102 (p=0.001)	-0.153 (p=0.001)	-0.426 (p=0.001)	1.000	
Religious Affiliation	-0.112 (p=0.001)	-0.080 (p=0.011)	-0.031 (p=0.322)	0.040 (p=0.210)	0.010 (p=0.766)	1.000

of drinks consumed ($r = -0.112$, $p \leq 0.01$) and Time-One (age 22) incidence of heavy drinking ($r = -0.080$, $p \leq 0.01$).

Table 15 reports the correlations among the micro-level variables and the dependent variables number of drinks consumed and incidence of heavy drinking, at Time-Two (age 27). The table shows a significant relationship between being married and the number of drinks consumed ($r = -0.202$, $p \leq 0.01$), at age 27 (Time-Two). The influence of children in the household at Time-Two (age 27) on these respondent's number of drinks consumed ($r = -0.111$, $p \leq 0.01$) was also significant ($r = -0.131$, $p \leq 0.01$). Education was not significantly related to the number of drinks consumed but was related to the incidence of heavy drinking ($r = -0.137$, $p \leq 0.01$), at Time-Two (age 27). Those with the fewest years of education still tended to report a greater incidence of heavy drinking. By Time-Two (age 27) the influence of an adolescent affiliation with a religion that disapproved of alcohol was not significantly related to either total amount consumed or the incidence of heavy drinking.

Regression Analysis

The four dependent variables, number of drinks consumed at age 22, incidence of heavy drinking at age 22, number of drinks consumed at age 27, and incidence of heavy drinking at age 27 were each regressed separately on the independent variables. All four of the regression models were statistically significant ($p \leq 0.01$).

Table 15. Correlations among micro-level personal/family variables and the dependent variables, number of drinks consumed and incidence of heavy drinking, Time-Two (age 27).

	Time-Two (Age 27) (n=1003)					
	Number of Drinks Consum-ed	Incidence of Heavy Drinking	Marital Status	Presence of Children	Education	Religious Affiliation
Number of Drinks Consum-ed	1.000					
Incidence of Heavy Drinking	0.671 (p=0.001)	1.000				
Marital Status	-0.202 (p=0.001)	-0.187 (p=0.001)	1.000			
Presence of Children	-0.111 (p=0.001)	-0.058 (p=0.066)	0.193 (p=0.001)	1.000		
Education	-0.030 (p=0.349)	-0.137 (p=0.001)	-0.020 (p=0.524)	-0.396 (p=0.001)	1.000	
Religious Affiliation	-0.012 (p=0.704)	-0.039 (p=0.213)	-0.078 (p=0.014)	0.035 (p=0.274)	0.016 (p=0.618)	1.000

Time-One (Age 22)

The first two regression analyses examined the influence of the Time-One (age 22) variables on the two dependent variables, number of drinks consumed and incidence of heavy drinking.

Total Alcohol Consumption

Table 16 summarizes the results of estimating the first regression equation. For this analysis, the dependent variable, number of drinks consumed at Time-One (age 22) was regressed on the Time-One (age 22) independent variables in the four domains, availability of alcohol, political economic indicators, family transmission of alcohol problems, and personal/family influences. The table shows that at age 22 (Time-One) respondent's number of drinks consumed was most strongly influenced by the variables in the family transmission of alcohol problems and personal/family domains. Neither the availability of alcohol nor the local political economy appeared to have had much influence on the number of drinks they consumed.

Within the availability of alcohol domain, only the number of drinking places per 1,000 population was significantly related to number of drinks consumed ($\beta = 0.099$, $p \leq 0.01$), at Time-One (age 22). This suggested that, since drinking is often a social activity, access to a variety of drinking places may have encouraged heavier drinking by these young women. State restrictions on the sale of distilled spirits (number of liquor stores, grocery store sales allowed, billboard advertising allowed, state monopoly) did not have an influence on their Time-One (age 22) number of drinks consumed. In addition, per capita consumption of alcohol did not have a significant influence on the drinking behavior of the women at age 22 (Time-One).

Table 16. Results of regression analysis for number of drinks consumed, Time-One (age 22).

Domain	Variables	DF	Parameter Estimate (B)	Standardized Estimate (β)	Standard Error	t-ratio	Prob
Availability of Alcohol	Restrictions on Sales of Spirits	1	-0.289	-0.021	0.476	-0.608	0.544
	Number of Drinking Places	1	12.012	0.099	4.057	2.961	0.003
	Per Capita Con. of Alcohol	1	0.440	0.013	1.084	0.406	0.685
Political Economic Indicators	Per Capita Income	1	-0.000	-0.029	0.000	-0.717	0.473
	Unemploy-ment Rate	1	-0.336	-0.064	0.188	-1.787	0.074
	Urban County	1	1.527	0.034	1.595	0.957	0.339
Family Alcohol Problems	Alc. Mother	1	9.631	0.111	2.659	3.622	0.000
	Alc. Father	1	3.551	0.078	1.385	2.564	0.011
Personal/ Family Influences	Marital Status	1	-5.677	-0.146	1.254	-4.528	0.000
	Presence of Children	1	-4.962	-0.131	1.327	-3.740	0.000
	Education	1	-0.927	-0.101	0.318	-2.912	0.004
	Adolescent Religious Affiliation	1	-2.460	-0.066	1.228	-2.004	0.045
	Intercept	1	26.570	0.000	6.184	4.297	0.000

$F_{(12, 990)} = 7.838$, ($p \leq 0.000$), $R^2 = 0.087$

Although local economic conditions and living in an urban county were correlated with the number of drinks consumed, at Time-One (1983/1984), the regression analysis demonstrated that these factors did not have a significant independent effect on the number of drinks consumed, at age 22 (Time-One). None of the variables in this domain were statistically significant in the regression model.

The family transmission of alcohol abuse is an important issue in alcohol research. This regression model supported the hypothesis that having a parent who abused alcohol was related to higher levels of alcohol consumption. It was apparent from this model that a mother with an alcohol problem influenced respondent's drinking levels, at age 22 (Time-One), even more than an alcoholic father. Because these were dichotomous variables, coded 0 if the parent was not an alcoholic and 1 if the parent had an alcohol problem, the interpretation of these coefficients was fairly uncomplicated. The predicted number of drinks consumed per month for those with alcoholic mothers was 9.63 drinks higher than those who did not have a mother with a drinking problem. Having an alcoholic father increased predicted drinking levels by 3.55 drinks over the number of drinks consumed by those with no reported history of paternal alcohol abuse.

All of the variables in the personal/family domain were significantly related to alcohol consumption for our respondents. This included marital status, the presence of children in the household, educational level, and adolescent religious affiliation. Those who were not married consumed 5.68 drinks more per month than the married respondents. The presence of children in the household was coded 0 if no children were present and 1 if the respondent reported one or more of her children resided in the household. The presence of children reduced the predicted number of drinks

consumed by 4.96 drinks. Respondent's educational level was also significant. Each additional year of education reduced predicted number of drinks consumed by 0.93 drinks. This regression model indicated that adolescent affiliation with a religious organization that proscribed the use of alcohol also was a significant predictor of lower levels of adult alcohol consumption. Such members drank 2.46 fewer drinks per month.

The regression model tested the independent effect of these variables on the number of drinks consumed. It is important to note that these effects are additive. For example, at age 22, a married woman who had children present in the household would be predicted to consume 10.66 drinks less than one who was not married and did not have children present.

Incidence of Heavy Drinking

The results of estimating the second regression equation are presented in Table 17. This equation regressed the Time-One (age 22) dependent variable, incidence of heavy drinking (number of times consumed 6 or more drinks at one time) on the same set of Time-One (age 22), independent variables. The number of drinking places per 1,000 population ($\beta = 0.119$, $p \leq 0.01$) was the only component in the availability of alcohol domain that significantly predicted the Time-One (age 22) incidence of heavy drinking, for our respondents. This was consistent with the number of drinks consumed at Time-One (age 22). It appeared, from these data, that having a variety of drinking places available did tend to encourage these young women both to consume more alcohol and to drink heavily more often. Their frequency of heavy

Table 17. Results of regression analysis for incidence of heavy drinking, Time-One (age 22).

Domain	Variables	DF	Parameter Estimate (B)	Standardized Estimate (β)	Standard Error	t-ratio	Prob
Availability of Alcohol	Restrictions on Sales of Spirits	1	-0.032	-0.035	0.031	-1.016	0.310
	Number of Drinking Places	1	0.942	0.119	0.266	3.542	0.000
	Per Capita Con. of Alcohol	1	0.020	0.009	0.071	0.282	0.778
Political Economic Indicators	Per Capita Income	1	-0.000	-0.063	0.000	-1.550	0.121
	Unemploy-ment Rate	1	-0.018	-0.053	0.012	-1.473	0.141
	Urban County	1	0.142	0.049	0.105	1.365	0.172
Family Alcohol Problems	Alc. Mother	1	0.344	0.061	0.174	1.974	0.049
	Alc. Father	1	0.203	0.069	0.091	2.238	0.255
Personal/ Family Influences	Marital Status	1	-0.265	-0.105	0.082	-3.219	0.001
	Presence of Children	1	-0.292	-0.119	0.087	-3.353	0.001
	Education	1	-0.106	-0.177	0.021	-5.060	0.000
	Adolescent Religious Affiliation	1	-0.094	-0.039	0.080	-1.173	0.241
	Intercept	1	2.294	0.000	0.405	5.661	0.000

$F_{(12, 990)} = 5.894$, ($p \leq 0.000$), $R^2 = 0.067$

drinking did not appear to be influenced by either state control of distilled spirits or per capita consumption levels in their respective states.

Table 17 also shows that Time-One (age 22) heavy drinking was not significantly influenced by the county economic indicators of per capita income, unemployment rate, or urban/rural designation.

Having an alcoholic mother also significantly predicted the frequency of heavy drinking for these young women. Because having an alcoholic mother was a dichotomous variable, coded 0 if the mother had no history of alcohol abuse and 1 if she was an alcoholic, this coefficient can be interpreted as follows: An alcoholic mother increased the predicted frequency of heavy drinking by the amount of the regression coefficient, 0.344 ($p \leq 0.05$). This scale ranged from a score of 0 for no episodes of heavy drinking, to a score of 6, for ten or more episodes of heavy drinking. Therefore, a respondent who had an alcoholic mother was predicted to score 0.34 higher on the incidence of heavy drinking scale than one who's mother did not have an alcohol problem. Those who reported their father had an alcohol problem were not significantly more apt to have had a higher incidence of heavy drinking themselves.

Within the personal/family domain, only adolescent religious affiliation was not significantly related to the incidence of heavy drinking. Marital status, presence of children in the household, and the respondent's educational level all significantly predicted heavy drinking, at Time-One (age 22). Married respondents were predicted to score 0.27 less on the incidence of heavy drinking scale. The presence of children in the household was coded 0 = none and 1 = one or more children present. Children in the household reduced the predicted frequency of heavy drinking by 0.29, on the

incidence of heavy drinking scale. Each year of education also significantly decreased the predicted incidence of heavy drinking by 0.11.

Time-Two (Age 27)

The next phase of this analysis examined the influence of the Time-Two (age 27) independent variables on the dependent variables number of drinks consumed and incidence of heavy drinking.

Total Alcohol Consumption

The next regression equation regressed the number of drinks consumed at Time-Two (age 27) on the Time-Two (age 27) independent variables in the four domains. The results of this analysis are reported in Table 18. Neither the availability of alcohol domain nor the county level economic indicators were significantly related to total consumption, by Time-Two (age 27). In the family transmission of alcohol problems, having an alcoholic mother was also not significantly related to total alcohol consumption, at Time-Two (age 27). Father's alcohol problems, however, still significantly predicted number of drinks consumed. Those with no history of paternal alcoholism were predicted to consume 2.93 fewer drinks than those with an alcoholic father. It is interesting to note, however, that the influence of both maternal and paternal alcoholism declined between Time-One (1983/1984), when these young women were 22 years old, and Time-Two (1988/1989), when they were 27 years old. Because this influence declined as these respondents aged, it is suggested that parental alcoholism was a social influence, perhaps transmitted by modeling, rather than a hereditary one. As individuals matured and were less influenced by their

Table 18. Results of regression analysis for number of drinks consumed, Time-Two (age 27).

Domain	Variables	DF	Parameter Estimate (B)	Standardized Estimate (β)	Standard Error	t-ratio	Prob
Availability of Alcohol	Restrictions On Sales of Spirits	1	-0.288	-0.019	0.546	-0.528	0.598
	Number of Drinking Places	1	7.004	0.051	4.433	1.580	0.114
	Per Capita Con. of Alcohol	1	0.634	0.011	2.074	0.306	0.760
Political Economic Indicators	Per Capita Income	1	-0.000	-0.0317	0.000	-0.764	0.445
	Unemploy-ment Rate	1	-0.119	-0.0184	0.238	-0.500	0.617
	Urban County	1	2.227	0.051	1.516	1.469	0.142
Family Alcohol Problems	Alc. Mother	1	3.743	0.045	2.581	1.450	0.147
	Alc. Father	1	2.925	0.068	1.346	2.173	0.030
Personal/ Family Influences	Marital Status	1	-6.147	-0.172	1.145	-5.388	0.000
	Presence of Children	1	-4.464	-0.123	1.264	-3.531	0.000
	Education	1	-0.616	-0.078	0.274	-2.252	0.025
	Adolescent Religious Affiliation	1	-0.084	-0.002	1.177	-0.072	0.943
	Intercept	1	20.392	0.000	6.121	3.331	0.001

$F_{(12, 990)} = 5.791$, ($p \leq 0.000$), $R^2 = 0.066$

childhood experiences, the influence of an alcoholic parent on drinking behavior lessened.

Marital status was a strong predictor of the number of drinks consumed, at Time-Two (age 27), as well as Time-One (age 22). In Time-Two (age 27), the predicted consumption for those who were married was 6.15 drinks less than for those who were not married. The presence of children in the household also remained a strong predictor of the number of drinks consumed at Time-Two (age 27), for our respondents. However, this influence lessened slightly between the two time periods. At Time-One (age 22), children in the household reduced the predicted number of drinks consumed for these young women by 4.96 drinks. By Time-Two (age 27), the presence of children reduced predicted consumption by 4.46 drinks. Time-Two (age 27), educational level was also a significant predictor of alcohol consumption. Each additional year of education reduced the predicted level of alcohol consumption by nearly two-thirds (0.62) of a drink. Adolescent religious affiliation was not a statistically significant predictor of total alcohol consumption, at Time-Two (age 27).

Incidence of Heavy Drinking

The factors that influenced the incidence of heavy drinking, at Time-Two (age 27) were examined in the final regression analysis. This equation regressed the incidence of heavy drinking at Time-Two (age 27) on the Time-Two (age 27) independent variables. The results of this analysis indicate that the factors influencing heavy drinking also changed somewhat between Time-One (age 22) and Time-Two (age 27). The results of this final regression analysis are presented in Table 19. The number of drinking places per 1,000 population remained a statistically significant

Table 19. Results of regression analysis for incidence of heavy drinking, Time-Two (age 27).

Domain	Variables	DF	Parameter Estimate (B)	Standardized Estimate (β)	Standard Error	t-ratio	Prob
Availability of Alcohol	Restrictions On Sales of Spirits	1	0.017	0.02	0.032	0.532	0.595
	Number of Drinking Places	1	0.709	0.086	0.264	2.689	0.007
	Per Capita Con. of Alcohol	1	-0.094	-0.028	0.123	-0.764	0.445
Political Economic Indicators	Per Capita Income	1	-0.000	-0.045	0	-1.103	0.270
	Unemploy-ment Rate	1	-0.007	-0.017	0.0141	-0.470	0.639
	Urban County	1	0.102	0.039	0.09	1.133	0.257
Family Alcohol Problems	Alc. Mother	1	0.242	0.049	0.153	1.577	0.115
	Alc. Father	1	0.042	0.016	0.080	0.519	0.604
Personal/ Family Influences	Marital Status	1	-0.360	-0.168	0.068	-5.286	0.000
	Presence of Children	1	-0.251	-0.115	0.075	-3.346	0.001
	Education	1	-0.087	-0.182	0.0163	-5.327	0.000
	Adolescent Religious Affiliation	1	-0.054	-0.025	0.07	-0.775	0.438
	Intercept	1	2.084	0	0.364	5.727	0.000

$F_{(12,990)} = 7.096$, $(p \leq 0.000)$, $R^2 = 0.079$

predictor of the frequency of heavy drinking. None of the other variables in either the availability of alcohol or the county economic indicators domains were significantly related to heavy drinking. This was consistent with Time-One (age 22). In addition, by Time-Two (age 27), having an alcoholic parent did not significantly predict the incidence of heavy drinking, although maternal alcoholism had been a statistically significant predictor in Time-One (age 22).

Marital status, which predicted heavy drinking in Time-One (age 22), was also a significant predictor in Time-Two (age 27). Married respondents were predicted to score 0.36 lower on the incidence of heavy drinking than those who were not married. The presence of children in the household also significantly predicted heavy drinking at Time-Two (age 27), although this influence decreased somewhat between Time-One (age 22) and Time-Two (age 27). At Time-One (age 22), children in the household decreased the frequency of episodes of heavy drinking by 0.29. By Time-Two (age 27), the presence of children decreased heavy drinking by 0.25, on the incidence of heavy drinking scale. Both Time-One (age 22) and Time-Two (age 27) were measured on the same scale with a range of from 0 equal no episodes of heavy drinking during the study month, to 6 equal ten or more episodes of drinking 6 or more drinks at one time. Each year of education also significantly predicted a decrease in the frequency of heavy drinking (0.09). Adolescent religious affiliation also did not significantly predict the frequency of heavy drinking at Time-Two (age 27).

Longitudinal Structural Equation Model

The final phase of this research was the development of a longitudinal structural equation model. Figure 1 illustrates the hypothesized structural equation

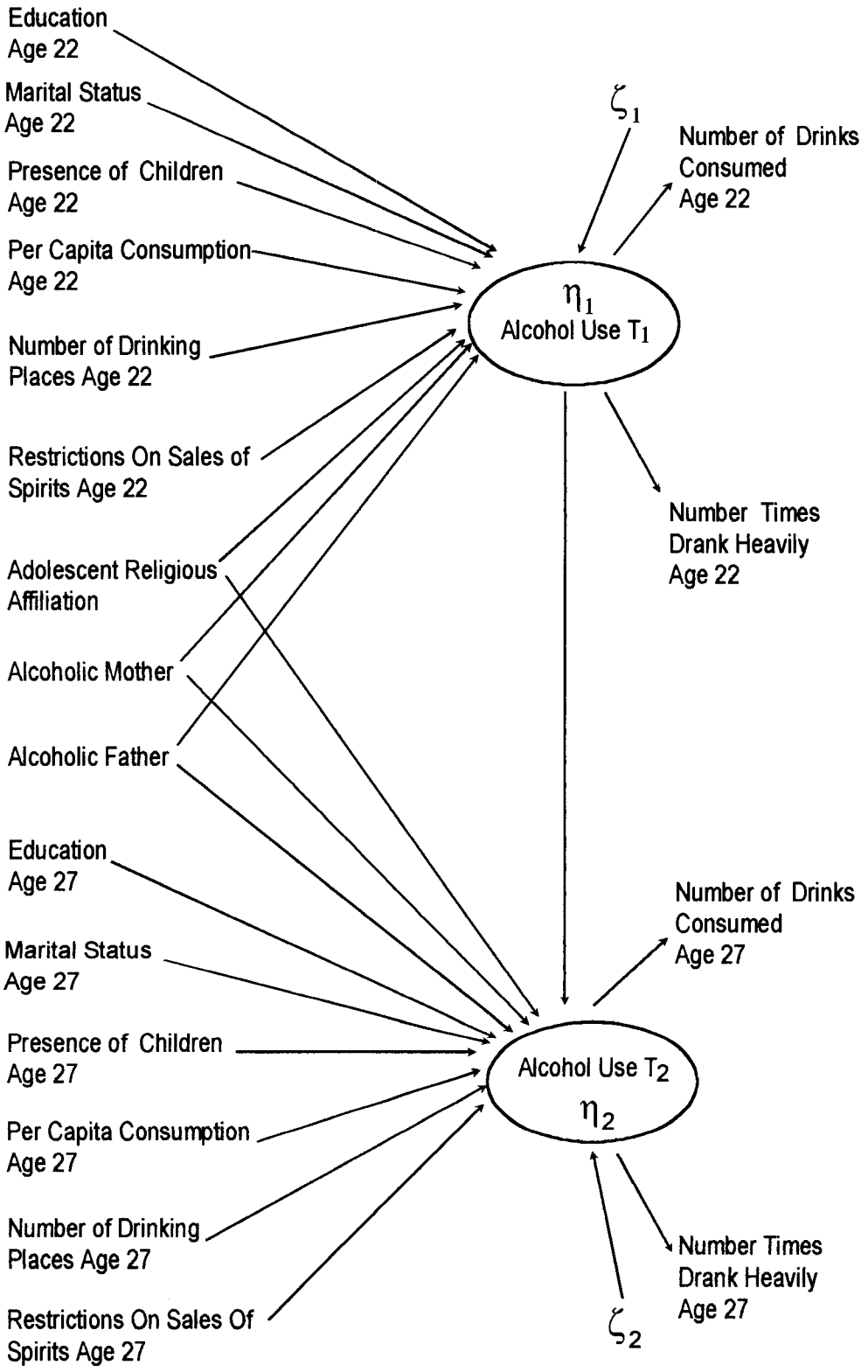


Figure 1. Longitudinal model of alcohol use by women at age 22 and age 27.

model of alcohol use. Alcohol use was conceptualized as two latent constructs: Time-One alcohol use (age 22) and Time-Two alcohol use (age 27). Each of these has two highly correlated indicators, the number of drinks consumed and the number of times drank heavily. Time-One (age 22) alcohol use was caused by education, marital status, presence of children, per capita consumption, number of drinking places, and the availability of alcohol. All these were measured for the women when they were age 22. Additionally, Time-One (age 22) alcohol use was caused by adolescent religious affiliation, mother's alcoholism, and father's alcoholism. Because these independent variables were single indicators, it was not possible to compute their respective error terms. Therefore, these error terms were arbitrarily set at 0 for this analysis. Part of the consumption at Time-Two (age 27) was explained by consumption at Time-One (age 22), since the women who drank a lot or little when they were age 22 were likely to be drinking a corresponding amount when they were age 27. Time-Two (age 27) alcohol use was also caused by the same variables described above except they were measured when the respondents were age 27 (education, marital status, presence of kids, per capita consumption, number of drinking places, and availability of alcohol). Adolescent religious affiliation, mother's alcoholism, and father's alcoholism were also included as predictors of drinking at age 27.

Measures of the political economy (unemployment rate, per capita income, and urban classification) were not included in the longitudinal structural equation model. The previous regression analysis showed that they did not have a significantly independent impact on the drinking behavior of young women.

Because alcohol use at Time-One (age 22) was included as a predictor of alcohol use at Time-Two (age 27), the effects of the other predictors of Time-Two (age

27) are actually measuring their ability to predict change in alcohol use. That is, they are predicting alcohol use at Time-Two (age 27) that is residualized on alcohol use at Time-One (age 22). Thus, this model seeks to estimate the stability of alcohol use and also to explain the change in alcohol use as women go from the age of 22 to the age of 27.

Many of the observed causal variables were dichotomous. According to Aish & Jöreskog (1990), it is more appropriate to analyze categorical variables using a matrix of polychoric correlations and weighted least squares (WLS). WLS has the added advantage of not being as dependent on multivariate normality as maximum likelihood estimation. Therefore, the model was analyzed using weighted least squares rather than maximum likelihood. This was done using LISREL 8 (Jöreskog and Sörbom, 1994) based on a matrix of coefficients produced by PRELIS 2 along with an estimated asymptotic variance-covariance matrix. This produced the least biased parameter estimates and the most accurate fit indices.

Estimation of the Initial Model

The initial model represented by Figure 1 was only moderately successful in fitting the data (χ^2 = 573.61, 43 df, $p < 0.001$). Chi-Square is sensitive to sample size (Jöreskog and Sörbom, 1994). The adjusted goodness of fit index (AGFI) = 0.99 depends less on sample size and should exceed 0.9 (Jöreskog and Sörbom, 1994). The comparative fit index is 1.0, its maximum, and is more appropriate for WLS because of its independence from estimation procedure (Tanaka, 1993). The standardized root mean square residual (RMSR) = 0.043. This should be under 0.05. The root mean square error of approximation (RMSEA) = 0.11. Jöreskog and Sörbom

(1994) recommend the root mean square error of approximation as an excellent fit index and state this should be less than 0.08. This last criterion is much more stringent than the criteria for the other indexes.

According to Aish and Jöreskog (1990), an exploratory model may be modified to better fit the data if there is a theoretically substantive reason to do so, the sign of the parameter is correct, and there is a clear explanation for the relaxed parameter. With these guidelines in mind, the model was modified to include a direct effect of marital status at age 22 (Time-One) to consumption at age 27 (Time-Two), correlation of the measurement error for number of drinks consumed at age 22 (Time-One) and age 27 (Time-Two) as well as a correlation of the measurement error for the number of times drank heavily at age 22 and age 27. There were large modification indexes for each of these parameters. The correlated errors are reasonable because the questions were worded similarly in one case and identically in the other case. The direct effect of marital status at Time-One (age 22) on alcohol use at Time-Two (age 27) needs further justification. While being married has been shown to reduce drinking, there is much evidence that early marriage has long term adverse effects (Otto, 1979). It is reasonable to argue that being married by the time you are age 22 may reduce your drinking compared to other 22 year olds who are not married. But, this early marriage may have the opposite long term effect. That is, the women who married early may have more problems in the latter 20s, including drinking, than the women who married later.

The model was then re-estimated ($\chi^2 = 346.80$, 40 df, $p \leq 0.001$). The difference in Chi-Square for the two models was 226.81 with 3 degrees of freedom. This is highly significant ($p \leq 0.001$), indicating that the second model fits significantly

better than the first. The AGFI for model 2 is 0.99, the comparative fit index is 1.0, the standardized RMSR is 0.028, and the RMSEA is 0.087. All of these fit indexes are excellent with the exception of the RMSEA which should be less than 0.08 (Jöreskog and Sörbom, 1994). Because the fit is reasonable and the modification indexes are justified, model 2 will be used for the remainder of the analysis. It is important to note that the cross-sectional regressions, which examined the number of drinks consumed and heavy drinking as separate entities, may provide results that differ to some extent from the LISREL analysis that focused on the latent construct, alcohol use. Where these analyses differ, the discussion will highlight the results of the second longitudinal structural equation model (LISREL), rather than the regressions.

Estimation of The Revised Model

The following discussion of this model will review the standardized parameter estimates. The model explains 13% of the variance in alcohol consumption at Time-One (age 22) and 31% of the variance in alcohol consumption at Time-Two (age 27). The following reports the results summarized in Table 20.

Alcohol consumption in Time-One (1983/1984), when these respondents were age 22, was most strongly influenced by the family/personal and family transmission of alcohol variables. The model indicates that education ($\gamma = -0.18$, $p \leq 0.05$), marital status ($\gamma = -0.20$, $p \leq 0.05$), the presence of children ($\gamma = -0.10$, $p \leq 0.05$), and adolescent affiliation with a religious organization that proscribed the use of alcohol ($\gamma = -0.09$. $p \leq 0.05$) reduced alcohol consumption. The effect of mother's alcoholism ($\gamma = 0.21$, $p \leq 0.05$) was moderately strong at Time-One (age 22). Having an alcoholic father was also positively related to increased alcohol consumption in Time-One, when

Table 20. Parameter estimates for the longitudinal structural equation model 2.

Relationship	Standardized Estimate	t-ratio
Alcohol Use at Time-One (age 22)		
Education	-0.18	- 4.64
Marital Status	-0.20	-10.27
Presence of Children	-0.10	- 4.11
Per Capita Consumption of Alcohol	0.02	0.76
Number of Drinking Places	0.03	0.92
Index of Restrictions On Sales of Spirits	-0.06	- 2.09
Adolescent Religious Affiliation	-0.09	- 3.73
Mother's Alcoholism	0.21	16.63
Father's Alcoholism	0.05	3.24
Total Number of Drinks Consumed	1.01	46.55
Incidence of Heavy Drinking	0.80	43.07
Alcohol Use at Time-Two (age 27)		
Education	-0.07	- 2.23
Marital Status	-0.38	-10.91
Presence of Children	-0.13	- 4.45
Per Capita Consumption of Alcohol	-0.09	- 3.65
Number of Drinking Places	-0.04	- 1.65
Index of Restrictions On Sales of Spirits	-0.02	- 0.59
Adolescent Religious Affiliation	-0.05	- 1.47
Mother's Alcoholism	0.03	1.84
Father's Alcoholism	-0.03	- 1.44
Total Number of Drinks Consumed	0.86	37.76
Incidence of Heavy Drinking	0.91	24.63
Marital Status at Time-One (age 22)	0.28	11.14
Alcohol Use at Time-One (age 22)	0.45	9.41

these respondents were age 22, ($\gamma = 0.05$, $p \leq 0.05$). However, the strength of this parameter was much less than that of an alcoholic mother. The number of drinking places and per capita consumption of alcohol did not significantly influence Time-One (age 22) alcohol use, but the state restrictions on sales of distilled spirits was weakly related to higher consumption ($\gamma = -0.06$, $p \leq 0.05$), at Time-One (age 22).

The primary interest of this analysis was in the parameters for Time-Two (age 27) alcohol consumption. There was a strong stability coefficient ($\beta = 0.45$, $p \leq 0.05$). This suggested there was some change, but on average, the women who drank heavily at Time-One (age 22) were the ones who were still drinking heavily at Time-Two (age 27).

Variables predicting a change in the use of alcohol by women include the following Time-Two (age 27) variables: education ($\gamma = -0.07$; $p \leq 0.05$), marital status ($\gamma = -0.38$; $p \leq 0.05$), and having children at age 27 ($\gamma = -0.13$; $p \leq 0.05$). Mother's alcohol abuse was no longer significant. Neither the number of drinking places nor the state control of sales of distilled spirits had a significant effect at age 27 (Time-Two). Surprisingly, the state per capita consumption at age 27 (Time-Two) had a weak significant negative effect ($\gamma = -0.09$, $p \leq 0.05$). A very interesting finding is that being married at age 22 (Time-One), while reducing drinking at age 22 (Time-One), leads to increased drinking at age 27 ($\gamma = 0.28$; $p \leq 0.05$).

Marital Status

In order to more clearly understand the relationship of marital status to consumption, the following analysis was performed. Respondents were divided into the four categories: 1) married age 22 - married at age 27, 2) not married at age 22 -

married at age 27, 3) not married at age 22 - not married at age 27, and 4) married at age 22 not married at age 27. Figure 2 illustrates the mean amount consumed by each group and Figure 3 shows the mean scores on the incidence of heavy drinking scale. These means were compared using two general linear models. Both models were significant ($p \leq 0.001$). A Bonferoni test of multiple comparisons ($\alpha = 0.05$) revealed that consumption was not significantly different for the first two categories (married age 22 - married age 27 and not married age 22 - married age 27). The second two categories (not married age 22 - not married age 27 and married age 22 - not married age 27) also did not differ significantly from each other, however the first two categories did differ significantly from the second two. Those who were married at age 27 (Time-Two), whether or not they had been married at age 22 (Time-One), drank significantly less than those who were not married at age 27 (Time-Two). This pattern was also apparent for the incidence of heavy drinking. Those who were married at age 27 (Time-Two) drank heavily significantly less often than those who were not married at age 27 (Time-Two). It is also interesting to note that those who were married at both age 22 (Time-One) and age 27 (Time-Two) averaged the fewest number of drinks per month, 4.00 (sd=8.32) while those who were married at age 22 (Time-Two) and not married at age 27 (Time-Two) averaged the most, 13.97 (sd=30.32).

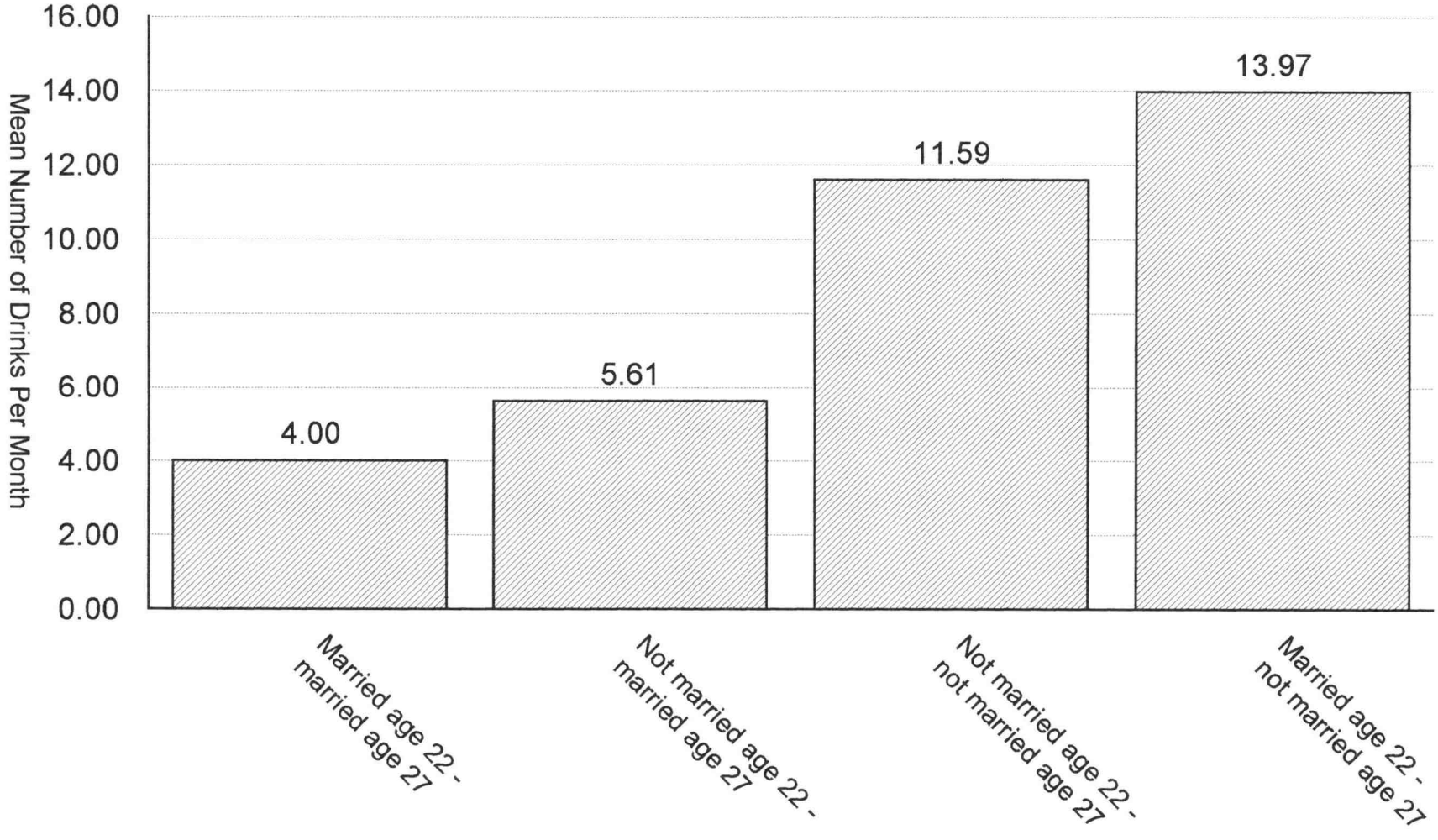
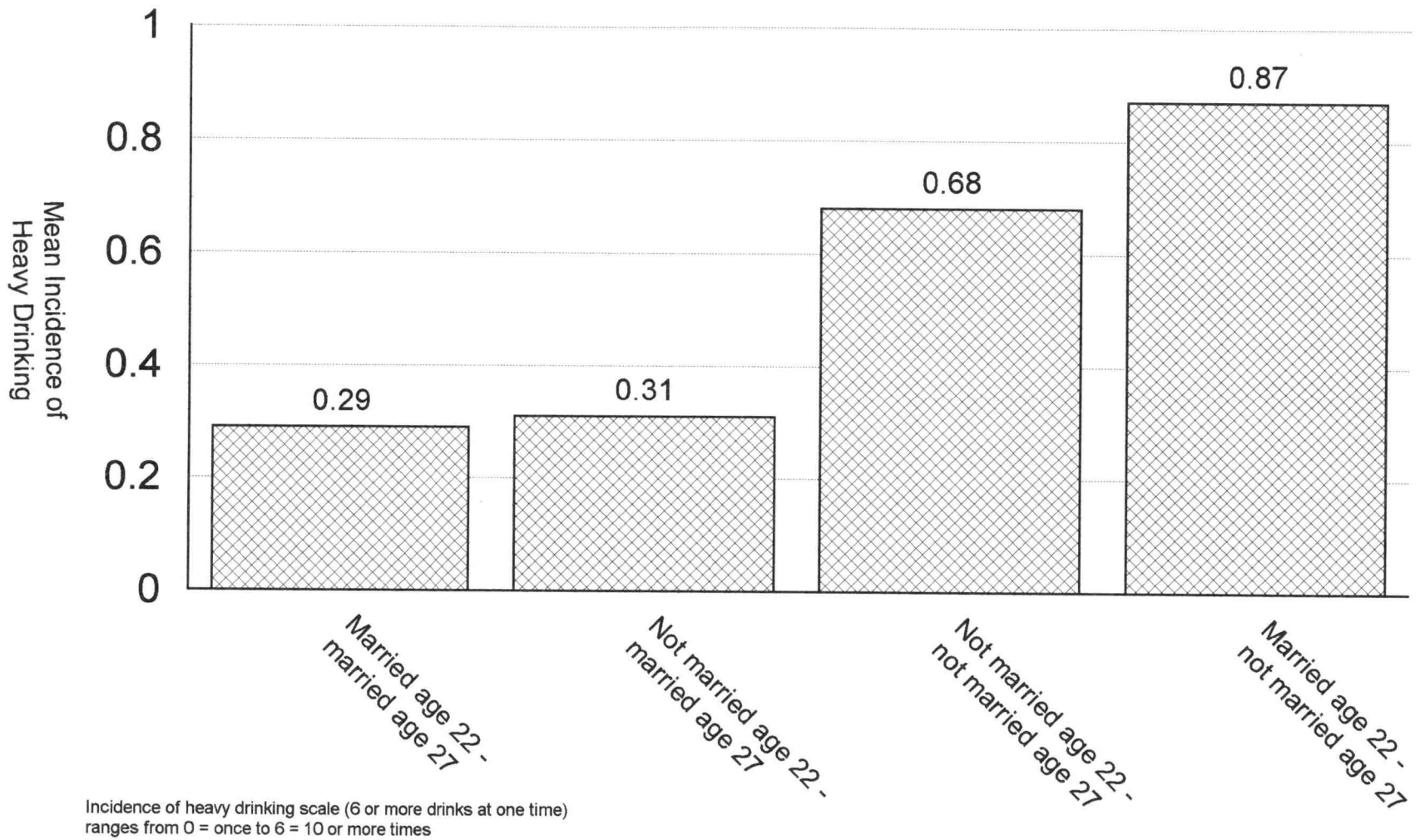


Figure 2. Alcohol consumption at age 27 by marital status



Incidence of heavy drinking scale (6 or more drinks at one time) ranges from 0 = once to 6 = 10 or more times

Figure 3. Incidence of heavy drinking at age 27 by marital status

Discussion

The various models proposed by researchers to explain alcohol use and abuse served as a useful guide for understanding the drinking behavior of young women. However, much of the research focused on men and very little was longitudinal. While research existed on the relationship of geopolitical and economic factors to alcohol consumption, at the aggregate level, virtually no research linked these variables to individual behavior.

This study examined factors that influenced levels of alcohol consumption for young women. Two dimensions of consumption were analyzed, number of drinks consumed during the previous month and the incidence of heavy drinking (number of times 6 or more drinks were consumed at one time). These measures of consumption were also combined into latent factors that measured alcohol use at both age 22 (Time-One) and again at age 27 (Time-Two). The separate dimensions of alcohol consumption were analyzed in four cross-sectional regression equations. Further analysis of the factors that influenced alcohol use and contributed to changes in use were then explored using a longitudinal, structural equation model. Although these analyses produced similar results, in some instances they were not in complete agreement. It is important to note that the results of the regression analysis apply only to a single time and a single dimension of alcohol consumption. The structural equation model, however, provides a better overall picture of the use of alcohol by this sample.

The research focused on the link between alcohol use and four domains of independent variables, 1) state-level availability of alcohol, 2) county-level political economic factors, 3) family transmission of alcohol abuse, and 4) personal/family

characteristics. The first research question addressed the influence of the variables in the first domain, availability of alcohol, on the number of drinks consumed, incidence of heavy drinking, and alcohol use. This domain contained measures of the number of drinking places per 1,000 population, per capita consumption of alcohol, and an index of state restrictions on the sale of distilled beverages. These restrictions included the number of liquor stores per 1,000 population (more or less than the mean for all the states included in the study), whether billboard advertising was allowed, whether spirits were sold in grocery stores, and whether the state had a monopoly on the sale of distilled beverages.

The variables in this first domain proved to have little influence on either the amount of alcohol consumed or the incidence of heavy drinking. The regression analysis showed that only the number of drinking places per 1,000 population was significantly related to the number of drinks consumed at Time-One (1983/1984) and the incidence of heavy drinking, at both Time-One (1983/1984) and Time-Two (1988/1989). This variable remained significantly related to the incidence of heavy drinking at Time-Two (1988/1989). This provides some support for the hypothesis that those who live in an area with a high number of drinking places will drink more. However, the longitudinal model of alcohol use indicated that the only variable in this domain that was significantly related to the latent construct, alcohol use, at Time-One (1983/1984), was the index of restrictions on sales of distilled spirits. This indicates that restricting access to distilled beverages may have some influence on alcohol consumption by women at age 22. In addition, only one variable, per capita consumption of alcohol, was significant in explaining change in the longitudinal equation model and its effect was not in the predicted direction. This was a surprising

finding since it indicated that young women drink more in states with lower per capita consumption. Although this is somewhat counter intuitive and needs further investigation, it does challenge the idea that the only way to lower individual alcohol consumption is to lower the per capita amount consumed (shift the Ledermann curve). Changing per capita consumption does not appear to decrease alcohol use by young women. Just the opposite, this analysis suggests that their consumption may be higher in areas where overall drinking is less popular.

The variables in the political economy domain were the focus of the second research question. The regression analyses found that these variables were not significantly related to the alcohol consumption or incidence of heavy drinking of these respondents. There was no evidence that high levels of unemployment, low per capita income, or living in an urban area significantly increase alcohol consumption. The study found that alcohol consumption was not influenced by the surrounding political economic environment. It is especially interesting that urban residence, a variable that other studies have found to significantly increase consumption has no effect on young women's alcohol consumption. Because there was no evidence that these variables had an independent effect on either the number of drinks consumed or the incidence of heavy drinking for these respondents, they were not included in the longitudinal analysis.

It is widely accepted that alcohol abuse is a problem that is more prevalent in some families than in others and that alcoholism may be a genetically transmitted disease. The family transmission of alcohol problems was addressed by the third research question. The literature indicated that the children of alcoholics are more likely to suffer from alcohol abuse themselves. Although much work has been done on

the intergenerational transmission of alcoholism and alcohol abuse, little work has focused on the relationship between parental alcohol abuse and non-alcoholic levels of alcohol consumption by their adult children. Also, because alcoholism has traditionally been viewed as a male problem, most of the work in this area has focused on paternal alcoholism and the sons of alcoholics. The effects of maternal alcoholism and the influence of either maternal or paternal alcoholism on women has rarely been examined. This study examined whether a history of parental alcoholism was related to either the number of drinks consumed, the incidence of heavy drinking, or alcohol use. It searched for evidence that heavy consumption (alcoholism) was genetically transmitted from parent to child.

The results of the regression analyses of the separate dimensions, number of drinks consumed and heavy drinking, differed somewhat from the longitudinal analysis that focused on alcohol use. The cross-sectional regressions found that maternal alcohol problems were significantly related to the number of drinks consumed and the incidence of heavy drinking at Time-One (age 22). At age 22, those women who reported their mother had an alcohol problem were more apt to drink heavily themselves. Both the number of drinks consumed and the incidence of heavy drinking were higher for these young women. It is important to note, however, that only 49 women had a maternal history of alcoholism. Paternal alcoholism was also significantly related to the number of drinks consumed, at Time-One (age 22), but did not predict the Time-One (age 22) incidence of heavy drinking. By Time-Two (age 27), the regression analysis indicated that mother's alcoholism was no longer a significant predictor of the number of drinks consumed or the incidence of heavy drinking. Father's alcohol problems, however, were still significantly related to the number of

drinks consumed, at Time-Two (age 27), but not to the incidence of heavy drinking. This suggested that both maternal and paternal alcohol problems influenced the amount of alcohol consumed by these young women, when they were age 22, but that only the father's alcohol problems were still affecting their alcohol consumption at age 27.

These findings were somewhat contradicted by the longitudinal structural equation model. This analysis also found that both maternal and paternal alcohol problems were significantly related to alcohol use at age 22, however, the model indicated that neither maternal nor paternal alcoholism was related to alcohol use at age 27 or was significant in explaining change.

A genetic explanation of alcohol abuse suggests that its influence at age 22 should be the same or, since alcoholism is defined as a progressive disease, greater at age 27. In other words, the genetic component is a constant over this age range. The fact that both maternal and paternal alcohol abuse, indicators of a genetic transmission of alcohol abuse, decreased in importance with age suggests that the genetic argument might be questioned. As young women mature, other factors such as marital status and having children may become increasingly important and parental alcohol abuse appears to become less important. These findings support the hypothesis that alcohol abuse is a familial problem, but do not confirm that it is a genetically transmitted disease.

The fifth and sixth research questions examined the relationship of personal/family factors to young women's drinking. The variables in this domain, education, marital status, presence of children, and adolescent religious affiliation, were all significantly related to both number of drinks and the incidence of heavy

drinking, in the cross-sectional regression analysis. In addition, these variables were significantly related to Time-One (age 22) and Time-Two (age 27) alcohol use in the longitudinal model. Based on both the cross-sectional regressions and the longitudinal model, those events that mark the transition to adulthood, such as educational attainment, marriage, and having children were all significantly related to a lower number of drinks consumed and to a lower incidence of heavy drinking.

These findings supported the hypothesis that educational attainment was negatively related to the number of drinks consumed, and the incidence of heavy drinking. Each year of additional education resulted in a lower score on each of these variables.

Marriage also had an strong influence on the consumption of alcohol. While the literature reported that being married was associated with lower alcohol consumption, most of this work has been cross-sectional. This study also found that marital status was significantly related to a lower number of drinks consumed and the incidence of heavy drinking in the cross-sectional regression analyses, at both Time-One (age 22) and Time-Two (age 27). In addition, the longitudinal analysis indicated that early marriage reduced alcohol consumption at the age of 22 but it had the opposite long term effect. Specifically, while women married at 22 drank less than those who were single at that time, the long term effect was that being married at 22 increased alcohol consumption in later years.

Further investigation of this finding indicated that increased consumption was not specifically the result of early marriage, but rather the consequence of an early marriage that had ended. The only significant difference in alcohol use was between

those who were married at age 27 (Time-Two) and those who were not married at that age, regardless of their marital status at age 22 (Time-One) .

Two facets of marriage may account for its influence on alcohol use. First, the presence of a spouse may simply put a significant damper on drinking and second, the social milieu of married couples may be distinctly different from that of singles. Higher consumption by those who are not married may reflect a social life that focuses more on drinking activities such as dating and going to parties where alcohol is served. A third possible explanation for this finding is that those who drink heavily or want to maintain a lifestyle that includes a lot of alcohol either do not marry or do not remain married.

Marriage is one of the major transitions to adulthood, however, these findings suggest that it is being marriage, rather than becoming married that is important. Those who have once married and then ended the marriage may have made a transition to adulthood, but this does not appear to prevent them from drinking heavily. It appears to be the responsibilities and lifestyle of marriage that influences drinking rather than simply making a transition from youth to adult.

The presence of the respondent's children in the household was another factor that was significantly related to lower levels of alcohol use. This reflects many changes that may occur when children enter a family. First, the responsibilities that accompany parenthood do not easily coincide with a lifestyle that includes the frequent use of alcohol. Second, the cost of raising children is considerable and many young parents may find themselves unable to afford either the cost of alcoholic beverages or the extra expense of childcare that is necessary if they are to attend adult social activities where alcohol may be served. Since alcohol is a costly consumer good that

may be too expensive for many young parents to afford, they may decrease the amount they consume in order to spend their limited financial resources on their children. It appears, from these findings, that the responsibilities of marriage and parenthood have particularly strong negative effect on alcohol use by young women.

The final variable in the personal/family domain that influenced alcohol consumption was adolescent affiliation with a religious organization that proscribed the use of alcohol. The regression analysis indicated that adolescent religious affiliation was significantly related to a lower number of drinks consumed at Time-One (age 22), but not at Time-Two (age 27). It did not have a significant effect on the incidence of heavy drinking at either time. The longitudinal model also showed that it was significantly related to alcohol use at Time-One (age 22) but not at Time-Two (age 27). This finding indicates that those who belonged to a conservative religious organization (with respect to alcohol) drank, on average, less then those who did not belong to such an organization. Contrary to the findings of Calahan and Cisin (1968) and Skolnick (1958), who found that affiliation with a conservative religious organization was related to higher levels of problem drinking, this study did not find evidence that an affiliation with a conservative religious organization was related to heavy drinking. This finding suggested that religious training may have a good influence on amount of alcohol consumed by young women in their early 20's. However, since this influence weakened between age 22 (Time-One) and age 27 (Time-Two), it appeared that as young women mature the religious orientation they had as adolescents becomes more distant and may have less influence on their behavior. The data did not include the questions needed to allow evaluation of the influence of current religious affiliation. It

is possible that those who continue to belong to these organizations, or who join after adolescence are influenced to restrict or reduce their alcohol consumption.

Summary of Results

The following research questions and hypotheses were addressed by this study. For this summary, the questions and hypotheses are restated and each is followed by a brief summary of the results.

Research Question 1

Previous research suggested that the availability of alcohol, at the state level, influenced levels of per capita consumption. Do state restrictions that explicitly intend to limit access to alcohol have any effect on individual levels of consumption? What effect does living in an area where drinking is popular, as measured by per capita consumption, have on personal levels of alcohol use? Do those who live in states where per capita consumption is high, drinking places numerous, and state restrictions on the sale of distilled beverages are lax drink more than those who live in areas where drinking is less common, drinking places less frequent, and state restrictions greater? If the state-level restrictions on drinking change, for example if the individual moves from one state to another, does she change her consumption to correspond with the new circumstances, or does she tend to continue to drink at her accustomed level?

Results: Overall, this study did not find that high per capita consumption, numerous drinking places, or strong state restrictions on the sale of distilled beverages had much influence on the alcohol use of young women.

Hypothesis 1: Individuals who live in areas where drinking alcohol is more popular, as measured by per capita consumption, will drink more than those who live where drinking is less common.

Results: This hypothesis was not supported by these data. The cross sectional regression analysis indicated that per capita consumption did not have an independent influence on drinking at either Time-One (age 22) or Time-Two (age 27). Per capita consumption was significantly related to alcohol use at Time-Two (age 27), in the structural equation model, however the sign was not in the hypothesized direction. This model indicated that those young women who lived in an area of low per capita consumption were more apt to drink heavily.

Hypothesis 2: A drop in per capita consumption, between Time-One (1983/1984) and Time-Two (1988/1989) will be accompanied by a drop in individual consumption.

Results: The longitudinal structural equation model indicated that a change in per capita consumption was negatively related to a change in alcohol use. A decrease in per capita consumption was related to an increase in drinking by these respondents. Therefore, this hypothesis was not supported.

Hypothesis 3: Individuals who live in states that restrict the number of drinking places will consume less alcohol.

Results: This hypothesis received mixed support from this study. The cross sectional regression models indicated that the number of drinking places per 1,000 population was positively related to both the amount of alcohol consumed and the incidence of heavy drinking. However, the longitudinal

structural equation model showed that the number of drinking places was not significantly related to alcohol use, at either Time-One (age 22) or Time-Two (age 27).

Hypothesis 4: If the number of drinking places per 1,000 population decreases then individuals living in those areas will drink less alcohol.

Results: This hypothesis was not supported by the longitudinal model. A change in the number of drinking places was not significantly related to a change in levels of alcohol use.

Hypothesis 5: Strong state restrictions on the sale of distilled beverages will influence individuals to drink less.

Results: State restrictions on the sale of distilled beverages did not have an independent effect on either alcohol consumption or the incidence of heavy drinking. This hypothesis was not supported by these data.

Hypothesis 6: If state restrictions increase, thereby causing alcohol to be more difficult to purchase, individuals will drink less alcohol.

Results: This hypothesis was also not supported by the longitudinal model. Increasing state restrictions were not significantly related to decreasing levels of alcohol use.

Research Question 2

Urban areas with low per capita incomes and high unemployment provide a stressful environment that may result in higher alcohol consumption. Do individuals who live in these areas drink more due to the surrounding social/economic pressures? Do they increase their drinking if these measures of social stress increase over time?

Results: This study did not find that the surrounding political economy significantly influenced alcohol use. None of the variables in this domain had an independent effect on either alcohol consumption or the incidence of heavy drinking, therefore they were not included in the longitudinal analysis.

Hypothesis 7: Those who live in counties where the per capita income (adjusted for inflation) is low will drink more alcohol then those who live in more affluent areas.

Results: Per capita income was not significantly related to either the amount of alcohol consumed or the incidence of heavy drinking.

Hypothesis 8: If the adjusted per capita income falls, relative to other areas, then individuals will drink more.

Results: Because the regression analysis showed that per capita income did not have an independent effect on alcohol consumption or incidence of heavy drinking, it was not included in the longitudinal structural model. Therefore, this hypothesis was not directly tested.

Hypothesis 9. Individuals living in areas of high unemployment will consume more than those living where jobs are more plentiful.

Results: Unemployment rates were not significantly related to either the amount of alcohol consumed or the incidence of heavy drinking. This hypothesis was not supported at either Time-One (age 22) or Time-Two (age 27).

Hypothesis 10: A rise in unemployment, relative to other places, will cause individuals in those areas will drink more.

Results: Unemployment was not included in the longitudinal structural model because it was shown in the cross sectional models to have no independent influence on alcohol consumption. As a result, this hypothesis also was not tested.

Hypothesis 11: The stress of urban living will cause individuals to consume more alcohol than those living in rural areas.

Results: Urban residence was not significantly related to alcohol consumption at either Time-One (age 22) or Time-Two (age 27).

Hypothesis 12: Individuals who move to urban areas will drink more than those who remain in or move to a rural area.

Results: The longitudinal model did not test the effect of urban residence or the change from rural to urban because it was demonstrated in the cross sectional models that urban/rural residence did not have an independent effect on either the amount consumed or the incidence of heavy drinking.

Research Question 3

Alcohol abuse has been identified in the literature as a problem that may be transmitted from parents to their children. Do individuals who have a history of parental alcoholism drink more than those who have no family history of alcohol abuse? Does the level of alcohol use by young adults with a history of parental alcoholism remain stable, an indicator that alcoholism is genetically transmitted, or do these individuals, as they mature and distance themselves from their parents, decrease their consumption?

Results: This study did support the suggestion that a history of parental alcohol abuse was related to higher levels of alcohol consumption. However, because the effect of having an alcoholic parent weakened between Time-One (age 22) and Time-Two (age 27) the genetic transmission of alcohol problems was questioned.

Hypotheses 13: Individuals who have either an alcoholic mother or alcoholic father will consume more than those with no history of parental alcohol abuse.

Results: These data provided mixed results for this hypothesis. At Time-One (age 22) it was apparent that having an alcoholic parent was related to the number of drinks consumed. Heavy drinking at age 22 (Time-One) was influenced by maternal drinking but not paternal alcohol abuse. By age 27 (Time-Two) the cross sectional regression analysis indicated that only paternal alcohol abuse was related to the number of drinks consumed. The longitudinal structural model indicated that both maternal and paternal alcohol abuse were significantly related to alcohol use, at Time-One (age 22). By Time-Two (age 27), however, the model showed that parental alcohol abuse did not influenced alcohol use.

Hypothesis 14: Because alcoholism is a genetically transmitted problem, those with alcoholic parents will continue to drink more heavily than those who do not have parents who abuse alcohol. They will not decrease their consumption as they age.

Results: These data did not support the hypothesis that alcoholism was a genetically transmitted disease. The longitudinal model indicated that the influence of parental alcohol abuse was no longer significant by Time-Two (age 27). Having an alcoholic parent did not prevent respondents from

decreasing their alcohol consumption between age 22 (Time-One) and age 27 (Time-Two).

Research Question 4

The transition to adulthood has also been identified as a possible important factor in the use of alcohol by young adults. This transition, which often initiates new roles and responsibilities for the individual, may be marked by educational attainment, marriage, or becoming a parent. Do these personal factors influence alcohol consumption and changing levels of alcohol use?

Results: Educational attainment, marriage, and becoming a parent were all significantly related to alcohol consumption, the incidence of heavy drinking, and changing levels of alcohol use between age 22 (Time-One) and age 27 (Time-Two).

Hypothesis 15: Education will have a negative influence on alcohol consumption. For each year of education, alcohol consumption will decrease.

Results: Those individuals who reported higher levels of education tended to consume less alcohol. Education had a negative relationship to both the number of drinks consumed and the incidence of heavy drinking. A change in education also had a significant influence on a change in alcohol use between age 22 (Time-One) and age 27 (Time-Two), according to the longitudinal model. An increase in educational attainment was related to lower levels of alcohol use.

Hypothesis 16: Married individuals will consume less alcohol than those who are not married.

Results: Marital status was significantly related to alcohol consumption.

Individuals who were married drank, on average, less than those who were not married. Marriage at age 27 (Time-Two) had a particularly strong influence on the use of alcohol at that age.

Hypothesis 17: Children in the household will be related to lower levels of alcohol consumption.

Results: The presence of children in the household was also significantly related lower levels of adult alcohol consumption. The longitudinal model indicated that a change in whether children were present in the household was an important factor in changing levels of alcohol use between age 22 (Time-One) and age 27 (Time-Two).

Research Question 5

Many churches discourage the use of alcohol by their members. The literature suggested that members of these organizations drink less, on average. Do individuals who belonged to these organizations when they were adolescents drink less at age 22? What effect does an adolescent religious indoctrination against the use of alcohol have on drinking at age 27?

Results: Affiliation with a religion that proscribes the use of alcohol during adolescence was related to the use of alcohol at age 22 (Time-One). However, this study did not find any evidence that this affiliation had a lasting influence. By age 27 (Time-Two), adolescent religious affiliation was no longer significantly related to alcohol use.

Hypothesis 18: Individuals who report an adolescent affiliation with a conservative (with respect to alcohol) will drink less than those with a more liberal background.

Results: Adolescent religious affiliation was significantly related to the amount of alcohol consumed at age 22 (Time-One). However, this affiliation was not significantly related to the incidence of heavy drinking at age 22 (Time-One) or to either number of drinks consumed or the incidence of heavy drinking at age 27 (Time-Two).

Hypothesis 19: This training will continue to influence their use of alcohol over time. Therefore, those individuals from a conservative background will also continue to drink less, even at age 27.

Results: The longitudinal structural equation model indicated that an adolescent affiliation with a religious organization that proscribed the use of alcohol did not have an effect on changing levels of alcohol use between age 22 (Time-One) and age 27 (Time-Two).

Strengths and Limitations

This research provided insights into the factors that influence alcohol use and changing levels of consumption for young women. Its greatest strength was the development of a model of alcohol use that incorporated macro- and micro-level independent variables with individual-level dependent variables that measured alcohol consumption. The probability sample allowed generalization of the findings to other similar groups. It is, however, not appropriate to generalize these findings to men and other age groups, since age and gender are important factors in alcohol consumption.

Those groups must be studied using appropriate models that incorporate these variables.

The measures of consumption and incidence of heavy drinking used in this study are somewhat problematic. Both the amount consumed and the incidence of heavy drinking measures are self-reports that depend on the respondent's ability to recall and willingness to disclose specific behaviors. The measures of parental alcohol abuse also depend on the respondent's knowledge of a parental alcohol problem and their willingness to admit to having an alcoholic parent.

This research did not address whether personal economic stress, occupational category, race, or social class contributed to increased levels of drinking. In addition, it was not able to examine attitudes of the respondents, their families, or peers toward drinking alcohol. It also did not measure the amount of drinking by peers or siblings. These are all areas that could improve the model and explain alcohol consumption more fully.

Directions For Future Research

A number of directions for further research are suggested by this study. First, work needs to focus on the measures of state restrictions on the sale of distilled spirits. These measures, which have been used in a variety of studies on the relationship of availability to consumption, need to be examined to determine their validity and reliability. Do they really measure the restrictions on the availability of alcohol in a particular geographic area? Are they measuring a unidimentional construct or is there more than one dimension to availability? Structural equation

modeling, with its ability to test complex measurement models provides an ideal methodology for examining this problem.

Future research also needs to address the issue of macro-level influences on micro-level behavior. Much of the current research has used per capita consumption as an aggregate measure of alcohol use. It is apparent from this study that macro-level per capita consumption masks the drinking behavior of particular groups, such as young women. This may lead to misleading results, since per capita consumption may most strongly reflect the drinking of young men, who are the nation's heaviest drinkers. It fails to accurately measure drinking by other groups, such as adolescents, older men, and women of all ages. Those factors that influence the drinking behavior of young men may not be the same as those that influence these other groups. In order to fully understand alcohol consumption, it is important to develop models that examine many different types of individuals. The integrated model that has been used for this study can provide a first step in understanding the drinking behavior of other groups. The model can be modified, as needed, to accurately reflect the drinking behavior of these other groups.

A number of studies, including this one, have found a link between a family history of alcoholism and high levels of individual alcohol use. However, one question that has had little investigation is the influence of being raised by an alcoholic parent, or living with other alcoholic relatives. Does living with an alcoholic increase adult alcohol consumption? What is the impact of living with an alcoholic step-parent? Is it more damaging to live with a male or female alcoholic? Does the length of time the individual lives with the alcoholic matter? Is the impact of living with an alcoholic the

same for men and women? These and many other questions need to be addressed to assess the effect of growing up in an alcoholic home.

Further work also needs to concentrate on the use of alcohol by women, especially younger ones. Although, on average, this group drinks modestly even moderate drinking may have catastrophic consequences for the women and their families. Alcohol consumption during pregnancy, which may cause the baby to be born retarded and/or physically deformed (fetal alcohol syndrome), is the most common cause of mental retardation in this country. It is also 100% preventable. Since women in their twenties are likely to become pregnant, it is imperative to understand the factors that contribute to their use of alcohol and find methods of preventing consumption during pregnancy.

Additional longitudinal research is also needed to more fully understand the relationships of marital status and children in the household to adult alcohol use. For example, do those who have once been married, become single, and then married again change their drinking patterns as their marital status changes. The interaction of marriage and children in the household on alcohol use needs to be explored. Do those who become single and have children drink less then singles without children, or do they resume a more "single" lifestyle? Does it make a difference how old the children are? Do parents of older children drink less or more than those with infants in the household?

Conclusions

Overall, this study confirmed that drinking is a behavior that is influenced by the surrounding social environment. However, it is apparent from this research that it is

the micro-environment, rather than the surrounding macro-environment, that exerts the strongest influence. Neither availability of alcohol nor political economic stress contribute significantly to alcohol consumption by young women. Parental alcohol abuse, educational attainment, marriage, children, and an adolescent association with a conservative (with respect to alcohol) religious organization all influenced levels of consumption for these respondents. These findings suggest that although the transition to adulthood may have an impact on alcohol use, it is the responsibilities that accompany becoming an adult that may have the strongest influence on the use of alcohol.

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APPENDIX

Appendix A

Reconciling Time-One (1983/1984) Consumption With Time-Two (1988/1989)

The following analysis was done to determine whether reported alcohol consumption was significantly influenced by the wording change of the alcohol consumption questions. At Time-One (1983/1984), respondents were first asked whether they had ever consumed beverage alcohol. If the answer was yes, they were then asked if they had had any alcohol during the previous month. Those who said they had consumed alcohol in the past month were then asked a series of questions to determine how often they drank specific amounts of alcohol. For example, one question asked, "How many days during the previous month did you have one drink?" A second question asked, "How many days during the previous month did you have two drinks?" This basic question was repeated for three, four, five, and six or more drinks.

These questions were used to compute the amount the individual drank during the previous month for Time-One (1983/1984) of this study. If the respondent reported they had never had alcohol, or had not had any alcohol during the previous 30 days, their consumption level was coded 0. If they had consumed alcohol during the previous month then the amount of alcohol they had consumed was computed. An example of how this consumption was computed is presented in Table A.1.

For the second time period, 1988/1989 (Time-Two), the respondents were also asked whether they had ever had any alcohol and whether they drank alcohol during the previous month. Those who indicated they were drinkers were then asked to estimate the average number of drinks they consumed on an average day when they

Table A.1. A sample of how consumption was coded and computed for Time-One (1983/1984).*

(This coding is fictitious, it is only intended to serve as an example)

ID Number	1 Drink	2 Drinks	3 Drinks	4 Drinks	5 Drinks	6+ Drinks
	r1022200	r1022300	r1022400	r1022500	r1022600	r1022700
001	4	3	0	2	0	0
002	1	5	3	0	0	0
003	0	0	1	0	0	0

*Questions (r1022200 -- r1022700): How many days did you have ____ number of drinks last month?

The following demonstrates how the average and total number of drinks were computed:

Case 001 had 1 drink 4 times (1*r1022200 = 4 drinks),

2 drinks 3 times (2*r1022300 = 6 drinks),

3 drinks 0 times (3*r1022400 = 0 drinks),

4 drinks 2 times (4*r1022500 = 8 drinks),

5 drinks 0 times (5*r1022600 = 0 drinks)

6+ drinks 0 times (6*r1022700 = 0 drinks).

The total number of drinks during the previous month for case 001 = 4+6+0+8+0+0=18 drinks. The total number of days case 001 reported drinking in 1983 = variable r1022800. To compute the average number of drinks during a month in 1983 for case 001, divide the total number of drinks by the number of days case 001 reported drinking (18/r1022800).

drank. This variable was open-ended, therefore, it was necessary to truncate the upper-end of this Time-Two (1988/1989) variable to match the Time-One (1983/1984) variable, "How many days have you had 6 or more drinks during the previous month?" This was be done by making any response over 6, in the Time-Two (1988/1989) variable, equal to 6 to match the question in Time-One consumption variable. In Time-Two (1988/1989), respondents were also asked to estimate the number of days during the previous last month they had consumed alcohol. Once the amount consumed was calculated for each time period, it was necessary to determine whether the change in wording of these variables significantly influenced the amount respondents reported drinking.

Analysis of Wording Change, Time-One (1983/1984) vs Time-Two (1988/1989)

The literature indicated that age was the strongest predictor of alcohol consumption (Fillmore, 1987a,b). For example, the average amount of alcohol consumed by 22 year olds in 1984 should not differ significantly from the average amount consumed by 22 year olds in 1988. If the average amount consumed varied significantly between Time-One (1983/1984) and Time-Two (1988/1989), for a group of same age respondents, it was possible that the change in the wording of the dependent variable was responsible. Conversely, if the average amount consumed was not significantly different for a single age category across the period of the study, then the change of wording was less problematic. It is important to note that state per capita consumption did vary slightly, but significantly ($p \leq 0.001$), between these two time periods. At Time-One (1983/1984) per capita consumption in the respondent's respective states averaged 2.08 (sd=0.600), while at Time-Two (1988/1989) the

average consumption was 1.88 (sd=0.495) gallons of absolute alcohol per capita, a decreased of 0.251 (sd=0.344) gallons of absolute alcohol per capita.

The ideal way to analyze this problem involves examining the amount consumed by 22 year olds or 27 year olds in each of the study years, however, this was not possible because of the longitudinal nature of the data set. Table A.2 shows the age distribution of the young women in the NLSY data set. As shown in Table A.2, there were no 27 year olds in the early years of the study, 1983 and 1984, and there were no longer any 22 year olds by 1988. It was possible, however, to use a sample of respondents who were 25 years old in each of the study years to determine whether the change of wording affected their average alcohol consumption scores. A sample of respondents (n=3015) who were 25 years old was chosen for this analysis because they were adequately represented in each of the study years. Table A.3 presents details of how this sample was selected.

Because the NLSY survey was done at different times in each year, some respondents were the same age at consecutive interviews. For example, it was possible for a respondent to be interviewed right after her 25th birthday in 1983 and right before her 26th birthday in 1984. This individual would have been 25 years old at both interview times. Nineteen respondents were listed as 25 years old in both 1983 and 1984 and 78 were 25 years old in both 1988 and 1989. As shown in Table A.3, these 97 individuals, who were the same age in consecutive interviews, were arbitrarily assigned to the earlier year (1983 or 1988). In order to link consumption with age and not double count these individuals, the 1983 alcohol consumption scores were used for those who were 25 in both 1983 and 1984 and the 1988 reported consumption scores were used for those who were 25 years old in both 1988 and 1989. This

Table A.2. Age distribution of the full NLSY sample of young women (n=6,283) in 1983, 1984, 1988, and 1989, by age and year.

Age of Respondent at Interview	Number of Respondents by Age & Year			
	1983	1984	1988	1989
18	473			
19	747	477		
20	748	722		
21	750	739		
22	783	750		
23	849	762	124	
24	775	834	689	193
25	830	792	696	697
26	118	814	700	718
27		124	722	711
28			686	720
29			614	702
30			657	625
31			423	684
32			1	359

Table A.3. Selection process for the sample of 25 year olds.*

	Year				Number Dropped From Sample	Total Sample Size
	1983	1984	1988	1989		
Frequency of 25 year olds in NLSY data set.	830	792	696	697		3015
Number of 25 year olds after individuals who were the same age at two consecutive interviews were assigned to a single year.	830	773	696	619	97	2918
Abstainers, those who either never have had alcohol or did not have any during the previous month.	329	276	286	272	1163	1755
Missing - not abstainers but did not answer alcohol consumption questions.	2	0	2	2	6	1749
Number who answered the alcohol consumption question.	499	497	408	345		1749

*This sample was used for the general linear model that reconciled the Time-One (1983/1984) alcohol consumption questions with those asked in Time-Two (1988/1989).

reduced the number of 25 year olds in 1984 to 773 and in 1989 to 619. At this point the sample of 25 year olds included 2918 respondents.

The questions used to determine whether an individual was an abstainer (0 consumption) were consistent between Time-One (1983/1984) and Time-Two (1988/1989), therefore, abstainers were not included in this analysis. Abstainers accounted for 1,163 of the 2,918 respondents. The sample was further reduced by 6 respondents who indicated they had consumed alcohol during the previous month but failed to answer the questions about the amount they had consumed. The final sample includes only those respondents who had consumed alcohol during the previous month and answered the alcohol consumption questions in either Time-One or Time-Two (n=1,749), respectively.

The total alcohol consumption was then computed for those women who were 25 years old in 1983 or 1984 and compared to the total consumption reported by the women who were 25 in 1988 or 1989. Two class variables were created for this comparison, one for the year the alcohol questions were asked and another for the change of wording. Table A.4 shows the year the alcohol questions were asked, whether consumption was computed or reported, the coding for the change in wording, and the coding for the year the consumption questions were asked.

These variables were then analyzed using a general linear model to determine whether total alcohol consumption was significantly predicted by either the year the respondent was 25 years old, or the wording change of the alcohol consumption questions. Neither the year nor the wording significantly affected the alcohol consumption scores for this sample of 25 year olds ($p < 0.05$). Therefore it will be

Table A.4. Coding of alcohol consumption questions.

Year Respondents Were Asked About Alcohol Consumption	1983	1984	1988	1989
Consumption	computed	computed	reported	reported
Wording	wording = 1		wording = 2	
Year	year = 83	year = 84	year = 88	year = 89

assumed that the change of wording does not introduce an unacceptable bias into this study.