DOCUMENT RESUME

ED 456 983 RC 023 183

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TITLE Health Consequences of Alcohol Use in Rural America.
SPONS AGENCY National Inst. on Alcohol Abuse and Alcoholism (DHHS), Rockville, MD.
PUB DATE 1997-05-00
NOTE 39p.; In: Rural Substance Abuse: State of Knowledge and Issues. NIDA Research Monograph 168; see RC 023 179.
CONTRACT 5-R01-AA09224-02
AVAILABLE FROM For full text: http://www.nida.nih.gov/PDF/Monographs/Monograph168/Download168.html.
PUB TYPE Information Analyses (070) -- Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Alcohol Abuse; *Black Youth; *Drinking; Epidemiology; *Family Influence; Injuries; Models; Mortality Rate; *Physical Health; Preadolescents; Risk; Rural Areas; Rural Urban Differences; *Rural Youth
IDENTIFIERS African Americans; *Georgia

ABSTRACT

Results of three national surveys suggest that the prevalence of drinking was lower in nonmetropolitan areas than in metropolitan areas. However, nonmetro and metro areas were similar in the presence of risk for heavy, dependent, and problem drinking. Therefore, they probably share similar risks for health consequences of such levels of consumption. These consequences include alcoholism; chronic health effects on the liver, brain, heart, and reproductive system; increased risk of cancer; fetal alcohol syndrome; depressed immune system; accelerated diabetes; and acute effects such as increased motor vehicle accidents, other accidents, and related injuries and mortality. A study of alcohol consumption and related health problems in rural Georgia found more alcohol-related mortality in rural Georgia than in the nation, but somewhat less than in the state. However, the wide variation among the rural counties indicates a need for research focused on subpopulations at increased risk, a critical step in the development of effective intervention strategies. A study of predictors of alcohol use among rural African American adolescents focused on family processes in 90 African American families with married parents and a first-born child aged 9-12, living in rural Georgia or South Carolina. Analysis of observational data supported a proposed mediational model of relationships among family economic resources, family processes, and the development of externalizing behaviors that place rural youth at risk for alcohol problems. (Contains 86 references and 6 figures.) (SV)

Health Consequences of Alcohol Use in Rural America

Gene H. Brody, Eileen Neubaum, Gayle M. Boyd, and Mary Dufour

INTRODUCTION

Alcohol abuse and dependence are costly to society in both human and economic terms. In 1989, 108,458 deaths in the United States were alcohol related (Stinson et al. 1993), accounting for about 5 percent of all deaths that year and making alcohol the fourth leading cause of death after heart disease, cancer, and stroke (National Center for Health Statistics (NCHS) 1994*a*). These deaths represent in excess of 1.5 million years of potential life lost to age 65 and nearly 3 billion years of potential life lost to full life expectancy (Schultz et al. 1990). Alcohol-related morbidity also presents a significant burden to the Nation's health care system. Studies suggest that between 15 and 30 percent of patients in short-stay (average length of stay of fewer than 30 days) general hospitals have alcohol problems, regardless of their admitting diagnosis (Umbricht-Schneiter et al. 1991). In addition, families of alcoholics consume more health care services than do those of nonalcoholics (Holder 1987).

While there is a considerable body of research describing the prevalence and patterns of alcohol use and abuse and related health consequences in the United States, little is information specific to rural areas. As a first approximation of the potential burden in rural areas from alcohol-related morbidity and mortality, relationships between alcohol consumption and health outcomes established for the general population can be extrapolated. Therefore, patterns of alcohol use and health effects in the general population will be briefly reviewed, and relevant national-level data for nonmetropolitan populations will be presented.

Due to the heterogeneity among rural populations, the use of national data, in which data from rural areas throughout the country are combined, is a crude substitute for more indepth studies of specific regions. The latter part of this chapter will focus on rural counties in the State of Georgia. Epidemiologic data on alcohol problem indicators in this area

will be described, and preliminary findings will be presented from a study by the first author and colleagues on predictors of alcohol misuse.

PREVALENCE OF ALCOHOL USE AND ABUSE

> Alcohol abuse refers to patterns of problem drinking that result in health consequences, social problems, or both. Alcohol dependence, often called alcoholism, refers to a disease that is characterized by abnormal alcohol-seeking behavior that leads to impaired control over drinking. Although alcoholics and alcohol abusers may experience many of the same harmful effects of drinking, alcoholics can be distinguished by their physical dependence on alcohol and their impaired control over drinking (National Institute on Alcohol Abuse and Alcoholism (NIAAA) 1994*a*, p. xxi).

National Data

Based on data from the 1988 National Health Interview Survey (NHIS), approximately 32 percent of men and 53 percent of women age 18 and over abstain from alcoholic beverages (Williams and DeBakey 1992). The remaining 68 percent of men and 47 percent of women are current users of alcohol. Among these drinkers, the majority are light or moderate drinkers. Only 19 percent of men who drink and 7 percent of women are classified as heavier drinkers, indicating they consume on average two or more drinks every day.

Data from this survey have also been used to estimate the prevalence of alcohol abuse and alcohol dependence nationally (Grant et al. 1991). An estimated 8.63 percent of the population, over 15 million people, met criteria for alcohol abuse or dependence specified in the *Diagnostic and Statistical Manual of Mental Disorders*, 3d edition, revised (DSM-III-R) (American Psychiatric Association 1987). Abuse and dependence were more prevalent among males (13.35 percent) than females (4.36 percent).

Nonmetropolitan Areas

Use of national data sources to develop estimates for rural areas is complicated by the fact that different classification systems may be used for urbanicity. Rural, as defined by the Census Bureau, is based on

population density and includes territory outside places with a population of 2,500 or more or outside of urbanized areas. The data reported below are based on a classification system adopted by the Office of Management and Budget, in which entire counties are designated as metropolitan (MSA) or nonmetropolitan (non-MSA). Metropolitan counties contain a place or urbanized area of 50,000 or more and a total population of at least 100,000.

These two classification systems overlap, but are not synonymous. It can easily be seen that a geographically large MSA county could contain areas with low population density that are not proximal to an urbanized area. Similarly, parts of a non-MSA county could actually be suburbs for a large metropolitan area lying in an adjacent county. Approximately 34.5 percent of the non-MSA population lives in urban areas, and 16.1 percent of the MSA population are rural (Rogers et al. 1993). Almost 55 million persons, or approximately 22 percent of the total U.S. population, live in nonmetropolitan counties (NCHS 1994*b*).

Alcohol-related data from the 1988 NHIS were analyzed for this chapter according to place of residence designations—MSA or non-MSA (table 1). Comparisons of means indicated significantly more nondrinkers and infrequent drinkers (fewer than 8 drinks in the past year) in the non-MSA areas. Only 44.1 percent of the non-MSA population were current drinkers, compared to 53.9 percent of MSA residents. However, among the current drinkers, MSA and non-MSA areas did not differ in the prevalence of heavier drinking. In both areas, approximately 14 to 15 percent of drinkers consumed an average of two or more drinks daily.

Estimates of the prevalence of persons meeting DSM-III-R criteria for abuse and dependence have not been developed for the non-MSA population, but the survey did include a question in which respondents were asked directly whether they had ever been an alcoholic. There were no differences between the MSA and non-MSA areas in the proportion of persons who reported having been an alcoholic at some time in their life.

Data from the 1984 and 1990 National Alcohol Surveys conducted by the Alcohol Research Group in Berkeley, California also allow the examination of drinking patterns and problems by urbanicity (Midanik and Clark 1995). This study employed different classification criteria for drinking status, so estimates are not comparable with the 1988 NHIS survey. However, the pattern of findings regarding urbanicity are similar to those reported above. In cross-sectional analyses of the 1990 data,

TABLE 1. *Prevalence of alcohol consumption levels and self-reported alcoholism by gender in metropolitan and nonmetropolitan areas, 1988.*

Location	MSA			Non-MSA		
Gender	M	F	T	M	F	T
Drinking category	Percent					
Abstainer[1]	10.0	23.3	17.0	13.1**	33.5***	23.8***
Former drinker[2]	18.3	17.8	18.0	21.9***	18.0	19.8*
Infrequent drinker[3]	6.3	15.4	11.1	7.6	16.3	12.2*
Current drinker	65.4	43.5	53.9	57.5***	32.1***	44.1***
Light drinker[4]	39.7	58.6	47.7	43.4**	62.6**	50.8**
Moderate drinker[5]	40.3	33.5	37.4	38.4	29.6**	35.0**
Heavy drinker[6]	20.1	8.0	14.9	18.2	7.7	14.2
Has been an alcoholic	3.3	1.1	2.1	3.9	0.8	2.2

KEY: * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.002$. 1 = Fewer than 12 drinks in lifetime. 2 = 12 or more drinks in 1 year, but none in past year. 3 = Average less than 0.01 oz. alcohol per day in past year. 4 = Average 0.01 to 0.2 oz. ethanol per day in past year. 5 = Average 0.21 to 0.99 oz. ethanol per day in past year. 6 = Average 1 or more oz. ethanol per day in past year.

SOURCE: Data from 1988 National Health Interview Survey.

Midanik and Clark contrasted respondents in nonmetropolitan areas with those in metropolitan areas of less than 50,000 population and of 50,000 or more. Respondents in large and small metropolitan areas did not differ

significantly from each other, but there were significant differences ($p < 0.05$) between the metropolitan and nonmetropolitan groups on all measures except the five drinks per occasion measure (table 2). Non-metropolitan respondents were less likely to be current drinkers and less likely to be weekly drinkers but were just as likely to report having five or more drinks on one occasion at least once a week during the previous year.

TABLE 2. *Prevalence of drinking, dependence symptoms, and social consequences in metropolitan and nonmetropolitan areas.*

Drinking characteristics	Metropolitan > 50,000		Metropolitan < 50,000		Nonmetropolitan	
	1984	1990	1984	1990	1984	1990
	Percent					
Current drinkers[1]	72.5	67.3	78.6	70.0	63.5	56.3
Weekly drinkers[2]	39.7	31.2	39.6	30.6	31.6	23.7
Having 5+ drinks/occasion weekly[3]	7.2	4.8	7.1	2.7	4.9	3.7
3+ dependence symptoms[4]	7.9	9.7	6.3	5.6	5.8	6.4
2+ social consequences[5]	13.9	13.5	9.0	10.7	9.5	14.2

KEY: 1 = Any alcoholic beverage use in the past year. 2 = Any alcoholic beverage use at least weekly in the past year. 3 = Having 5 or more drinks on one occasion weekly or more often in the past year. 4 = Having experienced 3 or more of 13 symptoms of physical dependence in the past year. 5 = Having experienced 2 or more of 21 social consequences from drinking in the past year.

SOURCE: Data from 1984 and 1990 National Alcohol Surveys conducted by the Alcohol Research Group (Midanik and Clark 1995).

As shown in table 2, in general, lower rates of alcohol use were reported in 1990 than in 1984. Among nonmetropolitan respondents, fewer individuals reported being current drinkers or weekly drinkers in 1990. However, the number of drinkers who reported having five or more drinks on one occasion at least once a week during the previous year did not change significantly (Midanik and Clark 1994).

Using the same two data sets, rates of alcohol-related problems reported to have occurred over the past 12 months were examined. Problems were classified in two broad areas—symptoms of alcohol dependence (i.e., morning drinking, hands shaking) and social consequences (i.e., fighting while drinking, arguing while drinking). As expected, heavier drinkers were more likely to experience dependence symptoms and social consequences than were light and moderate drinkers. In regression analyses, neither urbanicity nor year of survey predicted the presence of drinking problems.

It appears from the three surveys presented here that the prevalence of drinking is lower in nonmetropolitan areas. However, these areas are similar to metropolitan areas in the presence of risk for heavy, dependent, and problem drinking. In the absence of data to the contrary, it must be assumed that they also share equally in risk for health consequences from these levels of consumption.

HEALTH EFFECTS OF ALCOHOL MISUSE

Alcohol consumption may be nonproblematic or it may have negative consequences, some of which directly affect physical or mental health. Other consequences, such as divorce or loss of a job, are not health related, although they may negatively impact on health indirectly through loss of income and concomitant loss of access to health care (see chapter by Kelleher and Robbins, this volume).

Negative health consequences of alcohol consumption are of three basic types: (1) the primary chronic disease resulting from long-term consumption of large quantities of alcohol—alcohol dependence or alcoholism; (2) other chronic disease consequences, such as alcoholic liver disease and alcoholic brain damage; and (3) the acute or immediate consequences of ingesting large quantities of alcohol in a short period of time (minutes or hours), such as alcohol poisoning or alcohol-related motor vehicle crash injuries. Because the majority of drinkers are not

alcohol dependent, it is critical to keep in mind that a person need not be an alcoholic to suffer the negative health consequences of alcohol consumption. For example, teenagers may die in an alcohol-related crash following their first drinking episode or an individual may drink enough to damage the liver or any other organ without being an alcoholic.

Dependence

Key to the problem of alcoholism are the effects of alcohol on the brain itself. It has been known for millennia that alcohol ingestion creates a pleasurable state of mind, yielding after heavy drinking to confusion, incoordination, sedation, and coma. How alcohol produces intoxication is only now beginning to be understood. The brain adapts to long-term exposure to alcohol and eventually functions more normally in its presence (tolerance). When alcohol is withdrawn suddenly, this adaptive state becomes nonadaptive and tremors, hallucinations, and convulsions may ensue (physical dependence) (Charness 1990).

With repeated drinking, susceptible individuals develop a craving for alcohol that becomes the dominating motivational force, sustaining long-term drinking in the face of loss of family, job, and personal dignity (psychological dependence). Over the years, the brains of alcoholics develop lesions due to the toxic effects of alcohol and its breakdown products; liver failure, nutritional deficiency, and repeated episodes of trauma are also common. In many alcoholics, these accumulated insults result in social deterioration, inability to walk, and severely disabling disorders of memory and cognition and, with continued drinking, culminate in death (Charness 1990).

Chronic Health Effects

Alcohol affects every organ in the body. Drinking patterns, amount of alcohol consumed, length of time spent drinking, presence or absence of preexisting diseases or nutritional deficiencies, and genetic factors all influence an individual's likelihood of developing diseases from excessive drinking, as well as the severity of the diseases. Liver disease, the most prominent of these manifestations, is the leading cause of death among alcoholics (Rubin 1989); alcohol misuse is the leading cause of liver disease in America. In 1990, there were an estimated 39,815 deaths for which cirrhosis was an underlying or contributing cause. Approximately 900,000 persons in the United States have evidence of cirrhosis or chronic liver disease (Stroup et al. 1993).

Ninety percent of problem drinkers develop fatty liver, also called alcoholic steatosis; 40 percent develop alcoholic hepatitis and fibrosis (in which healthy liver tissue is replaced with scar tissue); and 15 percent to 30 percent develop cirrhosis. Both fatty liver and hepatitis are reversible if drinking is stopped, but cirrhosis is not.

The likelihood of developing cirrhosis increases with the amount consumed per day and the number of years over which drinking takes place, regardless of beverage type. Women are more susceptible than men to serious liver disease and it progresses more rapidly in women. Nutritional and genetic factors may also be important (NIAAA 1994*a*; Stroup et al. 1993). Metropolitan and nonmetropolitan areas do not differ in prevalence of liver disease (2.84 percent and 2.66 percent, respectively).

Alcoholic brain damage is manifested in a variety of impairments that range from specific disorders to generalized cognitive impairments. Alcoholic dementia results in loss or impairment of mental function, akin to Alzheimer's dementia. Korsakoff's syndrome, one of the most severe brain impairments found in alcoholics, is characterized by the inability to remember recent events or to learn new information (Oscar Berman 1990). Generalized cognitive impairments include absent-mindedness and deficits in learning, attention, memory, and the coordination of fine movements (Ryan and Butters 1986).

Acute pancreatitis is caused primarily by heavy alcohol consumption and gallstones. Approximately three-quarters of people with chronic pancreatitis have a history of heavy alcohol consumption (Van Thiel et al. 1981).

Degenerative changes of the heart and skeletal muscle may result from chronic alcohol consumption (Arria and Van Thiel 1992; Rubin 1989). It is estimated that 20 to 30 percent of cardiomyopathy cases can be attributed to alcohol abuse (NIAAA 1994*a*).

Reproductive disorders in both men and women are associated with alcohol. In women, they include anovulation, amenorrhea, and early menopause (Rubin 1989). Alcohol-related testicular atrophy may contribute significantly to sexual problems in male alcoholics.

Alcohol consumption is a major risk factor for hypertension (MacMahon 1987). Hypertension, in turn, contributes substantially to the risks of coronary heart disease, ischemic stroke, other complications of

atherosclerosis, and damage to specific body organs (Labarthe and Roccella 1993).

An increased risk of cancer of the liver, esophagus, nasopharynx, and larynx is associated with chronic heavy alcohol consumption (Decker and Goldstein 1982; Driver and Swann 1987; Tuyns 1979). Although the evidence is less conclusive, some studies also suggest that alcohol consumption may play a role in cancers of the stomach, large bowel, and female breast (Driver and Swann 1987; Gapstur et al. 1991; Rosenberg 1965).

Fetal alcohol syndrome (FAS) describes a distinct cluster of birth defects that are observed in some children of alcoholic mothers. These include growth retardation, a specific pattern of facial morphological characteristics, and central nervous system effects, the most debilitating of which are mental handicaps and hyperactivity. Fetal alcohol effects (FAE) are also observed in some alcohol-exposed children who do not manifest the complete syndrome (NIAAA 1991*a*). These conditions are believed to be underreported, and it is difficult to estimate the incidence and prevalence of FAS/FAE. An Institute of Medicine (IOM) review of studies worldwide estimates the incidence of FAS to be between 0.5 and 3 cases per 1,000 live births (IOM 1995). Not all children of women who drink heavily during pregnancy develop FAS/FAE, and other biological and environmental factors are believed to play a role. Some populations, including African-Americans and Native Americans, appear to be at much higher risk. Clearly, there will be considerable variability in the prevalence of FAS/FAE among rural locales, depending at least in part on alcohol use practices and population subgroups.

Chronic alcohol abuse depresses the immune system and leaves the individual susceptible to infectious diseases, including pneumonia and tuberculosis (Roselle 1992). The possible role of alcohol in the transmission and progression of HIV/AIDS is under investigation (Kruger and Jerrells 1992).

The development of diabetes can be accelerated by alcohol use, as can the development of nerve and muscle damage. Additionally, a variety of nutritional and blood disorders are related to chronic heavy alcohol consumption (NIAAA 1990, 1994*a*).

Acute Health Effects

Acute effects from alcohol consumption can be equally as devastating as chronic effects, and even light or infrequent drinkers can be at risk. Young drinkers are at special risk for some acute effects, such as alcohol-related crashes and other accidents. Unintentional injuries account for about half of deaths among persons aged 15 to 24. Of these, 75 percent are motor vehicle crashes (Centers for Disease Control and Prevention (CDC) 1991).

Drinking drivers are more likely than nondrinking drivers to be seriously injured or killed when they are involved in accidents, and the likelihood of serious injury or death increases as blood alcohol concentration (BAC) increases. This risk appears to be higher for younger drivers than for older ones, and for women than for men (NIAAA 1994*a*).

In 1993, 44 percent of all U.S. traffic fatalities, a total of 17,461 deaths, were alcohol related. The highest rates of alcohol involvement in fatal crashes occurred among drivers aged 21 to 24, followed by drivers 25 to 44 and 16 to 20. Among drivers aged 16 to 20 and 21 to 24 who were involved in fatal crashes, 16.2 percent and 30.7 percent, respectively, had blood alcohol concentrations of 0.10 grams/decaliter (g/dL) or greater. In most States, this is the legal criterion for intoxication (National Highway Traffic Safety Administration 1993). Although these figures represent decreases from previous years, alcohol-related traffic fatalities remain a major adverse consequence of alcohol misuse.

Alcohol is involved in other forms of unintentional injury, including air crashes, drownings, and falls. Studies using medical examiner or coroner reports have estimated alcohol involvement in deaths from unintentional injury at 30 to 80 percent, varying with demographic characteristics, location, and methodology. The prevalence of alcohol involvement in emergency room trauma cases ranges from 15 to 25 percent. Alcohol has been associated with between 47 and 65 percent of adult drownings (NIAAA 1994*a*). Alcohol involvement in intentional injury, both homicide and suicide, is discussed elsewhere in this monograph.

Alcohol-induced impairment in the performance of complex tasks, such as driving, can begin at very low blood concentration levels (0.01 to 0.02 percent) and increases with higher levels of blood alcohol (NIAAA 1994*b*). Because the prevalence of heavier and problem drinking is similar in nonmetropolitan and metropolitan areas, these areas can be

expected to share in risk for alcohol-induced impairment associated with higher consumption. However, environmental factors are also important determinants of whether impairment results in injury or other accidents. Important factors that will vary with urbanicity and location include quality of roads, miles typically driven, enforcement of driving under the influence (DUI) and other traffic laws, normative attitudes toward driving and drinking, and the presence of home and workplace hazards. Certainly farming, mining, logging, processing of agricultural products, and factories provide more opportunities for injury than do office and business environments. Correspondingly, data from the 1993 NHIS indicate higher annual rates for nonfatal injuries in non-MSA compared to MSA areas (24.3 versus 22.9 per 100 persons, $p < 0.001$) (NCHS 1994*b*).

CONCLUSION

It must be reiterated that the use of data from nonmetropolitan areas is only suggestive of patterns of alcohol consumption and related problems in rural areas. About a third of those living in non-MSA counties are in areas with a population density sufficiently high to be classified as urban, and only 54 percent of the rural population lives in nonmetropolitan counties (Rogers et al. 1993). Equally important, there are tremendous differences among rural areas in population demographics, economic bases, cultural values, and social norms regarding alcohol (Chavez et al. 1986; Chavez et al. 1988; Kirk 1979; Peters et al. 1989). The analyses of nonmetropolitan areas reported here do suggest that, collectively, rural areas are not protected from adverse health consequences of alcohol use.

Although rural areas appear to share similar risks for alcohol problems with the rest of the country, they may not be sharing in prevention and treatment efforts that are appropriate for their populations. Intervention efforts will need to be informed by studies focusing on particular rural locales, types of economies, and population subgroups. Profiles are needed of the nature and density of alcohol problems, factors, and processes underlying alcohol misuse, social, economic, and environmental resources and barriers, and community norms that might impact the acceptability and success of intervention efforts. The limited information available on rural alcohol use primarily focuses on predictors, correlates, and extent of alcohol use among rural adolescents (e.g., Chavez et al. 1986; Chavez et al. 1988; Fournet et al. 1990; Gibbons et al. 1986; Kirk

1979; Long and Boik 1993; Pruitt et al. 1991; Sarvela and McClendon 1988; Winfree 1985).

In keeping with this need for locale-specific studies, the remainder of this chapter will focus on a more specific population—persons living in rural counties in Georgia. Alcohol-related health conditions in these counties will be described, and factors underlying early onset of alcohol use in rural African-American youth will be explored in some detail.

ALCOHOL USE IN RURAL GEORGIA

Rural Georgia: An Overview

The first author and colleagues at the University of Georgia have worked extensively with residents in the rural areas of the State of Georgia. The following discussion of health problems related to alcohol consumption focuses on that rural population.

In 1990, more than 2 million people in Georgia lived in rural areas. The Georgia County Guide (Bachtel and Boatright 1993) defines rural areas as those that do not include any town or city with a population of more than 2,500. Although only a little over a third (37 percent) of the total State population lived in rural areas in 1990, in 129 of the 159 counties more than half of the population was rural (see figure 1). Of these counties, 44 were entirely rural; they will be the focus of the following discussion. Although no data are available documenting rates of alcohol-related morbidity among residents of these counties, estimates of alcohol-related death rates are available. The authors readily acknowledge the inherent limitations in relying on mortality rates to quantify health consequences. Alcohol-induced illnesses or injuries that do not result in death will not be represented; mortality rates are insensitive to new trends in alcohol use; alcohol-related conditions are underreported on death certificates (NIAAA 1991*b*, 1994*a*); and there is no indication of personal and social costs associated with illnesses and/or debilitation before death. However, in the absence of morbidity data, mortality rates can provide a useful first approximation of the alcohol-related health burden experienced in this population.

The U.S. Alcohol Epidemiologic Data Reference Manual (NIAAA 1991*b*) provides age-adjusted mortality rates (annual number of deaths per 100,000 population) for U.S. counties, based on data collected in

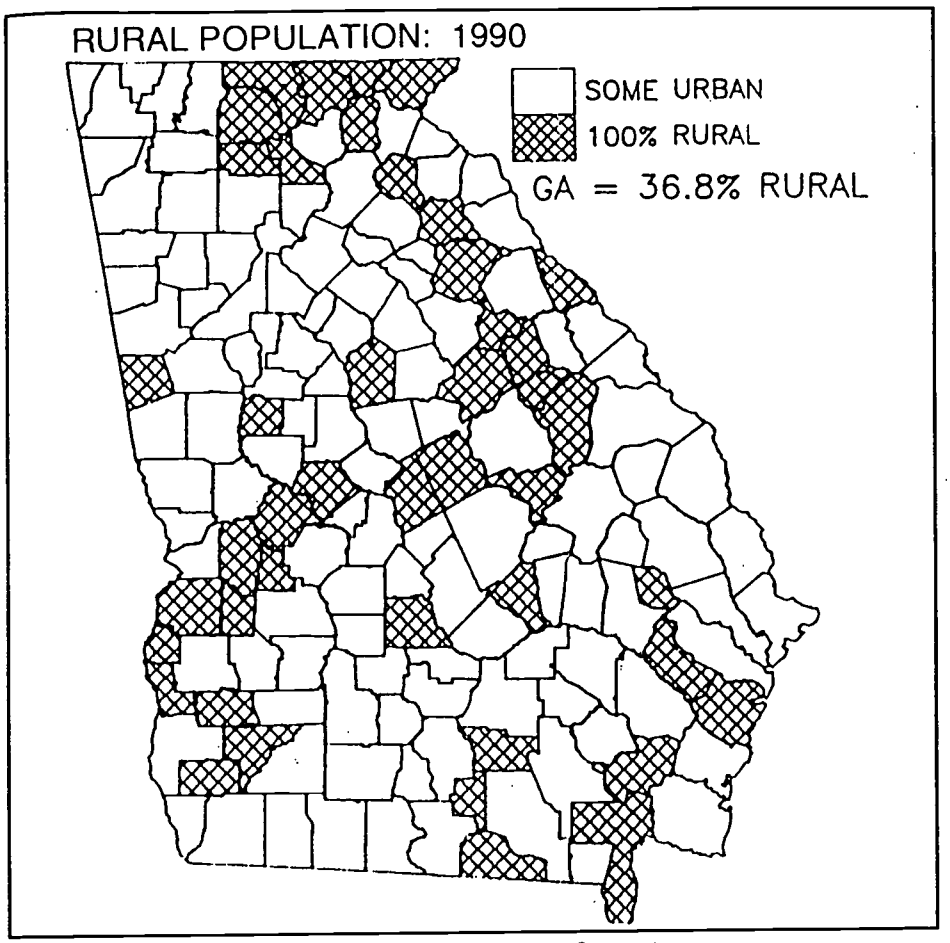

FIGURE 1. *Rural and nonrural counties in Georgia.*

1971, 1980, and 1983 through 1985. Weighted average mortality rates were computed across the 44 rural counties for each of 8 alcohol-related underlying causes of death. These data are displayed in figure 2. The top three bars represent deaths from unintentional (motor vehicle accidents) and intentional (suicide and homicide) injuries, and the bottom five represent deaths from alcohol-induced illness (cirrhosis, alcohol dependence syndrome, nondependent alcohol abuse, alcoholic psychoses, and alcohol poisoning).

In the 44 rural Georgia counties, deaths from alcohol-related injuries far outstripped those from illness. In fact, deaths from motor vehicle accidents alone occurred nearly three times as often as those from all five illness categories combined. More deaths also resulted from alcohol-related motor vehicle accidents (36.6 per 100,000) than from the other

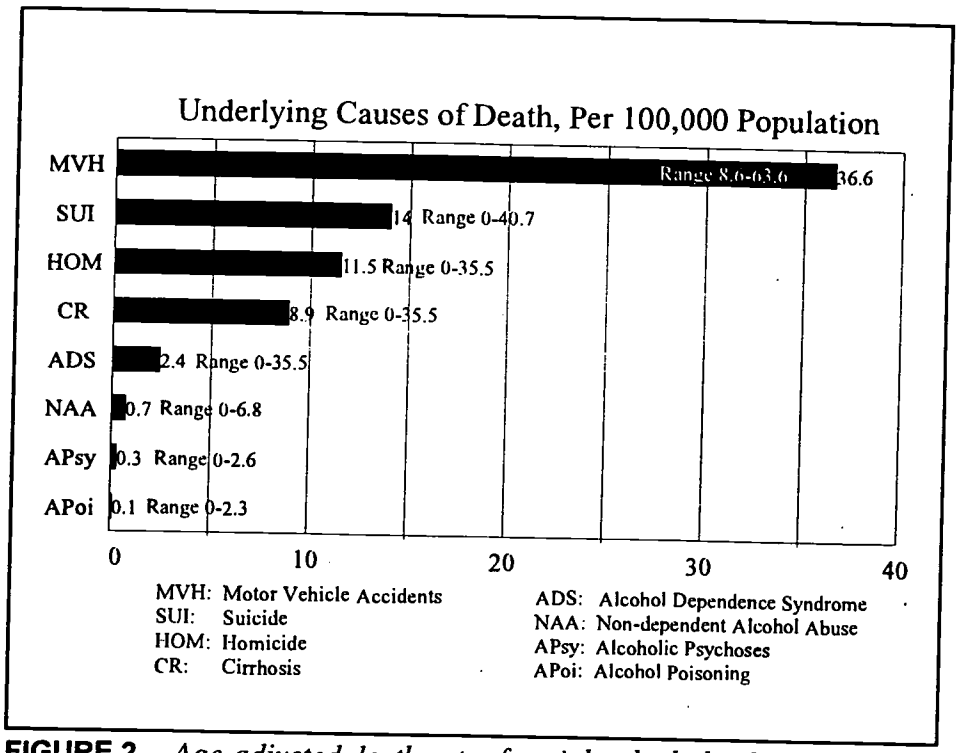

FIGURE 2. *Age-adjusted death rates for eight alcohol-related events or conditions identified as the underlying cause of death in 44 rural Georgia counties, 1979-1985.*

two injury categories, suicides (14 per 100,000) and homicides (11.5 per 100,000), combined. The average age-adjusted death rates for motor vehicle accidents and suicide exceeded those for the Nation (20.4 and 11.5, respectively) and for the State of Georgia (25.5 and 11.9). The alcohol-related homicide rate in rural Georgia also exceeded that for the United States (9.1), but was less than the Statewide rate (12.7), the sixth highest in the Nation.

The average death rate from cirrhosis (8.9) was over twice that from the other four illness categories combined. This is similar to the pattern observed statewide and nationally, although the cirrhosis rate itself was somewhat lower than the State (10.6) and national (10.8) rates.

Deaths may result from the combined effects of one or more contributing causes with the primary underlying cause of death. Figure 3 presents age-adjusted rates for deaths in which an alcohol-related illness was cited on the death certificate, regardless of whether it was the underlying or a contributing cause. By including all deaths in which alcohol has been

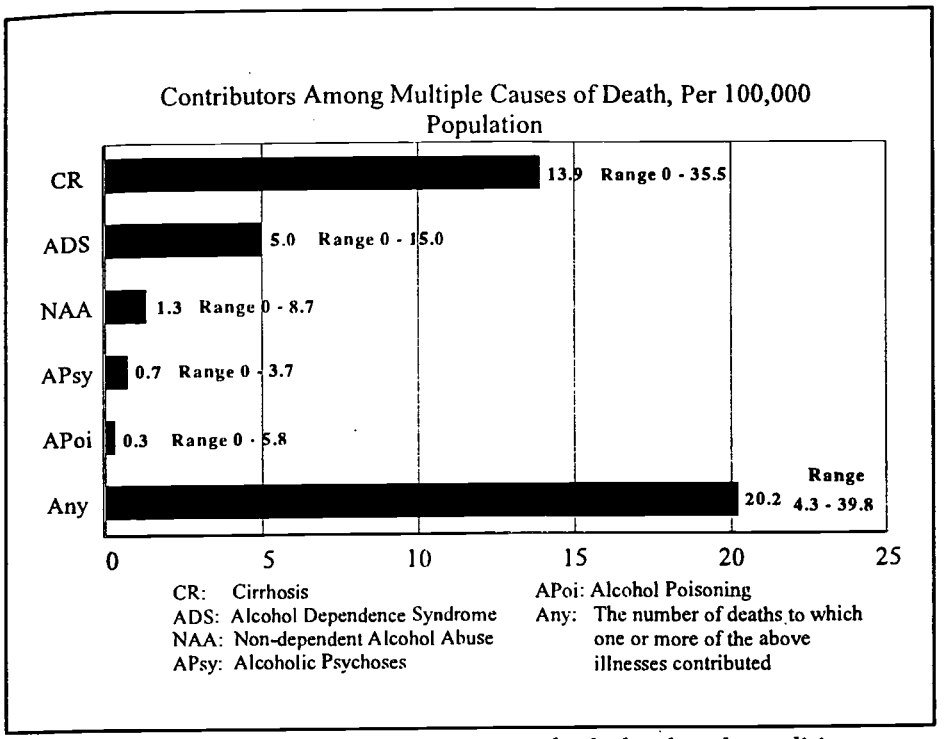

FIGURE 3. *Death rates for five chronic alcohol-related conditions identified as an underlying cause of death in 44 rural Georgia counties, 1979-1985.*

recognized to play a causal role, these data provide a more accurate picture of the full impact of alcohol on mortality (NIAAA 1991*b*).

It should be noted that more than one of the five illnesses shown in figure 3 may have been implicated in a single death, so some deaths have been counted several times. Therefore, the bottom bar in figure 3 presents the age-adjusted rate for all deaths in which there was citation of any one or more of the five alcohol-related causes.

When multiple causes of death are considered, the death rates for alcohol dependence syndrome, nondependent alcohol abuse, alcoholic psychosis, and alcohol poisoning double; and the rate for cirrhosis increases by more than 50 percent. Cirrhosis remains the major cause of death from alcohol-related illness.

The heterogeneity among rural areas, described earlier, is apparent in these data. Even though these rural counties are located in the same State, wide variation exists among them in alcohol-related mortality, as

is evident in the ranges for death rates shown in figures 2 and 3. More realistic comparisons between rural Georgia and other areas on alcohol-related mortality should accommodate this intercounty variation.

Therefore, the death rates for individual counties in Georgia, based on any mention of an alcohol-related illness, were compared with State and national data. Figure 4 shows the number of rural Georgia counties at or above the 50th percentile in such deaths among counties nationwide. Twenty-five counties ranked in the top half for the Nation, and 19 ranked below. For a within-State comparison, all 159 counties in Georgia were ranked by number of alcohol-related deaths, and a median split was performed on the ranking. Nineteen of the rural counties fell in the top half of the distribution, and 25 fell in the lower (see figure 4). It should be noted that Georgia ranks sixth in the Nation for alcohol-related mortality.

Thus, it appears that, as a whole, rural Georgia experiences more alcohol-related mortality than does the Nation, but somewhat less than the State. However, the wide variability among these rural counties indicates a need for research focused on subpopulations at increased risk and that will describe factors and processes underlying that risk. Such foundational research can be critical for the development of effective intervention strategies.

A STUDY OF PREDICTORS OF ALCOHOL USE AMONG RURAL AFRICAN-AMERICAN ADOLESCENTS

It is generally assumed that young drinkers are not at risk for alcohol-related chronic health effects, with the possible exception of HIV transmission, but there has been very little research in this area. Although limited, available studies do suggest a number of potential health consequences from adolescent alcohol abuse, including eating disorders, nutritional deficiencies, liver damage, retardation of bone and muscle development, endocrine abnormalities that can affect the onset and course of puberty, and a diminution of general physical hardiness (Arria et al. 1991). Adolescence is a period of physical and psychosocial maturation, and possible alcohol effects on these developmental processes could result in risks for adolescents not experienced by adult drinkers.

It is clear, however, that adolescents are at risk for a range of acute health effects, especially motor vehicle and other accidents. Due to lack

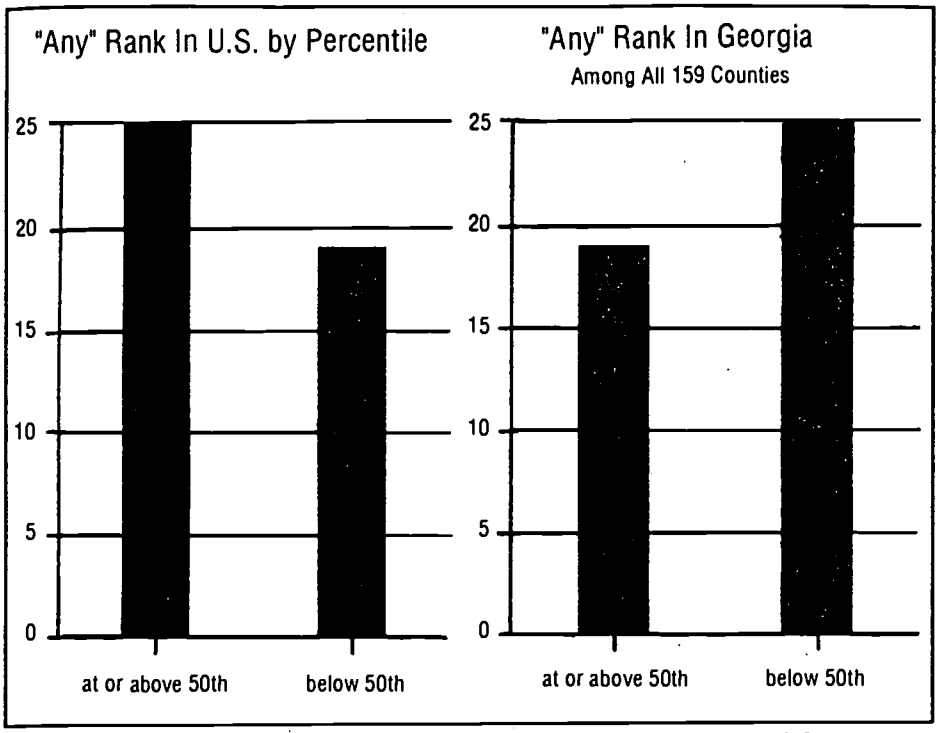

FIGURE 4. *Number of rural Georgia counties whose rate of deaths with an alcohol-related underlying or contributing cause fall above and below the median death rates for all U.S. and Georgia counties.*

of tolerance and inexperience, adolescents are more susceptible to alcohol-related impairment of driving than adults (NIAAA 1994*b*).

Alcohol-related unwanted pregnancy is clearly a major potential health consequence for adolescent females (in 1991, the birth rate for teenage girls aged 15 to 19 was 62.1 per 1,000 population (NCHS 1994*a*)). Equally important, young women who drink during their pregnancy place their infants at risk for FAS/FAE. The period when drinking is first initiated and early patterns of use and abuse become established is a critical juncture in individual drinking careers. Unrecognized physical and developmental effects in adolescence may have long-term health consequences. Disruption of psychosocial development and educational attainment have implications for future health and success. And the early initiation of a pattern of abusive drinking will hasten the development of chronic alcohol-related health problems.

Similarly, effective intervention to delay onset of alcohol use and prevent its abuse will have beneficial effects on immediate and future health. The development of such interventions will be facilitated by an understanding of the sociocultural context within which underage drinking emerges and of the key influences that promote or discourage alcohol misuse.

The first author is conducting ongoing research to identify some of the risk factors and processes that underlie early onset of alcohol use in a specific rural population—African-American adolescents living in areas that include the rural counties described above. Family processes are important determinants of alcohol practices by adolescents in the general population, including urban African-American youth (Barnes et al. 1995; Peterson et al. 1995), and the research described below focuses on this key domain of influence. In the general population, African-American youth do not initiate alcohol use as early as their white and Hispanic contemporaries (Johnston et al. 1994; NIAAA 1994*a*), but African-American men have higher prevalences of alcohol abuse and dependence (Williams et al. 1989) and experience disproportionately high rates of mortality from cirrhosis (Savage et al. 1994). Little is known about the rural African-American population, and the research described was undertaken to describe the nature and predictors of risk among these youth.

Many African-American families in rural Georgia live under conditions of severe, chronic environmental stress. Nevertheless, many of their children are, like those whom Garmezy (1976, 1981) described, "resilient," maturing into emotionally healthy, competent individuals despite these stressors. One possible reason for their resilience lies in the strength of their rural Southern families. Rural African-American families are more likely than those in urban areas to be headed by a married couple, even at poverty levels (Dietrich 1973; Hawkes et al. 1981). Married couples head nearly 70 percent of all African-American rural households with children under 18 (calculated from figures provided by the Census Bureau 1990). These families, as well as those that are headed by single parents (almost always mothers), often have strong extended kin networks that support family members in need (Hawkes et al. 1981), ties that may be more prevalent among rural than urban African-American families (Dietrich 1973; Dietrich and Grieger 1975; Donnenwerth et al. 1978). It appears, then, that many rural African-American families are extended, interconnected kinship networks that provide economic and instrumental assistance and cooperation (Tienda

and Angel 1982), nurturance, socialization, and a cultural identity (Hawkes et al. 1981; Shimkin et al. 1978).

The Development of Self-Regulation and Adolescent Externalizing Behaviors in Rural African-American Youth

In the effort to prevent high-risk behaviors such as alcohol misuse among adolescents, few question the importance of information-based educational programs, typically offered through institutions such as the schools. Increasingly, however, professionals are beginning to recognize the importance of broader social and emotional factors in preventing the initiation of such behavior (Gayle and D'Angelo 1991; Schvaneveldt et al. 1990). The family is often an important influence in the development of attitudes and behaviors that reduce adolescents' involvement in risky behaviors (Adams et al. 1992; Gray and Saracino 1991; Lee and Goddard 1989; Macklin 1988).

Few studies have been conducted of the psychological processes that mediate the impact of family processes on adolescents' risk for alcohol misuse. Data for specific ethnic groups and youths living in rural areas are especially limited. In a review of the literature on family correlates of drug use and nonuse among adolescents, Lee and Goddard (1989) identified family characteristics positively associated with restricting substance use: family members' involvement with one another, shared decisionmaking and clearly explained rules, loyalty and unity, values and religious orientation, emotional closeness and support, open and clear communication, and the ability to cope and to solve problems.

Although these family characteristics have been identified as important to adolescents' avoidance of substance misuse, the mechanism of their influence is less well understood. In concrete terms, why and how are family processes associated with adolescents' involvement in or avoidance of alcohol misuse? In the model that guides this research, specific family processes are hypothesized to affect the development of self-regulation. Self-regulated youths are, in turn, hypothesized to control impulsive behavior in a variety of contexts. This hypothesis is derived from the work of Greenberger (1982) and of Steinberg and colleagues (1989), who found that differences in self-regulation differentiate academically, socially, and emotionally competent adolescents beyond differences attributable to social class or academic ability. The self-regulation hypothesis is also consistent with the literature that identifies social skills and personality strengths important in the

avoidance of alcohol-related problems: personal control, decisionmaking skills, assertiveness, self-esteem, and the ability to communicate (Adams et al. 1992). These hypotheses regarding self-regulation are included within the model described below, and they will be tested as they relate specifically to rural African-American families.

Figure 5 presents an overview of the conceptual model that guides the research described below. In this model, family financial resources were measured using family per capita income, the family's annual income divided by the number of people in the household.

Low per capita income was postulated to be associated with more depressive symptoms and less optimism among parents. Parental mood in turn was proposed as the indirect link through which financial resources would influence parental co-caregiving relationships. The parental co-caregiving construct included three dimensions hypothesized to influence youth outcome: caregiver communication and instrumental support, caregiver conflict over child-rearing issues, and marital interaction quality. Parental co-caregiving functions optimally when parents display congruence on child-rearing practices, communicate with one another about child rearing, and support one another instrumentally on child-rearing tasks (see Belsky 1990). The ways in which spouses relate to one another in the child's presence are also an important aspect of co-caregiving. Harmonious and communicative interaction styles promote child competence and maturity, whereas conflicted styles are associated with children's academic difficulties and adjustment problems (Grych and Fincham 1990). Parents who are less depressed and more optimistic would be more likely to communicate with one another about child-rearing issues and to provide one another with instrumental and emotional support on child-rearing tasks.

Low co-caregiver communication, low instrumental support, and conflicted co-caregiving relationships were predicted to affect indirectly youths' externalizing behaviors by making it more difficult for youths to develop self-regulating competencies. Externalizing problems served as a focus because this behavior forecast involvement with alcohol and the development of alcohol problems. Given the ages of the youths in the sample (9 to 12 years), no appreciable involvement in drinking was anticipated. Youths who display other externalizing problems, however, are at risk for alcohol use, drunk driving, and alcohol problems.

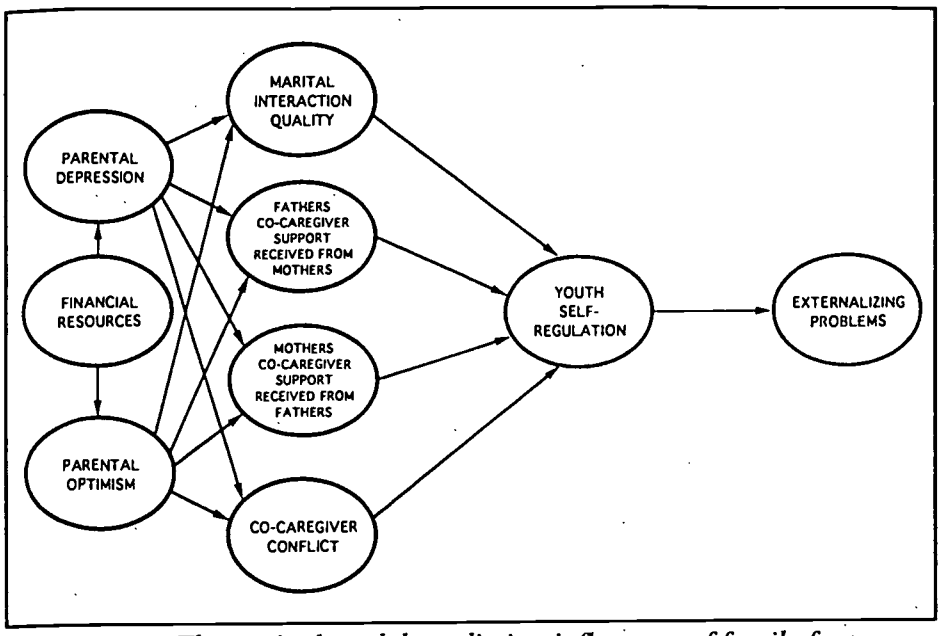

FIGURE 5. *Theoretical model predicting influences of family factors on adolescent alcohol use.*

Subjects

Ninety African-American families with married parents and a 9- to 12-year-old first-born child (48 females and 42 males) were recruited from nonmetropolitan counties in Georgia and South Carolina. This sample was drawn from rural areas with populations of less than 2,500. Only counties in which 25 percent or more of the population was African-American were sampled in order to ensure that a viable African-American community existed within the county. Families were recruited through schools, churches, and community contacts. The families represented an economic cross-section of the population under study; total family annual income ranged from $2,500 to $57,500, and per capita income ranged from $357 to $13,500.

Development of Measures With the Assistance of Community Members

The accurate assessment of the population under study was a concern because most instruments used to evaluate family processes and individual outcomes have been developed for use with, and standardized on, white, middle-class families. Consequently, the available measures may not validly describe family dynamics among rural African-Americans.

The researchers dealt with this issue through the formation of focus groups composed of rural African-American community members.

The communities from which the study participants were recruited are served by two State agencies housed on the University of Georgia campus. The Energy Education Program and the Expanded Food and Nutrition Program employ rural community members as peer agents who visit their neighbors' homes as educators and advocates in areas such as application for energy assistance, energy conservation, and basic nutrition. These agents are themselves African-American parents, representative of the families included in the study. Some agents recommended other African-American community leaders for participation. Two focus groups, each with 20 members, were formed that included people from throughout Georgia. The participants enthusiastically endorsed the research project and its hypotheses and encouraged the researchers to go forward with the study.

The groups then addressed two measurement issues, the first of which concerned the development of valid self-report instruments. Each group member rated each instrument that was to be used on a five-point Likert scale ranging from (1) not appropriate for rural African-American families through (3) appropriate to (5) very appropriate. Those instruments that attained a mean rating of at least 3.5 were retained. For these scales, the focus groups reviewed each item on each scale and suggested wording changes, as well as the deletion of items that they perceived as unclear or irrelevant to rural African-Americans.

The second issue concerned the planned videotaping of family interactions. In past projects the researchers had found that videotaping interactions was essential to the close study of family relationships. The focus group suggested that this procedure be made as nonthreatening as possible by recording no interactions involving finances or other sensitive information. From a list of activities in which families have been videotaped in past studies, the group selected game playing as the context that the families would consider most acceptable. In addition, during the first home visit the project staff clearly explained the videotaping procedure and the reasons for its use, strongly emphasizing its confidentiality. The staff also gave particular attention to establishing rapport and putting the families at ease, a process that was emphasized throughout the project. The majority of the families freely cooperated with the taping, and only two families dropped out of the study because of it.

Procedure

Three home visits, each lasting 2 to 3 hours, were made to each family, arranged as closely to a week apart as the families' schedules allowed. African-American students visited the families in teams of two, one male and one female, in order to give both parents someone with whom they could identify and to whom they could comfortably relate. During home visits, therefore, the male researcher worked primarily with the father and the female researcher with the mother and child.

Measures

Family Financial Resources. A single indicator was used as a measure of financial resources, each family's per capita income. Per capita income was operationalized as the family's total annual income divided by the number of people living in the household. The total family income was derived by averaging the husband's and wife's reports, which were found to correlate significantly ($r = 0.71$; $p < 0.001$). The two reports were averaged to create a more reliable index of family financial resources.

Parental Depression. Depression was assessed using a single indicator composed of 16 items from the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff 1977), which is widely used with community samples. The CES-D depression subscale contains items that were rated on a four-point Likert-type scale indicating how often in the last week the individual experienced the various symptomatic events, ranging from "rarely or none of the time (less than 1 day)" to "most or all of the time (5 to 7 days)." A sample of the items included: "How often did you feel like not eating; had a poor appetite?"; "How often did you feel that everything you did was an effort?"; and "How often did you feel that you could not shake off the blues?" The Cronbach alphas for mothers' and fathers' reports were 0.87 and 0.88, respectively.

Parental Optimism. Optimism was assessed through the use of two indicators: mothers' and fathers' scores on the optimism subscale of the CES-D, and Rosenberg's Self-Esteem Scale (Rosenberg 1965). The optimism subscale of the CES-D contains four items that were rated on a four-point Likert-type scale, indicating how often in the last week the individual had experienced a given event: (1) "How often did you feel you enjoyed life?"; (2) "How often were you happy?"; (3) "How often did you feel hopeful about the future?"; and (4) "How often did you feel

you were as good as other people?" Cronbach alphas for mothers' and fathers' were 0.59 and 0.64, respectively.

The Rosenberg Self-Esteem Scale contains 10 items that are rated on a five-point Likert-type scale, ranging from completely false to completely true. The scale includes items such as: "I feel that I'm a person of worth, at least on an equal basis with others"; "I take a positive attitude towards myself"; and "On the whole, I am satisfied with myself." The Cronbach alphas for mothers' and fathers' reports were 0.78 and 0.82, respectively.

The factor loadings of the two indicators of parental optimism (CES-D optimism subscale score and the Rosenberg scale score) were high and the saturation was moderately high (0.79 and 0.92 for fathers, 0.68 and 0.92 for mothers). These data support previous research indicating considerable overlap between optimistic outlooks and positive views of the self (Scheier and Carver 1985).

Co-Caregiver Support Received from Spouse. Co-caregiver support was assessed independently by fathers and mothers, using two indicators: the communication and instrumental support subscales of Ahrons' (1981) Quality of Coparenting Scales (revised). On this instrument, a five-point Likert-type format is used to indicate the frequency of agreement on parenting issues. Possible responses ranged from never to always. A sample of the six communication items included "How often do you and your spouse talk about your child's accomplishments and progress?" and "How often do you and your spouse discuss school or medical problems together?" Estimates of internal consistency ranged from 0.81 for mothers to 0.82 for fathers.

The items used to indicate co-parenting instrumental support were: (1) "When you need help with this child, how often do you go to your spouse for help?"; (2) "Would you say that your spouse is a help to you in raising your child?"; and (3) "Would you say you are a help to your spouse in raising your child?" Estimates of internal consistency ranged from 0.55 for mothers to 0.60 for fathers.

Co-Caregiver Conflict. Co-caregiver conflict was assessed independently by mothers and fathers, using two indicators: the conflict subscale of Ahrons' (1981) Quality of Coparenting Scales (revised) and the O'Leary Porter Scale (OPS; Porter and O'Leary 1980). Estimates of internal consistency ranged from 0.60 for mothers to 0.68 for fathers.

On Ahrons' co-parenting conflict scale, a five-point Likert-type format is used to indicate frequency of agreement with respect to parenting issues. Possible responses ranged from never to always. The scale includes three items: (1) "When you and your spouse talk about how to raise the child, how often is the conversation hostile or angry?"; (2) "Do you and your spouse have big differences of opinion as to how to raise your child?"; (3) "When your child complains about your spouse, how often do you usually agree with your child?"

To assess frequency of interparental conflict in the presence of children, mothers and fathers completed the OPS. The OPS is a 10-item scale with a five-point Likert-type format that ranges from never/very little to a lot. A sample of the items includes: "How often has your child heard you and your spouse argue about the wife's duties, such as housework or her job?"; "How often do you complain to your spouse in front of your child about the things they do?"; and "How much do you argue with your spouse in front of your child?" Estimates of internal consistency ranged from 0.77 for mothers to 0.87 for fathers.

Marital Interaction Quality. Marital interaction quality was assessed using four observed behavioral indicators: harmony, engagement, communication, and warmth. African-American student assistants received a minimum of 10 hours of training in observational coding, which included study and discussion of the coding category definitions and observation of videotaped family interactions. The coders worked in teams of two, viewing the videotapes and independently rating the interactions on the following dimensions:

- The Conflict-Harmony scale, ranging from (1) conflicted (relationships among the family members are hostile and tense, with frequent displays of negative verbal and nonverbal behavior) to (7) harmonious (relationships are warmly supportive; dialog is relaxed; members clearly work together to resolve issues; tone is friendly).

- The Engagement scale, ranging from (1) not engaged (family members do not speak to one another or interact nonverbally) to (7) engaged (family members frequently talk to each other and interact nonverbally).

- The Communication scale, ranging from (1) not at all characteristic (family members rarely explain or clarify their remarks to make

themselves understood) to (5) highly characteristic (family members virtually always explain and clarify their remarks to promote understanding).

- The Warmth scale, ranging from (1) not at all characteristic (family members rarely or never display examples of warmth and involvement) to (5) highly characteristic (family members actively display high levels of concern, support, praise, encouragement, touching, eye contact, etc.).

The codes were designed to focus on the interacting couple as a dyad, in order that the couple, not the individuals, would be the focus of the analyses. Because couple interactions took place in two task settings, the scores for each setting were averaged across tasks to increase the reliability of the assessments (Epstein 1979). These coders, who also worked as home visitors, did not rate any families whose homes they had visited.

Reliability was calculated using split-half, Spearman-Brown coefficients, computed for each possible pair of observers. Mean agreement scores were calculated across subjects for each pair, and across all pairs of observers. Estimates of reliability between raters for each code were: conflict-harmony scale = 0.86; engagement scale = 0.96; communication scale = 0.97; warmth scale = 0.87.

Youth Self-Regulation. Self-regulation was assessed using the self-control subscale of the Children's Self-Control Scale (Humphrey 1982). This subscale contains five items that were rated on a five-point scale by mothers, fathers, and teachers. The items were: (1) thinks ahead of time about the consequences of his or her actions, (2) plans ahead before acting, (3) pays attention to what he or she is doing, (4) works toward goals, and (5) sticks to what he or she is doing, even on long, unpleasant tasks, until finished. The Cronbach alphas for mother, fathers, and teachers were 0.80, 0.71, and 0.92, respectively.

Externalizing Problems. Externalizing behavior patterns are characterized by angry, disruptive behavior. Mothers, fathers, and teachers completed the 10-item conduct disorder subscale from the Revised Behavior Problem Checklist (RBPC; Quay and Peterson 1987). The Cronbach alphas exceeded 0.90 for both parents and teachers in this sample. Parents and teachers also completed the antisocial behavior subscale from the Self-Control Inventory (SCI; Humphrey 1982).

Cronbach alphas for parents exceeded 0.70, and for teachers, 0.90. The teacher-assigned classroom conduct grade (A, B, C, D, F) was included as an additional indicator.

Results

Latent variable path analysis with partial least-squares estimation procedures (LVPLS) was used to examine the hypothesized relations depicted in the theoretical model presented in figure 5 (Lohmoeller 1989; Lohmoeller and Wold 1984). LVPLS is part of a family of statistical procedures known as component analyses, of which principal component analysis and canonical correlation are most well known.

Structural equation modeling with partial least squares was developed by Wold (1975; Joreskog and Wold 1982) for situations in which data do not meet the highly restrictive assumptions that underlie maximum likelihood techniques such as LISREL (see Falk and Miller 1991; Fornell and Bookstein 1982; Ketterlinus et al. 1989). The advantage of LVPLS over other regression analyses is that it allows the assessment of both direct and indirect effects, both of which are included in hypotheses used in this research.

Several statistics are generated by this analysis (see Falk and Miller 1991). First, goodness-of-fit indices assess the extent to which the model reproduces the actual covariance matrix. The coefficient RMS COV (EU), which stands for the root mean square of the covariance between the residuals of the manifest and latent variables, is an index of the overall model's fit with the raw data. This coefficient would be 0 in a model that describes with complete accuracy the relationships between the variables. A coefficient above 0.20 indicates a poor model, and a coefficient of, for example, 0.02 indicates a superior one. The two models presented here achieved coefficients of 0.07 using mothers' data and 0.08 using fathers' data. Second, the mean of the squared multiple correlations of latent variables is the arithmetic average of the multiple R squares for all the endogenous variables.

The findings presented in figure 6 indicate that financial resources have a negative direct effect on parental depression, and a positive effect on parental optimism. Within the context of the model relationships, greater family resources predicted lower parental depression levels and higher parental optimism levels. An indirect effect also emerged between family resources and the parent co-caregiving constructs, through parental

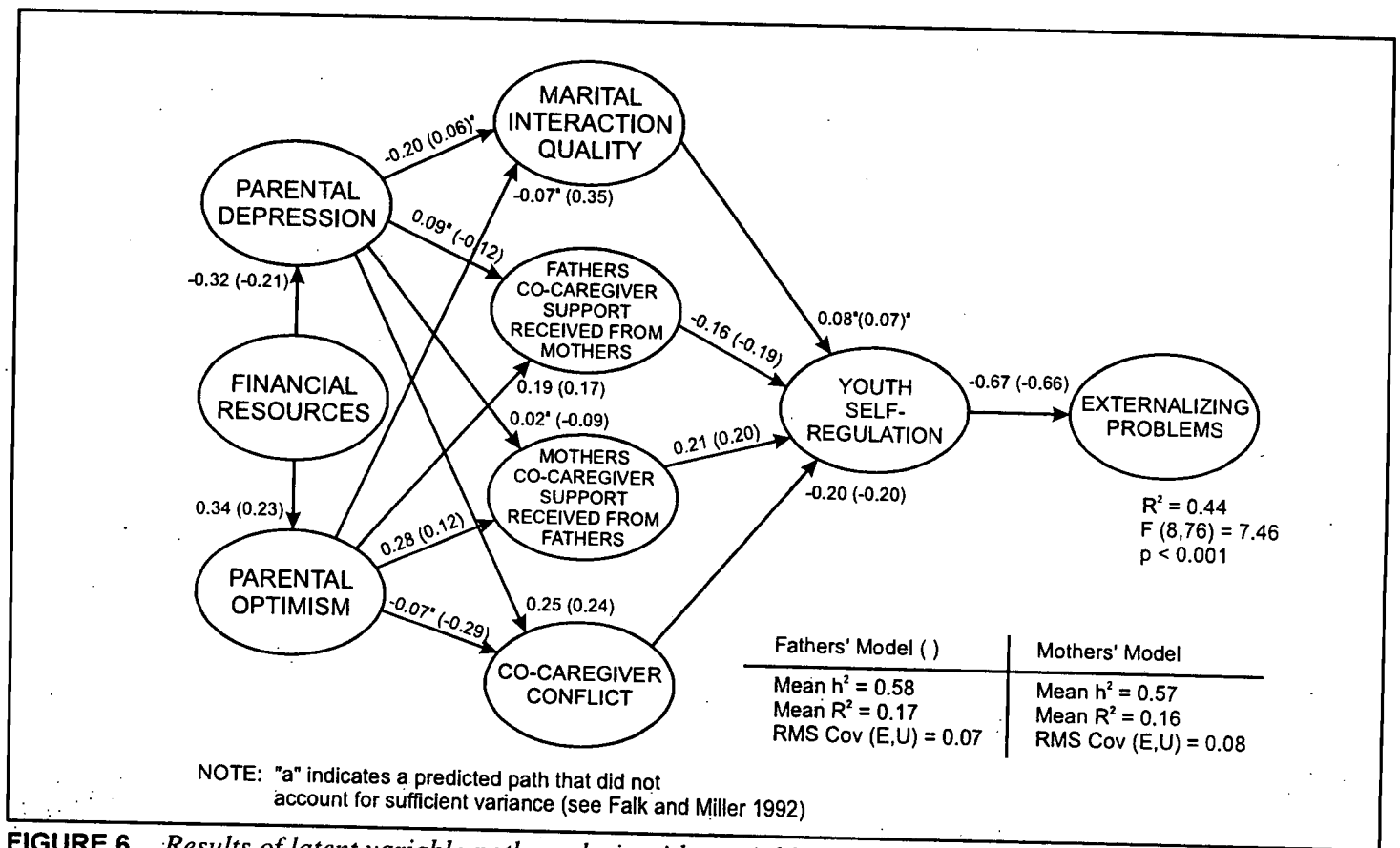

FIGURE 6. *Results of latent variable path analysis with partial least-squares estimation procedure predicting adolescent externalizing problems.*

depression and optimism. In the theoretical model, it was postulated that family financial resources would indirectly affect parental co-caregiving and marital interaction quality through their influence on parents' depressed mood and optimism. These findings are consistent with such a model and support some of the hypothesized pathways.

Maternal depression was negatively linked with marital interaction quality and positively linked with co-caregiver conflict. Greater paternal depression was linked with lower levels of co-caregiving support received from mothers and with higher levels of co-caregiving conflict. Parental optimism also mediated relationships between family financial resources and co-caregiving relationship quality. For both parents, higher optimism levels were associated with greater maternal and paternal co-caregiver support. Paternal optimism was also positively related to higher marital interaction quality and lower levels of conflict, whereas maternal optimism was not. While not all hypothesized pathways were significant, these analyses generally support the role of parental depression and optimism as mediators between family financial resources and co-caregiving relationships.

It was also hypothesized that co-caregiving relationships would indirectly affect the development of externalizing problems through youth self-regulatory competence. Consistent with the theoretical model, parental co-caregiving relationships were related to youth self-regulatory competence, which in turn negatively affected externalizing problems. Contrary to the authors' predictions, fathers' reports of co-caregiver support from mothers was negatively linked with self-regulation. Because data reported here are contemporaneous, it is plausible that less self-regulated youth elicit greater caregiving involvement from their mothers. Marital interaction quality was not related to youth self-regulation.

Two alternative models were also tested. The first added direct paths from family financial resources to the co-caregiving relationship constructs. Consistent with the hypothesized mediational process model, adding these direct paths did not improve the fit of the model, using either the mothers' or fathers' data (adding these paths, either singly or as a group, did not decrease the RMS COV[E,U] or increase the R^2 of the endogenous variables). The second model included only paths from family financial resources to the endogenous variables. The mean R^2 for the endogenous variable for this model was 0.12, compared to 0.44 for the proposed theoretical model. Deleting the hypothesized mediational paths greatly reduces the explanatory power of the data.

Overall, the analyses reported here support the proposed mediational model of relationships among family economic resources, family processes, and the development of externalizing problems that place rural youth at risk for alcohol problems. Greater family resources predicted lower parental depression levels and higher parental optimism levels. These, in turn, influenced parental co-caregiving support and conflict. Not all hypothesized pathways were significant for both mothers and fathers. Generally, however, parental depression was associated with increased conflict and decreased support, whereas optimism was associated with decreased conflict and increased support. As predicted, parental co-caregiving relationships were related to youth self-regulatory competence, which in turn negatively affected externalizing problems.

The analyses reported here are based on data collected when the participating youth were 9 to 12 years old, and significant alcohol use had not yet emerged. These youth will soon be entering their teenage years and will be exposed to both more opportunities and pressures to drink. Future waves of data collection in this ongoing research will be able to test the final hypothesized relationship between externalizing problems and alcohol use.

Recommendations for Future Research and Intervention

The research reported here has focused on factors underlying the onset of alcohol use by rural African-American youth. If the model presented continues to be supported by future waves of data collection when youth in this cohort are in their higher risk adolescent years, it will suggest some avenues for intervention research. The importance of family factors in adolescent decisions regarding substance use has been found in research with a variety of adolescent populations. Intervening with families that are economically stressed, as are many of the families in this study, will be especially challenging.

The methodology used in this study was designed in collaboration with rural African-Americans. Historically, community members have not been consulted in the development of assessment strategies. Although such input does not directly affect the psychometric properties of self-report instruments or interrater reliabilities for observational assessments, it can improve the appropriateness and acceptability of assessment procedures as perceived by participant families and the meaningfulness of resultant data. Family researchers are encouraged to solicit feedback from their target populations concerning research methods and intent.

CONCLUSION

While the available data on health consequences of alcohol use in rural areas are very limited, it is apparent that these areas are not protected from the adverse outcomes of drinking that occur in the general population. Further, there is considerable variability among rural areas in the incidence of alcohol-related health problems, and some areas are at very high risk. Reliance on national-level data will not allow adequate description of the nature and distribution of alcohol-related health problems in rural America. More locale-specific information on the health burden from alcohol is necessary to target areas at greatest need.

Additional research is also needed to understand the factors underlying alcohol use and abuse in different kinds of rural communities for use in developing effective interventions and targeting them appropriately. Programs may need to be tailored to the specific needs and characteristics of rural communities, taking into consideration the wide differences that can exist among them.

The research on underlying factors presented here focused on youth. However, alcohol problems are experienced throughout the life span; and research is also needed on adult alcohol-related problems in rural areas. Groups of special interest include women of child-bearing age, parents, specific occupational categories, and the elderly.

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ACKNOWLEDGMENT

Preparation of this monograph was supported by National Institute on Alcohol Abuse and Alcoholism grant number 5 R01 AA09224-02.

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