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STABILITY AND CHANGE IN ALCOHOLIC MEN OVER TIME

By

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ABSTRACT

Stability and change in alcoholic men over time

By

Fernando Gonzalez

This study examined the longitudinal relationship among antisociality, depression and alcoholism over a three year interval in a sample of 127 men recruited from the mid-michigan area. Using structural equation modeling techniques, stability and change were examined for the complete sample and on an Alcoholic subsample (n=85). Support was found for the presence of a second-order construct labeled General Psychopathology that is made up of the first-order latent factors Antisociality, Depression, and Alcoholism. Results indicated that once an individual becomes Alcoholic, his pattern of drinking is more likely to be influenced by level of depression than by previous drinking habits or difficulties. Both sets of analyses support the hypothesis that depression influences later alcoholism, while providing limited support for the influence of antisociality and prior alcoholism on the later outcome. Meaningful differences were present between the full sample and Alcoholic Only models in terms of both clinical implications and theory. For the full sample, Depression and Alcoholism at Time 1 were found to influence Alcoholism at Time 2, while Antisociality at Time 1 played an insignificant role in predicting later Alcoholism. However, for the Alcoholic subsample, Alcoholism at Time 2 was only determined by Depression at Time 1, and any influence from Antisociality or Alcoholism at Time 1 was negligible.

Differences between the two sets of analyses were attributed to a by-product of using Controls in the analyses.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Chapter 1

Introduction and Review of the Literature

Alcoholics, and in particular alcoholics who abuse other illicit substances, have consistently been found at higher risk for the development of other psychopathology and related problems (Carroll, Malloy, & Kendrick, 1980; Gonzalez, Zucker & Fitzgerald, 1993a; Helzer, Burnam & McEvoy, 1991; Kosten, Kleber & Morgan, 1989). Though there are numerous studies citing increased risk and problems, little is known about the mechanisms through which this effect escalates, ceases or is maintained. The extent to which a person's substance use and misuse may change over time is a fundamental issue in the research. Considering the importance and history of the problem of substance use, there is a paucity of longitudinal literature. In reviewing the international longitudinal research on alcoholism, Fillmore (1988) noted that there was an increase in longitudinal research on adolescents, focusing heavily on social and psychological variables as predictors of substance use. Many of theses studies have attempted to map out the progression and course of substance use (Kandel, 1975; Donovan & Jessor,1983; Pandina, Labouvie, Johnson & White, 1990). Many researchers have concluded that early antisocial behavior predicts substance abuse later in life (Bachman, O'Malley & Johnston, 1978; Jessor & Jessor, 1977).

The present longitudinal study explores patterns of stability and change in the use of alcohol and the impact of antisociality, depression and substance

use on patterns of alcohol use. The study's goal is to explore life adaptation and continuity in drinking patterns and related problems among men in early to middle adulthood, a substantial subset of whom are already known to have a highly troubled life course adaptation. The interval being studied is three years, and covers the span between Wave One and Wave Two of the Michigan State University-University of Michigan Longitudinal Study (Zucker & Fitzgerald, 1992).

Two core hypotheses guide this work. The first hypothesis is that alcoholics who are known to be more dysfunctional and have more severe substance abuse diagnoses and psychopathology at Time 1 will show stability in those problems over time, and will also have higher levels of substance abuse and related problems at Time 2. Second, change will be influenced by the levels antisociality, depression and substance use over the three-year interval; and conversely, positive life experiences and the cessation/decrease of alcoholism, antisociality and depression will lead to less problematic substance abuse at Time 2.

Though there is considerable literature documenting the connection between substance use and increased risk for other psychopathology, few studies have been able to document these difficulties over time. This study reviews three related areas of research on substance use: the cross-sectional literature, the longitudinal literature on adolescent and early adulthood, and the longitudinal literature on adults. The adolescent and early adulthood

literature, though describing two distinct age groups, are combined into one section because many studies beginning in adolescence ended in early adulthood.

Cross-sectional Research

Alcohol consumption increased throughout the 50's, 60's, and 70's, but since 1981 an apparent downturn has occurred. Over the same period, substance use, especially multiple drug use, has increased (6th Special Report to Congress, 1987). The traditional separation of alcohol-dependent persons from drug-dependent persons in treatment and research is no longer in agreement with current trends in substance abuse (Carroll, 1986; Carroll, Santo & Hannigan, 1980; Gardner, 1980; Gonzalez, 1991). "Overwhelmingly, MSA (multiple substance abuse) involves the sequential or concurrent abuse of alcohol and one or more other drugs." (Carroll, 1986, p. 85) The increased prevalence of multiple substance use, especially the combined use of alcohol and other drugs, has caused concern in the academic, medical and political communities.

In reviewing the literature on conjoint alcohol and drug abuse from 1925 to 1972, Freed (1973) concluded that approximately 20 percent of alcoholics use some other addicting drug. Freed also suggested that conjoint use of both alcohol and other addicting drugs is more prevalent among younger people than older people.

Sokolow, Welte, Hyen, and Lyons (1981) reported drug use by 44

percent of 1,340 surveyed clients in alcoholism rehabilitation units. Their research showed that drug-using alcoholics are more likely to be behaviorally and physiologically impaired than non-drug-using alcoholics. Physiological impairment included hangovers, numbness in hands or feet and dizziness. The behavioral scale used in the survey consisted of questions concerning drinking alone, missing work, and having a drink upon waking. Sokolow et al. concluded that multiple substance use was predictive of a poorer outcome after treatment and that alcoholism rehabilitation facilities should improve their assessment for these clients.

In a study of NIAAA-funded alcoholism treatment programs conducted by the Research Triangle Institute (RTI), clinicians interviewed by RTI reported that 30% to 60% of their clients used drugs as well as alcohol at the time of admission and half of those were suspected drug abusers (Tuchfeld et al., 1975).

Hasin, Grant, and Endicott (1988) reported that 54.5 percent of their sample of patients in an alcohol rehabilitation unit were also diagnosed as having a history of drug use disorders. Drug use disorders were second only to major depression (66.7%) as secondary diagnoses. Individuals with a history of drug use disorders were on average much younger and had begun their alcoholism earlier than other patients. Nearly a third of the drug using sample had no friends or had no friends or relatives outside their household to whom they felt close. "Many of these subjects spent much of their time

outside the home drinking with people they did not know well"(p.835). Subjects with drug histories reported missing more days of work in the previous five years than non-drug-using alcoholics. Gender, religion, marital status, and education did not differ significantly between those with and without a lifetime diagnosis of a drug problem.

In a socio-medical comparison of drug abusing and pure alcoholics, Ashley, Le Richie, Olin et al. (1978) observed that, besides being younger, drug-abusing alcoholics were more isolated, more disaffiliated, and physically sicker than pure alcoholics. Lifetime frequencies for neurological, genitourinary, respiratory, and locomotor illnesses were also higher among drug-using alcoholics.

In reviewing the literature on initiation into drug use, Kandel (1978) concluded that later age of onset was related to a greater likelihood of stopping and that the period of highest risk was age 18-22. In a survey of 1,012 university males, Schuckit and Russel (1983) reported "that age at first drink varied inversely with alcohol consumption and frequency of drinking, incidence of alcohol-related problems, and incidence of drug use and associated problems" (p.1221).

Multiple substance abuse among alcoholics correlates with youthfulness and is usually found in populations under 30. Carroll, Santos, and Kendrick (1980) reported the average age of the alcohol abuser as 40, compared to an average age of 26 for multiple substance users. In a prospective longitudinal

study tracing a nationally representative sample of seven cohorts, Menard and Huizinga (1989) concluded that substance use, like delinquent behavior, was subject to maturational reform effects. The study reported a peak at approximately age 20. Possible explanations for differences in age may include cohort or cultural effect or a maturational process.

The National Drug/Alcohol Collaborative Project (NDACP), jointly sponsored by the NIDA and NIAAA and conducted from 1974 through 1978, explored psychosocial and medical backgrounds of a sample of 1544 drug/alcohol abusers (Carroll, Santo, & Hannigan, 1980). Though the NDACP represents a unique exploration of multiple substance abuse and the population investigated was large and both geographically and racially diverse, the selection and screening methods used somewhat limit the study's generalizability. Since subjects were chosen through already funded programs and no attempts at randomization were made, the sample was not representative of any substance-dependent group in the country.

The NDACP project was further limited by its operational definition of alcohol abuse. In initial screening, respondents were asked two questions: (a) "Have you ever had a drink?" and (b) "Have you ever been drunk?" Respondents who answered yes to both questions met inclusion criterion for the initial screening. Though problems with selection and screening methods limited applicability of the NDACP research, the study is not without value. It represents a unique exploration -- the first systematic attempt to study the

concurrent use of alcohol and drugs on a grand scale.

In the NDACP study, 40 percent of alcoholics had also abused heroin at some time in their lives, and 25 percent abused heroin in the three months before beginning treatment. Cocaine use was reported by 24 percent of alcoholics; 11 percent in the last three months. Amphetamine use was reported by 47 percent of the alcoholics; 22 percent in the last three months. However, 96 percent of heroin addicts reported abusing alcohol in their lives, and 76 percent abused alcohol within the last three months. One hundred percent of cocaine addicts reported having abused alcohol in their lives; 79 percent in previous three months. Of amphetamine addicts, 98 percent reported having abused alcohol in their lives; 90 percent in the previous three months (Gardner, 1980). These data illustrate the intimate relationship between alcohol and other drugs.

Carroll and his colleagues' (Carroll et al., 1980) analysis of the NDACP data examined the following factors: family history, education, employment, criminality, family life as an adult, and social network characteristics. The data revealed "a population whose members experienced many medical and psychosocial problems" (p.47). Family problems started at an early age, with 76 percent reporting at least one major family problem while growing up. Divorce occurred in the families of 40 percent of the respondents at subject mean age of 7.8 years. Slightly more than one-fifth of the respondents reported serious or chronic illness in the family. Parental drug abuse and

alcoholism were reported in 12 percent and 35 percent of the families, respectively. Fifty-five percent of subjects did not complete high school. Over 40 percent began full-time employment before the age of 18 and tended to remain unskilled workers. Multiple substance abuse was associated with increased criminality, especially crime unrelated to substance use (e.g., burglary). "As adults, the subjects experienced stressful, problem-filled family or personal lives, much as they did as children" (p.49).

To evaluate the quality or strength of social networks, Carroll and his colleagues asked respondents to list three people they would turn to for help. Respondents cited mothers most often (28%). Only 18 percent identified spouses or children, and 10 percent listed three other substance abusers. Carroll et al.'s (1980) findings supported work by Gilbert and Lombardi (1967) showing that addicts lack stable and warm interpersonal relationships. Gilbert and Lombardi noted that "attempted suicide was reported by 18 percent of the respondents, perhaps reflecting both chaotic internal states and the poor impulse control that is characteristic of individuals with serious drug involvement" (p.50).

It should be noted, however, that the use of clinical populations may skew the findings of some studies, since the self-selection process by which individuals enter the hospital affects the representativeness of the sample. More affluent individuals may seek treatment earlier in the alcoholism continuum process than their less comfortable counterparts; similarly more

troubled individuals may in fact enter treatment later because of shame and/or a lack of coping ability.

The Epidemiological Catchment Area (ECA) study is the largest general population survey of psychiatric disorders ever conducted (Regiers, Myers, Kramer et al., 1984). The study involved face-to-face interviews with over 20,000 respondents in five sites across the nation ranging from major cities to rural areas. The ECA study is the most definitive epidemiological study on alcoholism, assessing alcoholism on a large population using objective definitions agreed upon for use by both researchers and clinical practitioners (Helzer, Burnam & McEvoy, 1991). Working with data from the ECA study, Helzer and Pryzbeck (1988) and Regier, Farmer, Rae et al.(1990) noted that substance use disorders account for a very high proportion of detected illnesses, with alcoholism being the most prevalent diagnosis and drug abuse/dependence third. Thirty-four percent of the ECA sample met lifetime criteria for a core diagnosis of alcohol abuse. Of those 34 percent, 32 percent had a secondary psychiatric diagnosis (Helzer and Pryzbeck, 1988). Alcohol abuse/dependence was the most common disorder and accounted for 13.5 percent of all core diagnoses; drug dependence-abuse disorders accounted for 6.1 percent (Regier et al., 1990). Of those 13.5 percent, 36.6 percent had a secondary psychiatric diagnosis, thus showing that alcoholics were more at risk for a secondary or double diagnosis than non-alcoholic individuals. Of respondents meeting the diagnosis of alcohol abuse/dependence, 21.5 percent

had a drug diagnosis, and half those met the diagnosis of drug abuse/dependence on one or more hard drugs. Substance use disorders were also found to be very highly associated with other non-substance disorders (Spearman r= 0.98).

Analyses of the ECA study by Helzer, Burnam, and McEvoy (1991) examined other diagnoses associated with alcoholism. Higher rates of alcoholism were found among users of harder drugs, ranging from 36% of cannabis users to 62% of stimulant users and 84% of cocaine users. Other areas examined included antisocial behavior, education, marital status, occupation, and income.

The diagnosis most often associated with alcoholism in the clinical literature is depression (Hesselbrock et al., 1985), a diagnosis only moderately elevated among the general population of alcoholics. Helzer and his colleagues posited that depressed alcoholics were more motivated to seek treatment than drug abusing or antisocial personality alcoholics, and thus were more likely to be uncovered in studies of treatment populations. In the ECA data set, affective disorders were found in 13.4% of those individuals with alcohol disorders compared with a 7.5% prevalence rate among those without alcohol disorders (Regier et al., 1990). Of the individuals with one form of affective disorder, 32% had some form of substance abuse-dependence (Regier et al., 1990).

Helzer et al. (1991) found a downward trend in lifetime prevalence of

alcoholism with higher levels of education. Surprisingly, the final level of educational attainment was not as important as whether an individual finished an educational program. College graduates followed by eighth grade and high school graduates had the lowest lifetime prevalence, while high school dropouts had the highest. Marital status was related to lifetime prevalence. The lowest lifetime prevalence was found among those with stable marriages (9%), followed by the never married non-cohabitating (15%), then less stable marriages (16-24%); and the highest among those who cohabit without marrying (30%) (Helzer et al., 1991).

The lowest one year current rate of alcoholism was found among professionals and managers, and the highest among laborers. Additionally, there was an association between income and alcoholism, with fewer alcoholics among the well paid (Helzer et al., 1991).

Antisocial personality was found associated with alcoholism more than with drug abuse (Helzer et al., 1991). Antisocial alcoholics had exceptionally early onset around 20 years of age versus 24 for non-antisocial alcoholics. Antisocial alcoholics also had a higher alcohol symptom count and longer duration of alcoholism. Some form of substance abuse was identified in 83.6 percent of individuals with antisocial personality (Regier et al., 1990). Researchers have consistently found a strong association between the early presence of antisocial behavior and later alcohol problems. Studies using DSM-III and DSM-III-R criteria have found incidence rates of antisocial

personality ranging from 40% to 50% in samples of alcoholic patients (Hesselbrock, Meyer, & Keener, 1985; Penick, Powell, Othmer, et al., 1984).

In examining data from two samples of subjects ages 20-29, one cross-sectional and one longitudinal, Sadava & Pak (1993) found consistent patterns of greater alcohol consumption and greater vulnerability to alcohol-related problems among people who were unattached than among people in committed relationships. "Given the developmental significance of committed relationships at this stage of life, the patterns suggest a problem syndrome among unattached people in this age group which includes tendencies toward problem drinking and psychosocial distress" (p.2).

The most frequent diagnoses co-occurring with alcoholism included depressive disorders, drug dependence and antisocial personality disorder (Helzer & Pryzbeck, 1988; Hesselbrock et al., 1985; Liskow, Powell, Nickel, & Penick, 1991; Powell, Penick, Othmer et al., 1982; Penick, Powell, Liskow et al., 1988); however, distinctions are often not made between alcoholics and alcoholics with additional diagnoses. Liskow and his colleagues (1991) examined the differences between four subtypes of inpatient alcoholics. The groups consisted of alcoholism only, alcoholics with antisocial personality (ASP), alcoholics with ASP and depression, and alcoholics with ASP and drug dependence.

Comparison among the three antisocial groups showed that they differed in measures of psychopathology and course and severity of

> alcoholism. When the ASP groups were compared to an alcoholism only group, an earlier onset, more rapid course and increased percentage of many alcoholism symptoms were found in the ASP groups. (p.62, 1991)

Though the alcoholics with ASP and drug dependence were seven to nine years younger and had an average of six to seven fewer years of alcoholism, they were equivalent or worse than the other ASP groups in terms of consequences of alcohol use. The ASP/drug group members were fired from more jobs due to alcoholism, were younger at the age of first hospitalization for alcohol abuse (over six years younger than the closest ASP group), and had more total arrests. In no area did any of the ASP group have a better course or fewer symptoms than the alcohol only group.

In exploring the differences in a population based sample of alcoholic men with varying degrees of other drug use, Gonzalez, Zucker and Fitzgerald (1993a) showed that compared with pure alcoholics or alcoholics with sub-clinical drug use patterns, drug abusing alcoholics reported higher rates of antisocial behavior (72% meeting criteria for ASP), depression, alcohol related problems and hassles. Drug abusing alcoholics also reported the lowest levels of mental health, global functioning, socioeconomic status, education and income. Age of first drink and drug use were found to be inversely related to the extent of current drug use.

In a cross-sectional population based study of 102 alcoholic men,

Zucker, Ellis and Fitzgerald (1993a) used a dimensional index of lifetime antisociality to distinguish between two types of alcoholics who differed in alcoholic-related difficulties, life adaptation and developmental etiology. Their study showed that Antisocial Alcoholics (AALS) have more difficulty than Non-antisocial Alcoholics (NAALS) on alcohol problems, demographic (e.g., lower income), and psychopathological variables. For Antisocial Alcoholics, biological risk was significantly related to alcohol problem indices. In addition, Zucker, Ellis and Fitzgerald demonstrated through path modeling that both childhood antisociality and a dense family history of alcoholism were predictive of adult alcohol problems for AALS; only depression was predictive of alcohol problems among NAALs"(Zucker, Ellis & Fitzgerald, 1993a, p.1).

Though the effort to categorize alcoholism has a long and distinguished history (Babor & Lauerman, 1986; Cloninger et al., 1981; Knight, 1938), the utility of the classification schemes as clinical tools has often been dubious (Zucker, Ellis & Fitzgerald, 1993a). Use of the antisocial/non-antisocial typology affords several advantages when compared with its predecessors.

> While it retains the capacity to differentiate among subsets of alcoholics in relative salience of family history as a predictor of outcome, it is: (a) more differentiating of alcohol severity in adulthood, (b) more differentiating of co-morbid psychopathology in adulthood, and (c) the pattern of suggested etiology...is more clearly consistent with the existing literature on the origins of problem alcohol involvement than

has been true of other models (Zucker, Ellis & Fitzgerald, 1993b, p.15-16).

From the cross-sectional research we can begin to understand and form a picture of the effects of substance abuse/dependence. Substance use has been shown to affect people at many different levels and areas of their lives. In addition to the problems directly related to substance use, many non-drug specific problems also arise. Antisociality and depression are recurring themes within the literature and have been shown to be intimately related to substance use, and are posited to place individuals at greater risk. The ECA study, like many of the studies reviewed, allows for study of the structure of alcoholism and associated consequences, but is limited by its cross-sectional design. The following sections will review the longitudinal literature on continuity in substance use. Longitudinal research, having the advantage of ascertaining the order of events, allows for a more comprehensive examination of substance abuse.

Longitudinal literature on adolescent/early adulthood

The issue of drug use should be viewed as a developmental task confronting the contemporary adolescent (Jessor, 1983). Focusing on the onset of drinking in adolescence, Jessor and Jessor (1975) described it as "an age-graded, normatively regulated, transition-marking behavior" (p.31). A follow-up study tracing subject development into young adulthood showed a trend away from problem drinking and back to conventionality in psychosocial

variables (Donovan, Jessor & Jessor, 1983). Those classified as problem drinkers as adults had less involvement in school and church, had fewer positive role models and were generally more prone to deviant behavior in adolescence. These trends leveled off during the college years and reverted back toward the direction of greater conventionality during the third decade in life (Donovan, Jessor & Jessor, 1983).

Shedler and Block (1990) followed 101 subjects from preschool through age 18 and found that individuals who engaged in drug experimentation were the best adjusted individuals in the sample. In contrast, those subjects who used drugs frequently were maladjusted, displaying symptoms such as poor impulse control, interpersonal alienation, and manifest emotional distress. Surprisingly, subjects who by the age of 18 had never experimented with drugs were relatively anxious, emotionally constricted, and lacking in social skills. Experimentation and use are viewed as normative in adolescence, with expectations that the individual will return to conventionality. Continuation or escalation of substance use can be viewed as non-normative development, and the prevailing evidence suggests it is linked to greater levels of corollary psychopathology.

Non-normative development has been researched using at-risk populations and longitudinal studies. In reviewing longitudinal etiologic evidence, Zucker and Gomberg (1986) noted the following cross-study commonalities: childhood antisocial behavior was consistently related to later

alcoholic outcome; males who later became alcoholics were more loosely tied to others interpersonally; heightened marital conflict was reported with consistently greater frequency in pre-alcoholic homes; parent-child interaction in pre-alcoholic homes was characterized by inadequate parenting and the child's lack of contact with the parent(s); parents of pre-alcoholics were more often inadequate role models for later normality; parents of pre-alcoholics were more likely to be alcoholic, antisocial, or sexually deviant.

Though most of the research on the etiology and development of substance abuse disorders has focused on adolescent populations, few studies have made the link relating these findings to future patterns of use and dysfunction as adults. Using longitudinal data, Pandina, Labouvie, Johnson and White (1990) examined the predictive power of baseline and changing intensities of substance use on personal and social competence and the ensuing effect of changing levels of social competence on subsequent substance use. Data on 1308 youth ages 12, 15 and 18 was collected, and the subjects were retested three years later. Pandina and her colleagues found that heightened levels of substance use were likely to perpetuate dysfunction across time, especially when substance use began between the ages of 12 and 15. "In turn, the perpetuation of deficits in competence is likely to maintain drug use" (p.89).

On the basis of these data as well as theory, it is reasonable to posit that the use of drugs during adolescent years negatively affects an individual's life

trajectory by retarding development of personal and social competencies. Deficits in personal and social skills may subsequently lead to weakening of social controls and involvement with delinquent peers, increasing the number of role models, opportunity, and motivation for further substance use and leading to poorer adaptation as young adults and thereafter. However, Fillmore's (1988) review suggested that as the data net is spread over a longer period, the findings are less clear-cut. Though the literature has repeatedly demonstrated the instability of drinking patterns over time, explanations are not yet available (Temple and Fillmore, 1985-86).

Researchers have had more success documenting the developmental stages of various drugs among adolescent substance users (Kandel, 1975). Denise Kandel (1975; Kandel & Faust, 1975) based her developmental model of drug involvement on a Guttman scale analysis of data from a longitudinal study of New York high school students in 10th and 11th grade. According to Kandel, five distinct developmental stages exist in the progression from legal to illegal drug use: (1) no use of any drug, (2) moving to beer and wine, (3) then cigarettes or hard liquor, (4) marijuana, and last (5) illicit drugs other than marijuana. Analyses were replicated on two different cohort samples (N = 5,468 and 985), and the data demonstrated that marijuana was a "necessary" pre-condition of later use of illicit drugs such as heroin and cocaine. Kandel showed that there is progression, from less severe licit drugs to the more severe illicit drugs.

Yamaguchi and Kandel (1984) conducted follow-up interviews with 24-25 year-olds initially interviewed nine years earlier as 10th and 11th graders. They conclude that:

> For men, the pattern of progression is one in which the use of alcohol precedes marijuana; alcohol and marijuana precede other illicit drugs; and alcohol, marijuana and cigarettes precede the use of prescribed psychoactive drugs. Eighty-seven percent of men (87 percent not by chance) are characterized by this pattern.

Cohen (1981) and O'Donnell and Clayton's (1982) worked support Kandel's interpretations. Work by Donovan and Jessor (1983) also supported the progression model, suggesting "that problem drinking may be seen as yet another step along an underlying dimension of involvement with both licit and illicit drugs" (p.543). Donovan and Jessor posited that excessive use of licit drugs such as problem drinking is more indicative of drug involvement than marijuana use.

Andersson and Magnusson (1988) investigated the relationship between self-reported frequency of drunkenness at 14-16 years of age and registered alcohol abuse at age 15-25 in a representative sample of Swedish males. Though they found that a high self-reported drunkenness at 14-16 was significantly related to registered alcohol abuse at age 18-24, 70-80 percent of the adolescent boys with the greatest frequency of drunkenness were not registered for alcohol abuse in young adulthood. The self-report data at age

14-16 allowed correct classification at age 18-24 of only 6 percent more adolescents than would have been expected by using random chance.

Numerous researchers (Bagnall, 1991; Ghodsian & Power, 1987; Ritson & Peck, 1989) have found evidence of some consistency in experiencing alcohol related problems. In examining the drinking habits of a cohort of 1,036 students at 15-16 year-old and again at 24-25, Bagnall (1991) noted that patterns of alcohol use at 15-16 bore little relation to consumption at 24-25. However, Bagnall identified a significant association between heavy drinking in wave one and subsequent illicit drug use at wave three, but not wave four. Additionally, he noted that marriage had a moderating influence on the level of alcohol consumption, finding that marriage was less common among those who had increased their consumption between ages 16 and 23.

Using data from the National Child Development Study, Ghodsian and Power (1987) examined the alcohol consumption of 6109 men and 6151 women at age 16 and 23. Correlations of .15 for women and .16 for men (both $p<.001$) were found in comparing alcohol intake in the week before testing at age 16 and 23. The low correlations suggested considerable movement between drinking categories; however, "the likelihood of heavier drinking was greater for those with earlier heavy drinking. For example, men who drank four or more units in a week at 16 were more likely to consume more than 50 units in a week at 23 (18%) than those who had never drank at (4%)"(p.178).

Donovan, Jessor and Jessor (1983) explored the degree of continuity in

problem drinking from adolescence to young adulthood, as well as the connection between measures of personality, environment and behavior in adolescence and later problem behavior. They reported that the modal tendency was in the direction of noncontinuity, with those respondents classified as problem drinkers in adolescence or college (1972-1973) tending to be nonproblem drinkers as young adults (1979). Variables identified in adolescence were found to be only moderately associated with later involvement in problem drinking in young adulthood. Donovan and colleagues posited that failure of the adolescent correlates to provide a stronger account of future behavior may be due to the multitude of changes in life situations experienced by respondents:

> Such transitions as getting married and having children do appear to have some influence on both the discontinuation for adolescent problem drinking and the continuation of nonproblem drinking. For example, among the high school sample men who were problem drinkers in both adolescence and as young adults, only 20% got married in the interim period; in contrast, 56% of the adolescent problem drinkers who became nonproblem drinkers as young adults got married in the interim. Among the college sample men who were problem drinkers in 1973, 39% of those who were still problem drinkers as young adults had gotten married between 1973 and 1979, in contrast to 62% of those who became nonproblem drinkers as young adults. (1983, p.134)

In examining the extensive follow-up data of the Monitoring the Future data set, Bachman, O'Malley, Johnston et al.(1992) noted that "on average, age related downturns in substance use take place during the mid-twenties. This study uses data available from senior class cohorts from 1976 onward, with each class followed for ten years. These declines occur primarily because at these ages increasing proportions of young adults become married and take on additional responsibilities such as pregnancy and parenthood"(p.1). Being married and/or a parent was associated with a reduction in use of both licit and illicit substances. No evidence was found connecting unemployment with increased alcohol use.

Temple and Fillmore (1985-86) examined the variability of drinking patterns and problems among 240 men followed from the age of 16 to 31 using a twelve panel longitudinal design. Temple and Fillmore found that the variables accounting for 42 percent of the variance at the age of 18 accounted for only 3 percent at age 31.

> The results indicate that there is little continuity in drinking across time, and that while an explanatory model using as independent variables the impact of negative peers, family social class, family support, and high school success is successful in predicting involvement at age 18, this model is of little utility in predicting alcohol involvement at age 31. (pp.1595-1596)

Temple and Fillmore further argued that because changes in drinking were

related to key transitions in the life cycle, predicting drinking patterns and problems at different points in the life will require different explanatory models using variables of importance to the chosen period.

Similar results were found by Plant, Peck and Samuel (1985) in a study following a representative group of Scottish teenagers from 15-16 to age 19-20. Plants, Peck and Samuel showed that early alcohol consumption or problems were poor predictors of the same variables four years later.

In a meta-analysis of 12 longitudinal studies, Temple, Fillmore, Hartka et al.(1991) examined the consistency of results with respect to change on the individual level in employment and marital status. Becoming married was associated with a decrease in consumption, while becoming unmarried was associated with increased consumption. No relationships were found between becoming unemployed or employed and consumption at Time 2.

> Perhaps the most important finding from these analyses is the relatively modest amount of explained variance contributed by the role and status change variables in the individual models for many of the studies under consideration. This is surprising in the view of the fact that marital and employment status have been the primary candidate for variables thought to change the course of drinking careers over time. (Temple, et al., 1991, p.1279)

There are, however, many limitations with the analyses that may have affected the results (Temple, Fillmore, Hartka et al., 1991). As described by

Temple and his colleagues, these limitations included: 1) No knowledge regarding the timing of change; 2) Only one dimension of drinking was examined in the analyses; 3) The measure of change may be relatively insensitive since the study collapsed differences into single categories; 4) The analyses used only first and last measurement points; 5) Abstainers were included in the results; and 6) Possible influences of race/ethnicity/social class, as well as history, culture, and cohort were not examined.

Research by Grant, Harford and Grigson (1988) reinforced Donovan and his colleagues' (1983) finding that young adults abandoned adolescent drinking patterns as they began to encounter the many responsibilities of adulthood; however, Grant concluded that with "regards to stability of drinking patterns over time, the modal tendency appeared to be in the direction of continuity" (p.258). Using the 1982 and 1983 panels of the National Longitudinal Survey of Labor Market Experience (Center for Human Resources Research, 1983), Grant et al., found that nearly 86.5 percent of current adolescent drinkers in 1982 maintained their current drinking levels in 1983.

In critiquing the data presented by Temple and Fillmore (1985-86), Windle (1988) concluded that the "data they present are not consistent with their conclusions of "strong" discontinuity, but reflect features of both continuity and discontinuity" (p.909). Using the same data Windle showed that the following conclusions could be reached:

(1) that there is a good deal of stability in drinking behavior over this

13-year interval; 2) that there are a fair number of regular drinkers at age 31: and 3) that these data are inconsistent with previous literature because they suggest that drinking to "regularly get high" in adolescence is indeed moderately to highly associated with "regularly getting high" in young adulthood. (p.909)

Longitudinal literature on adulthood

One of the initial general population longitudinal studies of adults was carried out by Cahalan (1970) and his associates using probability sampling techniques to obtain representative samples of drinking patterns and problems in different samples (Fillmore, 1988). Cahalan followed 751 men and 608 women over a three year period with subjects ranging from 21 to 70-plus years of age. Cahalan concluded that "problem drinking changes, and is correlated with changes in the lives of the respondents"(p.120). He showed a relationship between alcohol problems and marital status with maritally unattached being more likely to experience problems. Cahalan also found that higher rates of drinking problems were found among lower-status men under the age of sixty, while a "maturing-out" effect was found for higher-status men as they aged. Although Cahalan found some continuity of drinking problems over time, a substantial number of people reporting alcohol problems at one time period who reported none at the second measurement. Cahalan found that the chief single variable in predicting problem drinking scores was the person's attitude toward the usefulness and importance of alcohol in his life. This finding led

Cahalan to conclude that the there would be a "high payoff" in concentrating on understanding the origin, characteristics, and causal sequence of the development of attitudes about "drinking as such attitudes relate to the onset and changes in the severity of problem drinking in individuals over a period of time"(p.113).

In a similar study, Clark and Cahalan (1976) reported that within adulthood there was little consistency over time in experience of alcohol related problems, with most problem drinkers moving in and out of various categories of severity. They examined changes in problem drinking over a four year period in a strict probability sample of 615 respondents, ranging from 21 through 59 years of age at the first wave of data collection. Clark and Cahalan concluded that:

> Drinking problems do not typically appear unilinear, with progression from less severe problems to more severe problems and from single problems to many problems. Rather we observed great flux and turnover in alcohol problems, both in terms of problems and types of problems, over the short four year span. Many drinkers with numerous and severe problems are found to have gotten out of trouble at a latter time. (p.258)

In later analyses of the data set used by Clark and Cahalan (1976), Fillmore and Midanik (1984) showed that the "chronicity of alcohol problems among men is a function of age; the probable chronicity over time is greater

among older than among younger men. Alcohol problems among older men show greater interrelationships; remission is higher among younger men"(p.228). Fillmore and Midanik also noted that the age of alcoholics in clinical populations usually ranged between 35 and 60, while those individuals with serious drinking problems in the general population tended to be in their early 20s. Similar results were found by Temple and Leino (1989) who followed 786 males over a twenty year period, showing that as the respondents aged 20 years, their mean level of alcohol consumption remained stable.

Ritson and Peck found a moderate degree of temporal consistency in total number of problems in a random sample of 608 men and 399 women between the ages of 17 and 50, followed up three to four years later. The most consistent element among respondents was a feeling of shame over their behavior while drinking (Ritson & Peck, 1989).

Skog and Duckert (1993) examined data from two prospective studies of alcoholics and problem drinkers who had received treatment. The subjects were interviewed four times, beginning six months after treatment and then every twelve months. In their analyses, Skog and Duckert found substantial changes in heavy drinkers' and alcoholics' consumption over time, and that changes showed signs of accumulation over time. Their results indicated that consumption levels were very unstable over longer periods and that the evidence or sign of a systematic progressive disease as described by Jellinek

(1960) was weak. At all levels of consumption, substantial changes in drinking patterns were found, and these changes in drinking were nearly equally strong in both directions. "It is concluded that the observed patterns of change more resemble an indeterministic (or stochastic) process than a systematic natural history of a disease" (Skog & Duckert, 1993, p.178). Further, when change occurred, subjects usually moved to a neighboring consumption category, with very large and dramatic jumps occurring very infrequently. The authors took the perspective of describing drinking careers as a partly structured, "never" ending process of change (p.186).

In attempting to ascertain whether alcohol abuse was validly differentiated from the DSM-III-R category of alcohol dependence or was primarily a mild prodromal condition that deteriorates into dependence, Hasin, Grant and Endicott (1990) re-analyzed data from early work by Cahalan and Room (1974). The four-year longitudinal epidemiologic study of male drinkers recruited using national probability sampling techniques. Of the total sample of 593, 71 were classified as alcohol abusers without dependence indicators at the initial data collection. At follow-up, seventy percent (N=50) of the sample that was initially classified as alcohol abusers were still classified as abusers or were classified as remitted, indicating that although alcohol abuse appears to pose a risk for later alcohol dependence, alcohol dependence was not an inevitable fate. Of those subjects who where initially classified as alcohol dependent (N=109), fifty subjects (46%) were classified as dependent, and fifty-

nine (54%) were classified as abusers (N=16) or remitted (N=43). However, the authors noted that a longer follow-up would have provided additional information about the eventual outcome of alcohol abuse and dependence.

A related area that has received attention in the cross-sectional literature but is rarely studied in the longitudinal literature is the relationship between depressed mood and alcohol consumption. Though there is a consensus within the literature that depression co-occurs with alcoholism most often, little is known about the relationship between depression and alcohol and/or drug use. Previous research has proven inconclusive about "whether feeling depressed makes people drink more, or whether drinking makes people feel depressed" (Hartka, Johnstone, Leino et al.,1991, p.1285). Hartka and her colleagues noted that if depressed mood causes an increase in drinking, then treating the alcoholism and ignoring the concomitant depression would not address the total clinical picture. However, if depression is simply a symptom or byproduct of alcohol abuse, treating the alcohol abuse would alleviate the depressive symptoms (Hartka et al., 1991).

In reviewing the literature assessing the relationship between mood and alcohol use, Freed (1978) concluded that alcoholics experienced increasing dysphoria as a consequence of alcohol consumption, whereas nonalcoholics were more likely to anticipate and generally attain elevated moods from drinking alcohol. In a more recent review Schuckit (1994) wrote that individuals with depressions were likely to develop alcohol dependence at a

rate similar to the general population, while alcoholics were at greater risk to experiences severe depressive episodes. He noted that the depressive experiences of the alcoholic were often severe, but may be temporary major depression in the context of repeated heavy intoxication. Schuckit stated that each of these disorders was distinct with different prognoses and treatments, and that steps need to be taken to diagnose these disorders more accurately. He also posited that the difficulties with diagnosis often stemmed from confusion about differentiating drinking from alcoholism, sadness from depression, and the chronology of symptom development (Schuckit, 1986; Schuckit & Monteiro, 1988).

In assessing the long-term consequences of alcohol consumption on depression in a one year, four wave longitudinal study of 742 adults, Aneshensel & Huba (1983) posited that "feelings of depression may be followed by an attempt on the part of the individual to self-medicate the depression through the increased use of alcohol" (p.149). In the short term, higher alcohol use predicted lower levels of depression (i.e., four months); but in the long-term (i.e., one year), higher levels of alcohol use predicted higher levels of depression (Aneshensel & Huba, 1983). Aneshensel and Huba concluded that drinking alcohol did not alleviate long-term tendencies to become depressed and was not an effective means of self-medicating.

Problem drinking and depression among driving while intoxicated (DWI) offenders was examined longitudinally by Windle and Miller (1990).

They followed 302 subjects at 9 month intervals for three occasions. Their results were not clear cut and were described as reflecting a biphasic process, with a cross-lagged latent variable model showing high levels of depression at Time 1 associated with lower levels of drinking at Time 2. Similarly, higher levels of drinking at Time 1 were associated with lower levels of depression at Time 2. However, the cross-lagged coefficients were reversed for the same paths from Time 2 to Time 3, with higher levels of depression (T2) associated with higher levels of drinking (T3), and higher levels of drinking (T2) associated with higher levels of depression (T3). Windle and Miller suggested that the higher level of depression at Time 1 may reflect a response to being arrested and the uncertainty about the social, personal and legal consequences which may have led to an evaluation of life circumstances that further increased the subjects' levels of depression. They also suggested that inhibitory reactions related to the DWI arrest or treatment may have resulted in a reduction in both problem drinking and depression at the second measurement point. Windle and Miller also posited that between Times 2 and 3, no DWI arrest or treatment associated effects were present, resulting in a reversal of the cross-lags coefficients.

In a recent random sample survey of 1,192 household residents over a 7-year longitudinal study, Peirce, Frone, Russel and Cooper (1995) examined the relationship among social network contact, perceived social support, depression, and alcohol involvement. Examining the assertion that people

consume alcohol in order to regulate or relieve negative emotion, the authors followed the respondents over four waves of data collection. They were guided by the tension-reduction hypothesis and developed and tested an integrative model using structural equation modeling analysis. Peirce and his colleagues concluded that: "1) social contact was positively related to perceived social support, 2) perceived social support was, in turn, negatively related to depression, and 3) depression was positive related to alcohol involvement" (p.2). Further, the model suggested a feedback effect, such that an escalation of alcohol involvement reduced subsequent contact with one's social network and increased depression.

In a meta-analysis of eight general population longitudinal studies examining depressive symptoms and alcohol consumption over time, Hartka et al.(1991) found no relationship between Time 1 consumption and final measurement of depression for either long or short intervals between measurement. Over the long term, they found no connection between depression and drinking, but did find that depression decreased drinking in the short term. Hartka and her colleagues controlled for age and sex in their analyses, but did not control for other potentially stabilizing factors such as marriage, employment, SES, or education. Hartka argued for the inclusion of psychosocial variables in future analyses.

A related clinical area that has recently been the topic of study is the relationship between depression and relapse of alcohol use in individuals who

have sought treatment. In reviewing the literature on relapse Hodgins, el-Grebaly and Armstrong (1995) found that relapse has consistently been associated with negative mood states (e.g. depression, loneliness, anger), and negative mood states were frequently reported as precipitants of relapse. Additionally, men who returned to drinking after treatment were more likely to report more severe stress before their relapse than were men who remained abstinent (Brown et al., 1990).

Brown et al. (1995) compared the change in depressive symptoms among men with alcohol dependence, affective disorder or both, during a four week inpatient treatment. The rate of remission of depressive symptoms, as measured by the Hamilton Rating Scale for Depression (Hamilton, 1967), was consistent with their primary diagnosis. Depressive symptoms among primary alcoholics subsided more rapidly than among primary affective disordered patients. The authors noted that a period of at least three weeks of abstinence from alcohol was necessary to consistently differentiate between the group with dual diagnoses on the basis of their depressive symptoms. Further, the co-occurrence of primary alcohol dependence with primary affective disorder did not appear to intensify presenting depressive symptoms or retard the resolution of such symptoms (Brown et al.,1995).

In examining the role of negative mood in precipitating relapse of substance use Hodgins, el-Grebaly and Armstrong (1995) followed 84 subjects who had sought inpatient alcohol treatment. Upon completing the inpatient

program subjects were interviewed at three month intervals for a one year period. Hodgins et al. found that negative emotional states, as measured by the Beck Depression Inventory (Beck et al., 1961), was more likely to play a role in major relapses, whereas social pressure was more likely with minor relapses. Further, light drinking episodes were associated with positive emotional states, and negative emotional states were associated with heavy drinking.

In summary, within the adolescent and adult longitudinal literature, there is evidence for a substantial degree of discontinuity of alcohol problems and use over the life course (Cahalan & Clark, 1976; Donovan, Jessor & Jessor, 1983, Fillmore & Midanik, 1984; Temple & Fillmore, 1985-1986), with most problem drinkers moving in and out of various categories of severity. However, there is also evidence of stability in drinking patterns, with some studies providing support for both continuity and discontinuity. It is the general consensus that due to transitions within the life cycle, factors that are useful in predicting substance use at one time are less useful at a later time. Factors such as marrying, becoming a parent and completing an education appear to reduce substance use, while individuals who started drinking earlier, became divorced or were more deviant (e.g. antisocial) tended to have longer and more problematic substance using careers. Additionally, the cross-sectional research shows the inverse relationship between substance use and adaptation, with antisociality and depression being two of the most often co-

occurring disorders.

Statement of Problem

There is considerable evidence that individuals who abuse alcohol are more prone to significant psychological and social sequelae. Current research posits that certain subtypes (e.g., deviant, antisocial, depressed) are more at risk or vulnerable to continue or escalate substance use. This study builds on previous work (Gonzalez, 1991) which showed an inverse relationship between level of substance use and positive adaptation, and the work of Zucker, Ellis & Fitzgerald (1993a & b) which examined the role of antisociality in the etiology and progression of alcoholism. This study extends the previous research by using a longitudinal design to detect possible developmental differences in subtypes of alcoholics.

The purpose of this study is to explore life adaptation and continuity in drinking patterns and alcohol related problems by examining the process over time. The study examines psychopathological and psychosocial functioning to determine the extent to which substance use, antisociality, and depression affect later psychopathology and substance use.

Consistent with the child and adolescent longitudinal literature on origins of alcohol problems (Zucker & Gomberg, 1986), continual decrements in functioning are expected among alcoholics who are higher as compared to lower in antisociality. Previous cross-sectional research by Zucker, Ellis & Fitzgerald (1993a) suggested that different path models explain the life course

these for two types of alcoholics. The use of a longitudinal design will allow for examination of mechanisms of change over time and a better understanding of the processes involved. However, due to the relatively small sample available here, analyses will only be able to examine more general models involving the whole sample and alcoholics as a unitary group, analyses of subtype variation are not currently possible.

The sample for this study is unique in that it accesses a community based population of alcoholic and nonalcoholic but socially comparable men, initially in intact families. Control subjects were recruited from the same census tract as the alcoholic family through neighborhood canvassing. Canvassing the same communities where the alcoholics live ensured a more representative sample than would be attained through methods involving self-selection. Moreover, the use of the non-clinically accessed alcoholics made the sample more representative of alcoholics and their families than is generally true of treatment populations. Virtually all of the studies reviewed earlier made no attempt to control for family composition and were drawn from clinical populations further along in the progression of alcohol and drug related difficulties (Jellinek,1952; Mulford,1977). The use of a non-clinical population accessed fairly early in their substance use careers allowed exploration of the progression or lack of progression of alcoholic behavior.

Formal Predictions

It was hypothesized that individuals experiencing higher amounts of

substance use and psychopathology at Time 1 will have greater levels of substance use and psychopathology at Time 2. It is also anticipated that those individuals who report less substance use at Time 1 will report less substance abuse or related problems at Time 2. In other words, it is expected that there will be considerable stability across time with problematic individuals continuing to be problematic and non-problematic individuals remaining unproblematic. The hypotheses are expected for both the general model involving all subjects and for the Alcoholic Only sample. As part of the hypotheses, it is expected that the three factors, Depression, Antisociality and Alcoholism, will show significant levels of stability over the three year interval.

Hypothesis 1

Higher levels of antisociality at Time 1 will be significantly associated with higher levels of alcoholism at Time 2.

Hypothesis 2

Higher levels of depression at Time 1 will be significantly associated with higher levels of alcoholism at Time 2.

Chapter II

Method

Subjects

Subjects are 127 men participating in the Michigan State University-University of Michigan Longitudinal Study, a prospective study of the high-risk development of alcoholism (Zucker, 1987: Zucker & Fitzgerald, 1992). Three groups are participating: court-referred alcoholics (n=76), community control comparison families (n=9), and community recruited alcoholics(n=9). By far the majority (89%) of alcoholics were recruited using a population net in the mid-Michigan area involving four adjacent counties with six district courts, male convicted drunk drivers with a blood alcohol level of 0.15% or higher, or 0.12% or higher if the conviction was a second or later drinking-related legal problem were recruited into a study of "child development and family health." Probation officers from the district courts asked men for permission to release their name and telephone number to the project. At this juncture, potential respondents were told that the study had no connection to the courts and that all information collected was confidential. In addition, at the first contact, the subjects must have been living with a son aged 3.0 to 6.0 and with the boy's mother. The fact that respondents had a young son insured family developmental similarity, which reduced the heterogeneity frequently found in these studies. Subsequent screenings of the subject's alcohol history were carried out to insure that all men recruited make a Feighner et al. (Feighner,

Robins, Guze, Woodruff, Winokur and Munoz, 1972) diagnosis of at least Probable Alcoholic.

The aim of the parent study is to track and document the patterns of risk and coping in children and their families at three year intervals. However, since this is an on-going longitudinal study, only the subjects who had two waves of completed data at the time the analyses were begun were included in this study.

Recruitment focus was limited to men of non-Hispanic White heritage. The limited ethnic/racial composition was dictated by the fact that census data in the area showed that other ethnic and racial groups would represent less than 10% of the sample. Given the extensive literature showing a substantial relationship between patterns of alcohol involvement and ethnic/racial status and the fact that we could not effectively analyze for such differences with the study sample size, we opted to exclude such variation rather than have it contribute to error. Women are the topic of a separate study not included here, because significant gender differences in socialization practices and biological variation point to a possible hypothesis of gender differences in developmental antecedents and patterns of adaptation related substance use (Gonzalez, Zucker & Fitzgerald, 1993a; Gomberg & Lisansky, 1986).

After a high risk family was recruited into the study, a community comparison family whose parents were neither alcohol nor drug abusing/dependent was located using door-to-door canvassing interviews.

Canvassers began a door to door search one block away from the alcoholic family, staying within the same census tract and screened for an age appropriate (+/-6 months match) male child in a nonsubstance abusing home. Community canvassing to obtain comparison families was used to control for effects of age and sex of child, community influences, and as an approximate control for SES. This procedure allowed findings from the families with alcoholic men to be contrasted with an ecologically comparable but non-alcohol/drug abusing population. This procedures also allowed access to a subset of community families, whose father met either a probable or definite alcoholism diagnosis while meeting child and family criteria. The present study includes a subset of alcoholics (9 subjects or 11%) who were not court referred, but were found during canvassing for community controls. The larger study includes a much larger n, but only these 9 families were available at the time the present data analyses were completed. All families in the study received a fee for participating.

The fact that these men were convicted drunk drivers indicated that their alcoholism was more heavily combined with antisociality (Cloninger, 1987; Zucker. 1987) than is true of other types of alcoholism. Other analyses from this study have shown that 60% were classified as Type II alcoholics according to Cloninger's (1987) typology; 25% were classified as Type I (nonantisocial, later onset) and 14% were indeterminate. Thus, the present study is most representative of the subset of alcoholics known to be most

damaged, with the most psychosocial comorbidity and earliest onset (cf. Babor & Dolinsky, 1988: Regier et al., 1990).

Procedure

All families that participated in the project completed numerous questionnaires, interviews, and direct observation sessions. For both Wave I and Wave 2, data collection occurred across nine sessions, requiring approximately 15 hours for each parent (Zucker et al., 1986). Data collection was accomplished by professional staff as well as graduate and undergraduate students. All data collection was done with staff being blind to a subject's diagnostic status (alcoholic or control). Findings related to the men's drinking as well as measures of other psychopathology and social functioning are examined here.

Measures

Demographic Questionnaire. This instrument assesses basic background characteristics of self and family of origin. Adequate data were available to ascertain the SES of each family with the Revised Duncan Socioeconomic Index (Stevens & Featherman, 1981), an occupation-based measure of SES. This measure was selected because of work by sociologists indicating that occupation-based measures represent a contemporary indicator of socio-economic status that is sensitive to occupational attainment (Featherman & Hauser, 1977; Mueller & Parcel, 1981; Nock & Rossi, 1979). Each job classification is assigned a numerical score which allows for comparison over

time and between groups, with lower scores indicating lower SES occupation and higher scores indicating higher SES occupation (e.g., a chamber maid would be assigned a score of 15, a semi-skilled laborer would be assigned a score of 25, a white-collar clerical would be assigned a score of 32, a high-school teacher would be assigned a score of 43, and a college professor would be assigned a score of 70).

Drinking, alcohol abuse, and alcoholic diagnosis. Each subject completed the Short Form of the Michigan Alcoholism Screening Test (SMAST; Selzer, 1971, 1975), the Drinking and Drug History (DDH), and the National Institute of Mental Health Diagnostic Interview Schedule - Version III (DIS; Robins, Helzer, Croughan & Ratcliff, 1981) on three separate occasions, providing two questionnaires and one interview source of data. The SMAST was used as the initial alcoholism screening instrument, and detailed information on current consumption and alcohol-related difficulties came from the DDH and sections of the DIS relevant to alcohol-related problems. The DDH incorporates items from the 1978 National Institute on Drug Abuse survey (Johnston, Bachman & O'Malley, 1979), the American Drinking Practices Survey (Cahalan, Cisin & Crossley, 1969) and the Veterans Administration Medical Center Research Questionnaire for Alcohol (Schuckit, 1978). The data from the alcohol problem list provided information on time of first occurrence and last occurrence, and the number of occurrences for each problem during the respondent's lifetime. Items have been carefully reviewed

to yield information sufficient to provide diagnoses according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R; third edition, revised; American Psychiatric Association, 1987), Research Diagnostic Criteria (RDC; Spitzer, Endicott and Robins, 1975), and the Feighner criteria (Feighner, Robins, Guze, Woodruff, Winokur and Munoz, 1972). Diagnoses were based on symptoms reported to have occurred within the previous three years. For the analyses reported here, the DSM-III-R diagnosis was coded from zero to four: zero being no diagnosis; one, abuse; two, dependence-mild; three, dependence-moderate; and four, dependence-severe.

Lifetime Alcohol Problems Score. The Lifetime Alcohol Problems Score (LAPS; Zucker, 1991) is a three-component index that incorporates information collected using the DDH and DIS on the primacy (onset), variety, and life invasiveness of problems associated with drinking. This measure has already been shown to be a valid indicator of differences in drinking difficulties across a variety of areas, including successful differentiation between DSM-III-R levels of alcohol dependence, abuse, and no abuse (Zucker, 1991). For reasons of comparability across time, only the variety component which documents the variety of symptoms in different categories was used for the current analyses. This variable was labeled Variety Component (VC). The VC is the sum of the alcohol related symptoms endorsed on the DDH and DIS. These are the same items used to calculate the variety component of LAPS. The latent variable Alcoholism was assessed using the variety component of LAPS and the DSM-

III-R diagnoses.

Antisocial behavior. The Antisocial Behavior Checklist (ASB; Zucker and Noll, 1980) is a 46-item revision of an earlier antisocial behavior inventory used in the Rutgers Community Study (Zucker and Fillmore, 1968; Zucker and Barron, 1973). The ASB determines the frequency of the respondent's participation in a variety of delinquent, criminal, and antisocial activities (e.g., having an affair, resisting arrest, speeding tickets) and includes items relevant to childhood and adulthood. A series of reliability and validity studies with populations ranging from college students to prison inmates have shown that the instrument has adequate test-retest reliability (.91 over four weeks) and internal reliability (coefficient alpha =.93: Zucker and Noll, 1980). In a more recent factor analysis of the questionnaire, Zucker, Noll,Ham, Sullivan & Fitzgerald (1994), found antisociality, as measured by the ASB Checklist, to consist of two factors involving antisocial activity from adult and child domains. For reasons of comparability across time, the analyses reported here only use the sum of the 25 adulthood items used at both time periods. (See Appendix A.) Appendix A also includes the full score and a breakdown by group and Time period. From the adult items, six domains with alphas ranging from .54 to .80 were isolated by Zucker et al. (1994). With regard to the present study, it should be noted that Time 1 reporting of antisociality is based on the time frame of adulthood up to the point that the instrument was answered, while Time 2 antisociality is only based on a time frame spanning

the last three years.

The Lifetime version of the instrument (Childhood & Adulthood scocres) was used in the classification of alcoholics into Antisocial and Nonantisocial subtypes. Individuals scoring 24 or higher classified were antisocial alcoholics (AALs). Fifty-one of the subjects were classified as NAALs and the remaining 34 were classified as AALs. Using this cut-off score the instrument's sensitivity was .85 and its specificity was .83 for a diagnosis of antisocial personality disorder using DSM-III-R criteria (Zucker, Ellis & Fitzgerald, 1993b). Individuals scoring below 24 were classified as non-antisocial alcoholics (NAALs). However, due to sample size analyses using the AALs and NAALs classification are the subject of a future study.

Depression. Two measures of depression were collected. The Short Form of the Beck Depression Inventory (BDI-SF; Beck and Beck, 1972) was used to evaluate self-reported depression. The BDI-SF consists of 13 items focusing on various areas of functioning known to be affected by depression such as mood, appetite, sleep and so on. Respondents were asked to answer the question with regard to how they had felt in the past week. Items are scored from zero to three, and their score was the sum total of all the items. Scores on the short form of the BDI correlated between .89 and .97 with the long form, and considerable evidence supported the reliability and validity of the measure (Beck, Steer, and Garbin, 1988).

The second measure used to rate depression was the Hamilton Rating

Scale for Depression (HRSD; Hamilton, 1960, 1967), an instrument for the clinical rating of depression. The HRSD was completed following the NIMH Diagnostic Interview Schedule by the clinician conducting the interview. The rating covers a variety of behavioral, affective, somatic, and psychological dimensions associated with depression. The HRSD consists of 24 items, most of which are scored zero through four, zero when symptoms were absent and four when most severe. A subset of the items are scored zero through two. The subject's rating score is based on the summed total of the HRSD items. The clinician rated the level of depression based on the account during the DIS of the time when the person was most depressed or worst-ever depression. For Wave I data collection the score reflected a worst-ever depression over the course of the subject's lifetime, while only reflecting the previous three years at Wave 2. Interrater reliabilities ranged from .80 to .90 (Hamilton, 1969), and on this project interrater reliability was .93.

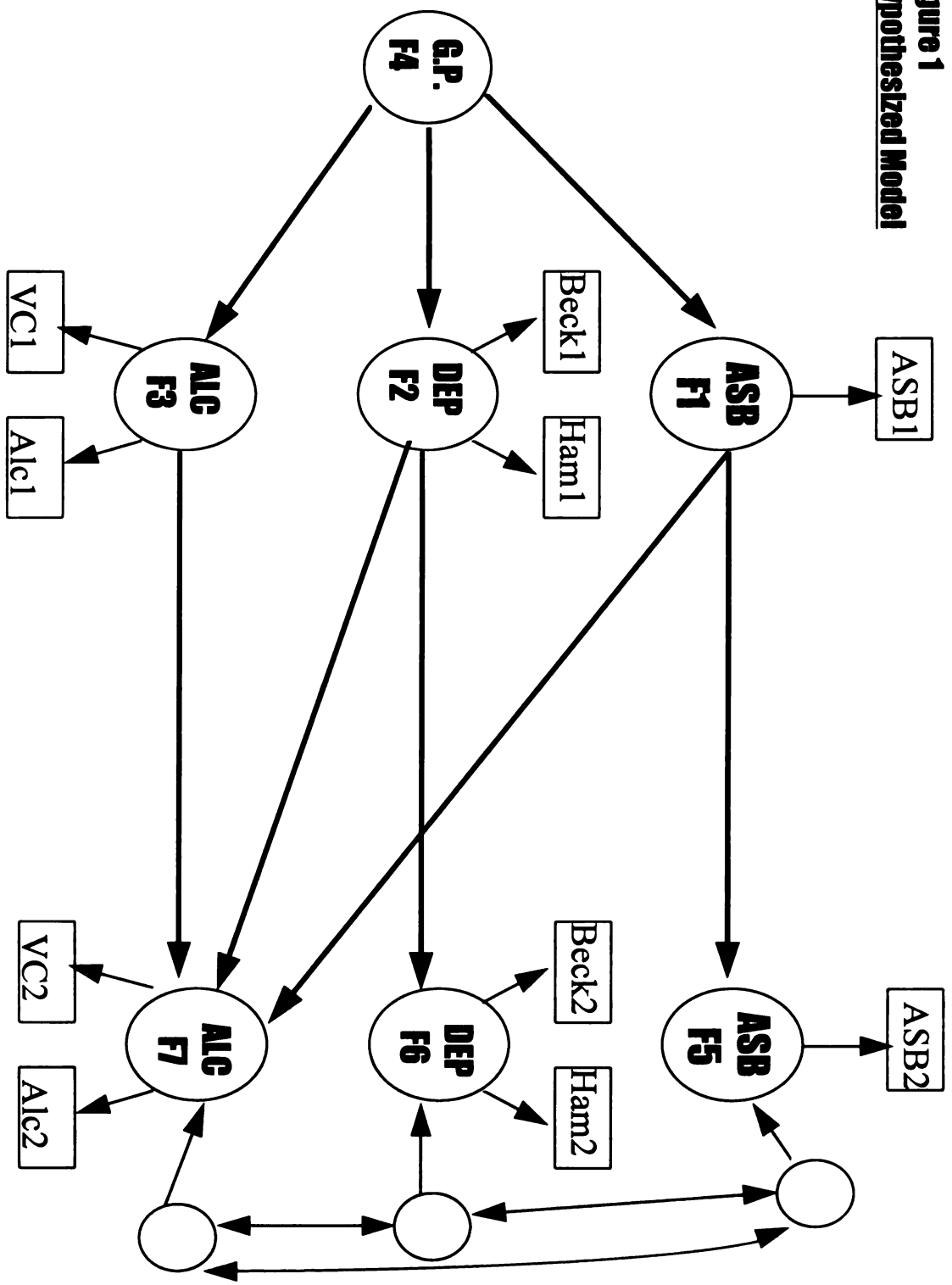
Chapter III

Results

The principal method for studying the longitudinal relationships was latent-variable structural equation modeling (Bentler, 1989; Bentler & Wu, 1993). All structural analysis was conducted using the EQS version 4.0 computer program (Bentler & Wu, 1993). Initially, the adequacy of the models chosen to reflect the latent factors was assessed using confirmatory factor analysis. This was followed by an examination of the temporal stability of these factors using across-time structural models without cross-lag paths. After this, across-time structural modeling was used to examine the plausible causal effects of previous alcoholism, depression and antisociality on later alcoholism. (See Figure 1)

Structural models typically consist of two parts: 1) a measurement model that delineates the association between measured and latent factors, and 2) a structural model that includes the direct and indirect effects among latent variables. Latent-variable structural equation models were used to examine the credibility of the proposed causal structural models using Maximum Likelihood estimates (as presented in Figure 1) (Bentler, 1989). Although Bollen (1989) noted that there was no generally accepted rule dictating exactly how many cases are required per parameter, these analyses should still be considered exploratory and hypothesis-generating due to the complexity of the model and the relatively small number of subjects ($\underline{N}$=127). In order to

Figure 1
Hypothesized Model



explore the possibility that effect structure might be different within the alcoholic population, a separate analysis was conducted on the subsample of individuals that made an alcohol abuse/dependence diagnosis (n=85).

Before analysis, a thorough screening was conducted to identify outliers and missing values. Regressed estimates on available data were used to control for missing data. At maximum, only four percent of the sample (or no more than five subjects) required this procedure on any one variable. Outliers were defined as nonadjacent values falling outside a normal distribution superimposed on the frequency distribution histogram. Any outlier was re-assigned a value next to the closest non-outlying value which although less extreme, maintained the rank order of subjects on each variable.

Demographic information for the sample is presented in Table 1. The average age was 32.7, with 13.3 years of schooling and a Socioeconomic Index score of 31.2. However, when the means of the alcoholics and controls are compared, significant differences were noted in SES and years of education, with Controls having more years of education and better employment. Similar results were found for age, SES and education at Time 2. Frequency statistics including the means, standard deviations, skewness, kurtosis and correlations between all the variables for the full sample are presented in Table 2. Generally speaking, correlations between measures within a construct were higher than those between constructs. Analyses were performed using maximum likelihood estimators (Bentler & Wu, 1993). Typically, assumptions

Table 1

Demographic Information for the Study Sample at Time 1 and Time 2(N=127)

	Full Sample (N=127)		Alcoholics (n=85)		Control (n=42)			
Measures	Mean	SD	Mean	SD	Mean	SD	F[b]	p
Age	32.7	5.1	32.7	5.2	32.6	4.7	.00	NS
Age-2	35.6	4.9	35.6	5.1	35.6	4.6	.00	NS
Years of Education	13.3	2.0	12.9	1.5	14.2	1.8	12.65	.00
Years of Education-2	13.4	1.9	13.1	1.8	14.2	1.9	9.78	.00
Socioeconomic Status[a]	31.3	17.1	27.3	14.1	39.3	19.2	15.56	.00
Socioeconomic Status-2	33.8	16.4	31.1	15.3	39.2	17.4	7.15	.00

Note. [a] Duncan's Socioecomonic Index

[b] Comparison of Alcoholic and Control group means.

Time 2 measures are indicated by the '2' at the end of the measure's name.

Table 2

Means, Standard Deviations, and Correlations on all Variables - Full Sample (N=127)

			Study Measures									
Measures	M	SD	1	2	3	4	5	6	7	8	9	10
1. Antisocial	8.45	6.45	--									
2. Beck	2.84	2.97	.47	--								
3. Hamilton	12.62	9.3	.46	**.47**	--							
4. VC-LAPS	8.0	6.47	.65	.34	.34	--						
5. Alc Dx	1.42	1.54	.60	.36	.31	**.78**	--					
6. Antisocial-2	2.65	3.13	.53	.26	.25	.37	.35	--				
7. Beck-2	3.11	3.64	.26	.46	.27	.19	.26	.23	--			
8. Hamilton-2	9.81	9.3	.27	.30	.29	.20	.19	.19	**.35**	--		
9. VC-LAPS-2	4.10	5.73	.37	.19	.34	.52	.43	.58	.27	.23	--	
10.Alc Dx-2	1.11	1.44	.38	.20	.19	.47	.46	.60	.28	.23	**.86**	--
Skewness			1.5	1.1	.7	.32	.43	1.7	1.8	1.0	1.6	.8
Kurtosis			2.5	.4	-.2	-1.1	-1.4	2.3	2.8	.2	2.2	.9

Note. Boldface values indicate correlations among measures within latent constructs. Approximate probability levels for all correlations are as follows: $r > .17$; $p < .05$: $r < .21$. $p < .01$. Time 2 measures are indicated by the '2' at the end of the measure's name.

of the maximum likelihood method require both univariate and multivariate normal data, but this method has been shown to handle mild departures from normality. Overall, kurtosis and skewness (Bentler, 1989) were within acceptable limits at both the univariate and multivariate level for the full sample and for the Alcoholic Only subsample.

Procedure and Fit Indices

An initial testing of the Confirmatory Factor Analyses (CFA) model was conducted to evaluate "the adequacy of the measurement of factor structure that specifies how the measured variables were hypothesized to reflect the underlying latent factors" (Newcomb & McGee, 1991, p. 621). This stage was necessary to assess the adequacy of the underlying structure before testing the structural model. For both time periods, items were allowed to load on only one construct, and latent constructs were permitted to correlate. In later analyses involving repeated measures, residual variables were allowed to correlate across time to capture the stability of specific measures (Newcomb & McGee, 1991).

Each of the three first-order latent factors consisted of two indicator or observed variables, except for the Antisociality factor (ASB) which consisted of a single indicator, the sum of 25 adulthood items from the Antisocial Behavior Checklist (Zucker & Noll, 1980) (also see Appendix A). The Depression factor (DEP) consisted of current ratings of depression as measured by the Beck Depression Inventory score and the Worst-Ever rating of Depression from the

Hamilton Rating Scale for Depression. The third factor known as Alcoholism (ALC) included two indicators: 1) diagnosis of alcoholism as assessed by the DSM-III-R's (American Psychiatric Association, 1987) with scores ranging from no use/abuse to dependence-mild/moderate/severe (i.e. 0 to 4 scale), and 2) the variety component of the Lifetime Alcohol Problems Score (LAPS) (Zucker, 1991) which is a symptom count of the total number of different symptom categories reported on the DIS and the Drinking and Drug History (Zucker, Noll & Fitzgerald, 1990).

Because no single test of significance is either sufficient or necessary to suggest an adequately fitting model, the adequacy of fit for all models was assessed using multiple indices, including the Comparative Fit Index, Normed Fit Index, and Chi-square. The Comparative Fit Index (CFI; Bentler, 1990), a revised version of the Normed Fit Index (BBNFI; Bentler & Bonnet, 1980), has been found to underestimate fit in small samples. However, for the purposes of comparison both the CFI and BBNFI were used to review the models. Values on both these indices which range from zero to 1.00 are derived from the comparison of a hypothesized model with the null model to provide an estimate of the complete covariation in the data, such that a score greater than .90 indicates an acceptable fit of the data (Byrne, 1994). Adequacy of fit was also estimated using the Chi-square statistic which estimates the difference between the observed data and specified model. As such, the smaller the chi-square value relative to the degrees of freedom, the more likely that the model

is an acceptable representation of the data. However, because the chi-square is greatly affected by the sample size, the CFI is the preferred method to assess fit.

Model modifications are usually made using two recommended procedures: the Lagrange Multiplier Test and the Wald Test (Bentler,1989; Bentler & Newcomb,1989; Hays, Marshall, Wang & Sherbourne, 1994). Both tests evaluate possible modifications at the univariate and multivariate level. The inclusion of additional parameters, such as covariances or correlations among residuals (uniqueness or error of measurement), were empirically determined by the Lagrange Multiplier test (LM: Bentler & Chou, 1986; Bentler, 1989; Byrne, 1994). The addition of these parameters usually reflects one of two types of phenomena: 1) relationships in the data that were not hypothesized a priori, or 2) a sample-specific association (Bentler & Newcomb, 1989). The LM test is used to guide model modification to add parameters by determining whether in a "subsequent EQS run, the specification of certain parameters as free rather than fixed would lead to a model that better represents the data"(Byrne, 1994, p.47).

The removal of parameters was primarily determined using the Wald Test. Hays et al.(1994) noted that a model with fewer parameter estimates is preferable and can be accomplished by removing nonsignificant parameter estimates to obtain the most parsimonious model possible. The Wald Test is a test of free parameters that assesses whether a free parameter could possibly

be zero in the population and therefore dropped as a parameter without substantial loss in model fit (Bentler & Wu, 1993; Byrne, 1994). Each modification was performed sequentially, with a change to one estimate at a time (one degree of freedom change), followed by a re-estimation of the model.

Confirmatory Factor Analyses Wave 1 Full Sample

Five observed variables were used to form the three constructs labeled as: 1) Antisociality (ASB); 2) Depression (DEP); and 3) Alcoholism (ALC). The substantial size (ranging from r = .54 to .73) of the latent factor intercorrelations at each time period suggested that a higher order construct, labeled as General Psychopathology (GP), might account for the apparent similarity among constructs (See Figure 3). Thus, the confirmatory factor analyses and later analyses were modified by adding one second-order latent construct to explain any similarity or common variance among the first-order factors. The variance of the second-order factor (F4) was fixed to 1.00, which was necessary because the free factor loadings were free to be estimated (Byrne, 1994). Further, the variance of D1 (the residual error in prediction of the unobserved variables F1) was held equal or constrained to that of D2. This specification was necessary because without a constraint placed on at least one parameter in a higher-order structure, this part of the model would be just-identified (Byrne, 1994; Bentler, 1989).

Results of the initial CFA model for Wave 1 showed that the indicated model reflected the data with adequate fits for the Comparative Fit Index

(.98), Bentler-Bonnet Normed Fit Index (.97), and $X^2(25, N=4) = 9.04$, $p= .06$. All parameters were significant ($p.< .01$) and no parameters were dropped or added. (See Figure 2.) All observed variables had high loadings on factors, ranging from .68 to .97. All paths from the higher order factor to the first-order factors were significant with path coefficients ranging from .72 to .97. An average of 67 percent of the variance of the first-order constructs was explained by the single second-order factor (F4/General Psychopathology). This percentage is the sum of the squared loadings on each second-order factor divided by the number of first-order constructs (McGee & Newcomb, 1992). All the major features of the model were confirmed.

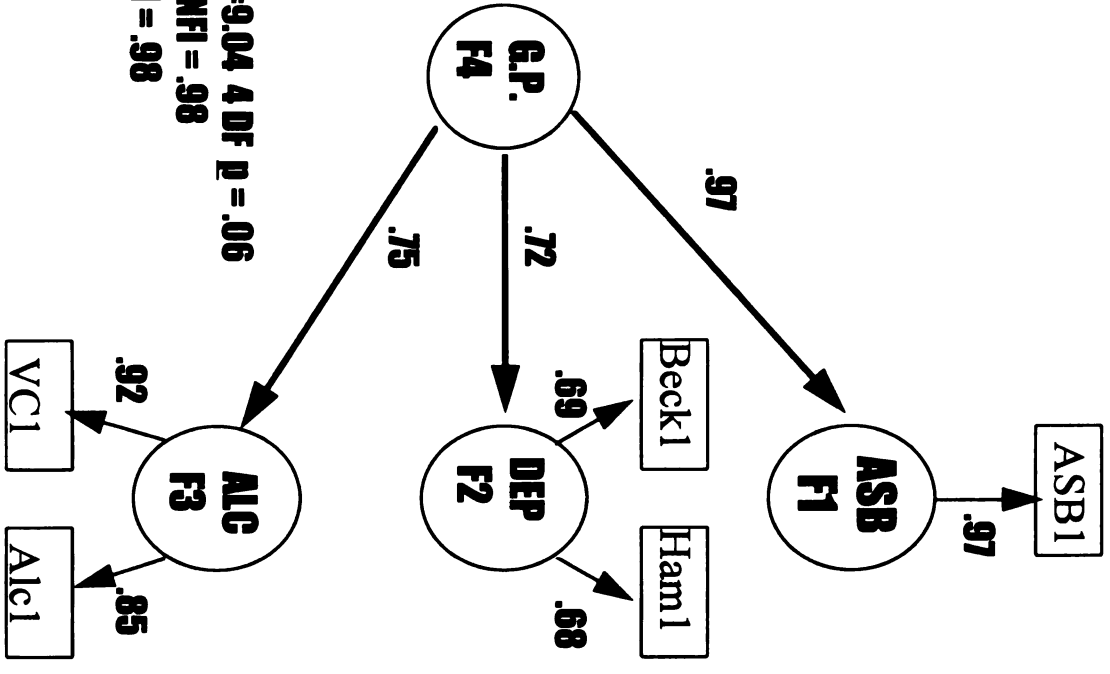
The high correlations between the factors showed a high degree of intercorrelation among the latent constructs during the first measurement period. These findings suggested the presence of a factor of general psychopathology operating as a meaningful second-order construct during adulthood (See Table 3).

Confirmatory Factor Analysis Wave II Full Sample

Using the same analytic strategy as the Time 1 measurement model, results of the initial CFA model for Wave 2 showed that the model reflected the data well with a CFI of .99, a BBNFI of .98, and a $X^2(4, N=127) = 4.6$, $p= .33$. As with the first analyses, parameters were significant ($p>.01$) with no additions or deletions in parameters. Figure 3 shows significant factor

Figure 2

Time 1 Measurement model for the Full Sample (N=127)



loadings ranging from .54 to .97 ($p>.01$), suggesting that the factors were adequately measured. It should be noted that all the loadings remained relatively stable with the exception of the Hamilton Depression Rating Scale at Time 2. Correlations between the factors at Time 2 ranged from .37 to .65, somewhat lower than estimates at Time 1, yet still significant at the .01 level. The structure of relationships among Alcoholism, Depression and Antisociality changed somewhat over the three-year period between assessments, although the measurement model still indicated a higher order relationship. (See Table 3).

Results of the CFA model for Wave 2 showed that the model reflected the data well. Overall, the Time 1 and Time 2 CFA models proved to adequately reflect the hypothesized underlying latent factors.

Figure 3
Time 2 Measurement model for the Full Sample (N=127)

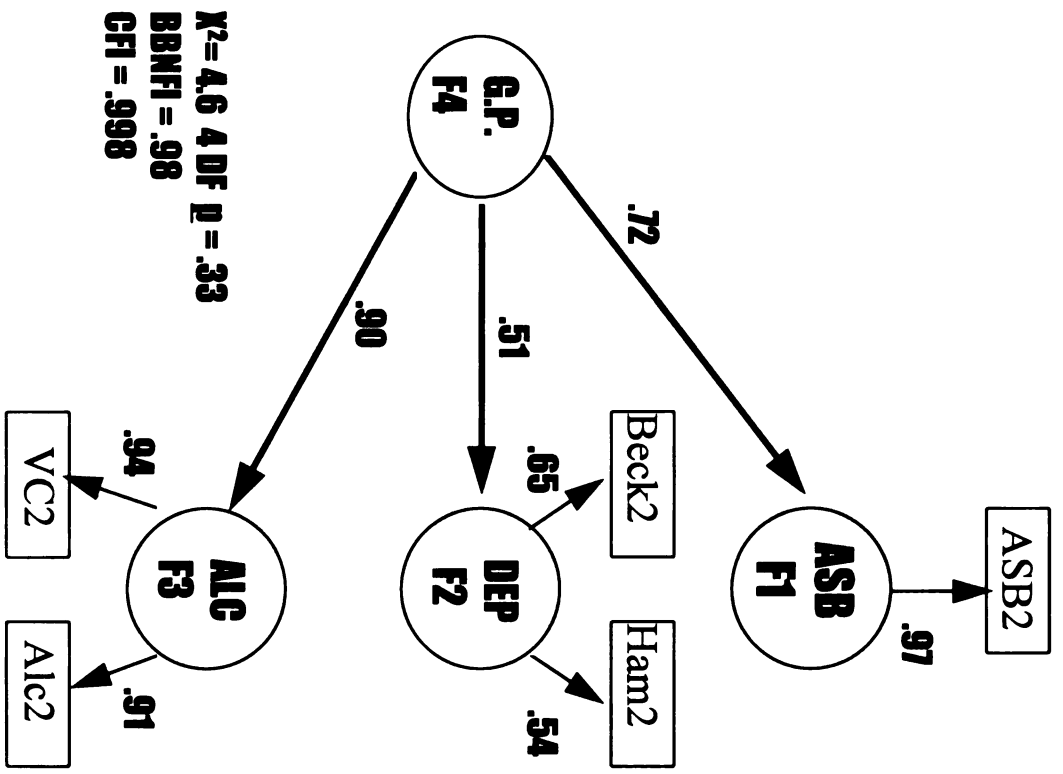


Table 3.

Intercorrelations Between First-Order Factors in Confirmatory Factor Analyses For the Full Sample (N=127)

	Factors		
Factors	F1	F2	F3
1. Antisociality	--	.70	.73
2. Depression	.37	--	.54
3. Alcoholism	.72	.51	--

Note. Values above the diagonal are for the Time 1 CFA and those below are for the Time 2 CFA. All correlations are significant differently from zero ($p < .01$).

Stability for the Full Sample

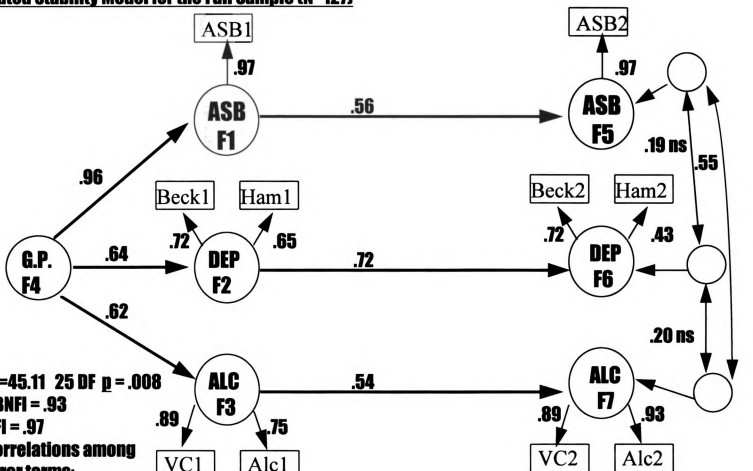
The next step in the analytic strategy was to compare the relationships between the latent constructs over time. First, the stability of the factors was inspected by examining a model with only autoregressive coefficients between the identical factors at Time 1 and Time 2. Next, an examination of the relationships was completed between all of the first-order factors at Time 1 (Alcoholism, Depression and Antisociality) and future alcoholism, followed by analyses of the Alcoholics Only subsample using the same analytic strategy. In assessing the stability of the constructs at Time 1 and Time 2, all measured error terms associated in similar measurement items were initially autocorrelated over time to control for stability of unique items residual (e.g., the error for Beck at Time 1 was allowed to correlate with the error term for the Beck at Time 2). The resulting model (autoregressive model without cross-lags) fit the data well in terms of practical fit criteria with a CFI =.93 and BBNFI of .97. All essential parameters were significant, and the only nonsignificant parameters were between residual terms. (See Figure 4.) No modifications were indicated by the Wald test, used to assess whether free parameters could be zero and therefore dropped as parameters without substantial loss in the model. Although the chi-square was significant $X^2(25, N=127) = 45.11.6$, $p= .008$, the model was accepted as all the other indices indicated an adequate fit. All three first-order constructs demonstrated considerable stability across time. Further, all cross-time paths between

corresponding constructs were significant ($p<.01$), with strong paths ranging from .72 for Depression, .56 for Antisociality and .54 for Alcoholism, which suggested that the constructs remained stable over the three-year interval for the entire sample.

First-order autoregressive models, such as the entropic model without cross-lagged regressions (where variables are repeated as causes of themselves over two time points), are the basis for modeling techniques studying change and stability (Hertzog & Nesselroade, 1987). These autoregressive coefficients are called stability coefficients and act as summary statements about relative change in a population of subjects. High stability coefficients can result if: 1) a high level of intraindividual change is noted and is consistent across individuals; 2) salient intraindividual change occurs only in a small proportion of the sampled unit; or 3) meaningful amounts of intraindividual change are relatively small when compared to the magnitude of interindividual differences (Hertzog & Nesselroade, 1987).

Within this framework, the covariation between models is expected to decrease unless a perfect stability or inertia of individual differences occurs across time. Hertzog and Nesselroade noted that "the implicit corollary of this assumption is that, if stability is imperfect, there has been change in individual differences that can be modeled as a function of the causes of change" (1987, p.101). Further, this issue can be addressed by examining the cross-lagged regressions. Within the current study, the stability coefficients were less than

Figure 4
Isolated Stability Model for the Full Sample (N=127)

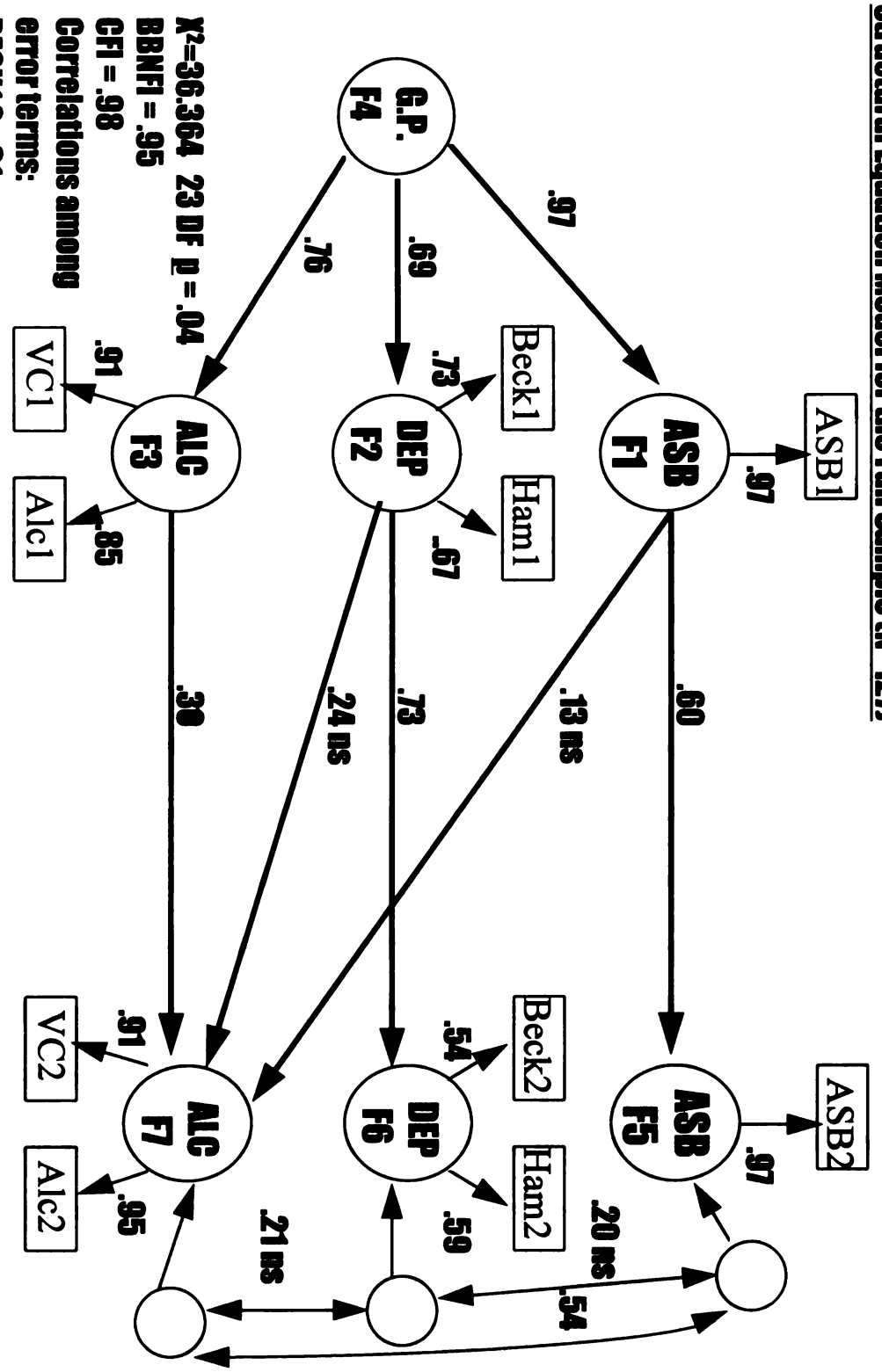


perfect, indicating that change may be a function of the other factors (cross-lagged regressions from other latent factors) or other mutually shared causes that were excluded from the analyses.

Structural Equation Model for the Full Sample

The next model assessed the degree of influence of the constructs at Time 1 on Alcoholism (ALC) at Time 2 and tested the general hypothesis in Figure 1 that higher levels of Antisociality, Depression and Alcoholism will be significantly associated with higher levels of alcoholisms at Time 2. The results of this analysis are presented in Figure 5. The model had a significant CFI of .98, BBNFI of .95 and $X^2(23, N=127) = 36.36$, $p= .04$. As with the isolated stability model, the chi-square failed to reach the required nonsignificance, but all other indices showed that the model adequately fit the data. In examining the cross-lagged relationships, neither the path coefficients from F1-F7 or F2-F7 were significant. However, the F2-F7 path of Depression 1 to Alcoholism 2 approached significance ($p=.07$). The path from Antisociality 1 to Alcoholism 2 was nonsignificant ($p=.34$). The Lagrange Multiplier test for adding parameters showed that none of the multivariate multipliers were significant; however, the ordered univariate test recommended including the path from ASB1 to DEP2 (F1 to F6). However, this addition did not significantly alter the chi-square and was later dropped from the analysis. Although the Wald test (multivariate) indicated that no significant changes in chi-square would have resulted from freeing any of the parameters, an

Figure 5
Structural Equation Model for the Full Sample (N=127)



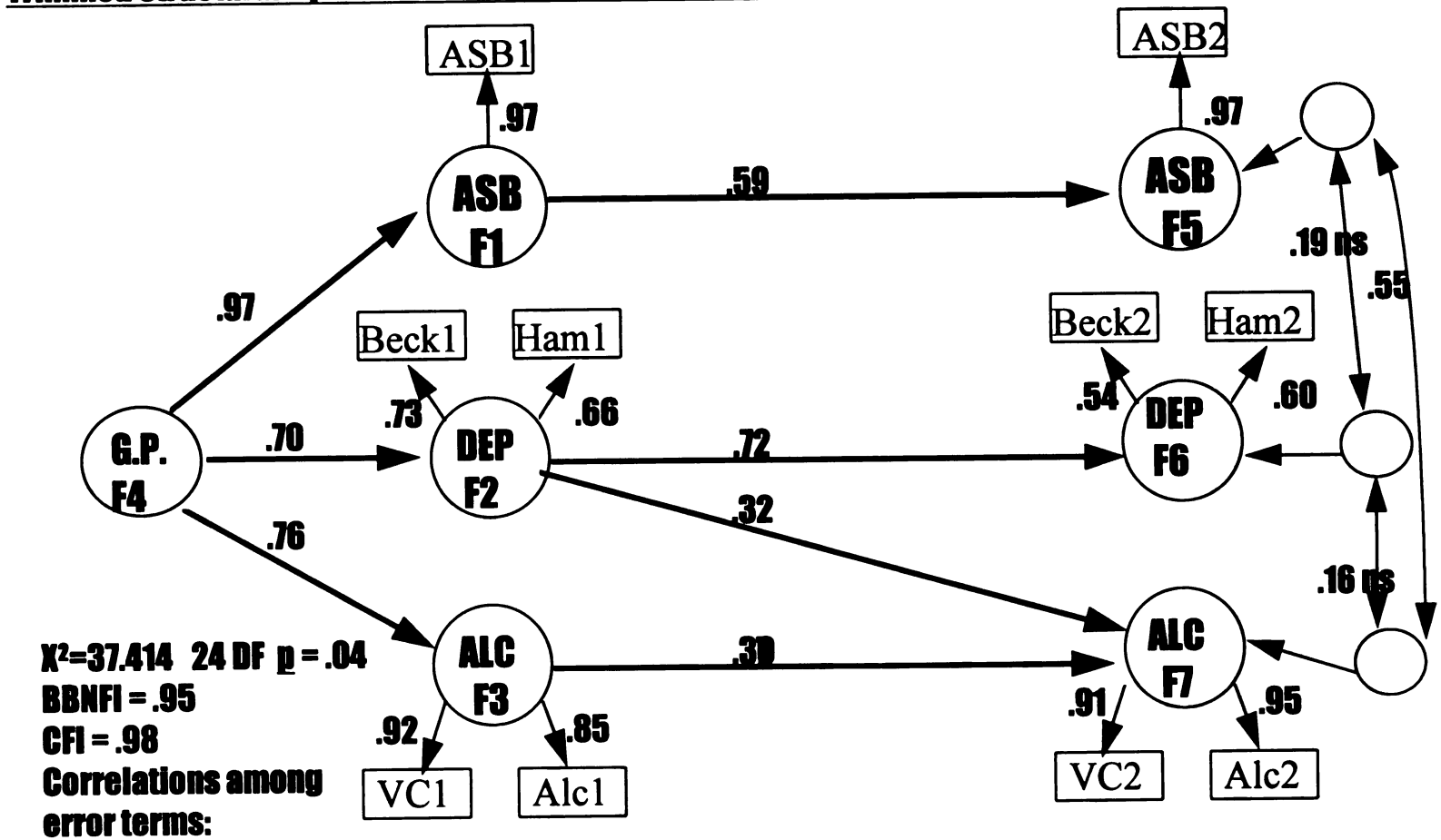
X^2=36.364 23 DF p = .04
BBNFI = .95
CFI = .98
Correlations among error terms:
BECK1,2=.31
HAM1,2 =.01 ns
VC1,2 = .45
ALC1,2= .12 ns

examination of the structural parameter estimates suggested that the path from F1-F7 might be redundant, and it was therefore dropped. This approach to examining data labeled "specification search", can "yield important insights into the limitations of the original model and plausible variations."(MacCullum , 1986)

The final model (Figure 6) assessed a similar version, with the exception that the path from Antisociality Time 1 to Alcoholism (ALC) at Time 2 was dropped. The resulting trimmed model has a significant CFI of .98, BBNFI of .95 and $X^2(24, \underline{N}=127) = 37.41$, $\underline{p}= .04$. Although the exclusion of the parameter was based on a univariate test of significance (z statistic) rather than a multivariate one, the deletion of the parameter resulted in no loss to model fit. However, since model was modified for empirical reasons (alpha levels), rather than on a theoretical basis, interpretations should be viewed with caution. This is especially true since the path from Depression went from bordering on significance to significance at the .05 level, with the deletion of the path from Antisociality. Competing models were also explored which included the path from ASB to Alcoholism while dropping the path from Depression to Alcoholism.

The key substantive questions that initially generated the model were addressed in the cross-time paths of the model's latent variables (Figure 5). Any missing paths would show that the path coefficients (*B*) were not significant and therefore could be excluded. Each factor displayed stability

Figure 6
Trimmed Structural Equation Model for the Full Sample (N=127)



over time; however, only Depression significantly influenced Alcoholism. The model provided no support for the hypothesis that Antisociality influences later Alcoholism over the three-year period. However, an across-time causal relationship existed in which the level of Depression had an effect on Alcoholism (Figure 6). Although these data supported the hypothesis that considerable temporal stability existed for Alcoholism, it should be noted that the sample included community controls who as a group were unlikely to begin problematic alcoholic use, thus enhancing estimates of stability. To further examine the plausible explanation for the pattern of results, the Controls and Alcoholics should be analyzed separately. However, due to the complexity of the generated models and relatively small sample sizes of each subgroup, only the Alcoholic sample could be analyzed further to explore whether the resulting model deviated from the more general models incorporating the entire sample.

Because the following analyses were conducted using sub-optimal numbers of subjects, analyses on the Alcoholic Only subgroup should be considered hypothesis generating and/or exploratory in nature. Although no clear rules exist concerning sample size, researchers (e.g. Bentler, 1989; Bollen, 1989; Byrne,1994) recommend using approximately five subjects per parameter or 10 per variable. Should the number of subjects drop below this suggested rule of thumb, the results may still be useful though viewed with caution. Frequency data and correlations for the alcoholics subsample ($\underline{n}$=85) are

presented in Table 4. Overall, kurtosis and skewness were within acceptable limits at both the univariate and multivariate level for the alcoholic sample.

Confirmatory Factor Analyses Wave 1 for the Alcoholic Sample

Results of the CFA model for Wave 1 showed that the model reflected the data well, with adequate fits for both the CFI (.97), BBNFI (.94), and $X^2(4, N=85) = 7.22$, $p= .12$. All parameters were significant ($p.< .05$), and no parameters were dropped or added. (See Figure 7). Further, all observed variables had high factor loadings, ranging from .65 to .97. In addition, the paths from the higher order factor to the first-order factors were all significant with path coefficients ranging from .62 to .96. An average of 57 percent of the variance of the first-order construct was explained by the single second-order factor. The correlations between the factors at Time 1 ranged between .40 and .62. (See Table 5).

Confirmatory Factor Analysis Wave II Alcoholic Sample

The results of the CFA model for Wave 2 showed that the model reflected the data extremely well, with a CFI of 1.0, BBNFI of .98, and a $X^2(4, N=85) = 2.7$, $p= .6$. All parameters were significant with no added or deleted parameters. Figure 8 shows significant factor loadings ranging from .43 to .97 ($p<.05$) suggesting that the factors are adequately represented. The correlations between the factors at Time 2 ranged between .28 and .62 (See Table 5), and though still significant at the .05 level, were somewhat lower than at Time 1. These findings indicate that the relationships between

Table 4

Means, Standard Deviations, and Correlations on all Variables - Alcoholic Sample (N=85)

			Study Measure									
Measures	M	SD	1	2	3	4	5	6	7	8	9	10
1. Antisocial	10.71	6.63	--									
2. Beck	3.38	2.97	.44	--								
3. Hamilton	14.82	9.3	.39	**.47**	--							
4. VC-LAPS	11.03	6.47	.51	.25	.23	--						
5. Alc Dx	2.11	1.54	.43	.21	.19	**.66**	--					
6. Antisocial-2	3.36	3.53	.45	.20	.18	.25	.23	--				
7. Beck-2	3.43	3.87	.22	.38	.26	.13	.11	.19	--			
8. Hamilton-2	11.07	9.92	.22	.27	.32	.13	.11	.12	**.31**	--		
9. VC-LAPS-2	5.94	6.2	.16	.08	.07	.34	.20	.53	.25	.15	--	
10.Alc Dx-2	1.61	1.50	.16	.07	.07	.23	.23	.55	.26	.16	**.83**	--
Skewness			1.1	.8	.5	.0	-.3	1.2	1.6	.7	1.1	.2
Kurtosis			1.2	-.33	-.52	-1.0	-1.3	.67	2.2	-.28	.74	-1.5

Note. Boldface values indicate correlations among measures within latent constructs. Approximate probability levels for all correlations are as follows: $r > .21$; $p < .05$: $r < .27$; $p < .01$. Time 2 measures are indicated by the '2' at the end of the measure's name.

Table 5.

Intercorrelations Between First-Order Factors in Confirmatory Factor Analyses For the Alcoholic Only Sample (N=85)

	Factors		
Factors	F1	F2	F3
1. Antisociality	--	.62	.60
2. Depression	.28	--	.40
3. Alcoholism	.62	.39	--

Note. Values above the diagonal are for the Time 1 CFA and those below are for the Time 2 CFA. All correlations are significantly different than zero ($p < .05$).

Figure 7
Time 1 Measurement model for the Alcoholic Sample (N=85)

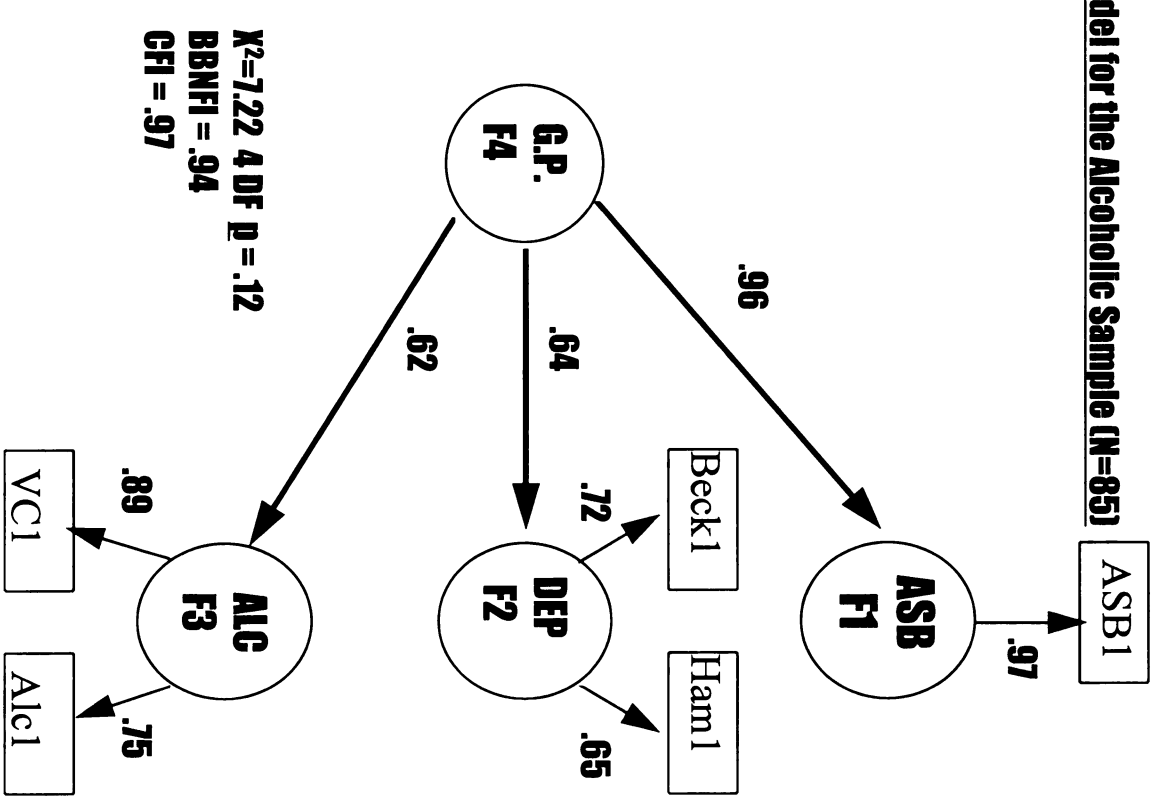
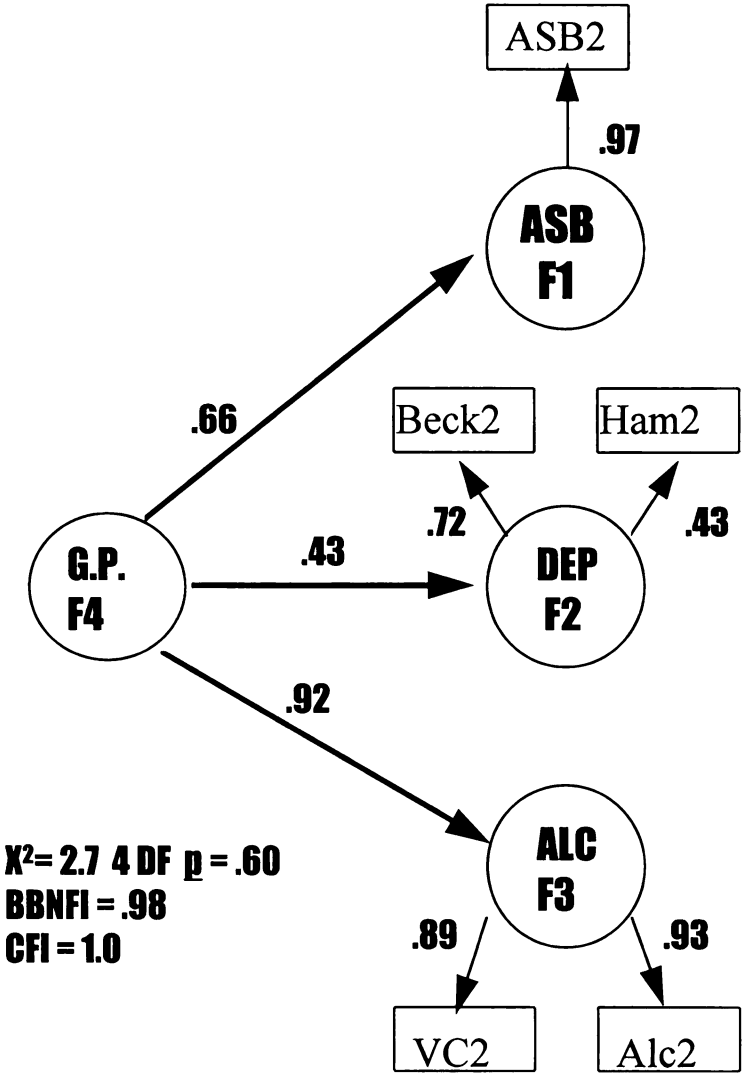


Figure 8
Time 2 Measurement model for the Alcoholic Sample (N=85)



Alcoholism and Depression changed over the three-year period between measurements. Nevertheless, the data still suggest a higher order relationship. Additionally, on average, all of the correlations between factors were somewhat lower in the Alcohol Only sample relative to the full sample, but the difference is not a reliable one.

Overall, the Time 1 and Time 2 CFA models adequately captured the hypothesized underlying latent factors. The next step in the analytic strategy was to compare the relationships between the latent constructs over time by examining a model using only autoregressive correlations, followed by an examination of the relationships between all the first-order factors at Time 1 (Alcoholism, Depression and Antisociality) and later Alcoholism.

Stability for the Alcoholic Sample

In terms of practical fit criteria, the model (autoregressive model without cross-lags) fit the data well with a CFI =.97, BBNFI of .97 and $X^2(25, N=85) = 35.54$, $p= .08$. All essential parameters were significant with the exception of parameters between some of the residual terms. (Figure 9.) No modifications were indicated by the Wald test. Although all three constructs displayed considerable stability across time, the path coefficients for

Figure 9
Isolated Stability Model for the Alcoholic Sample (N=85)

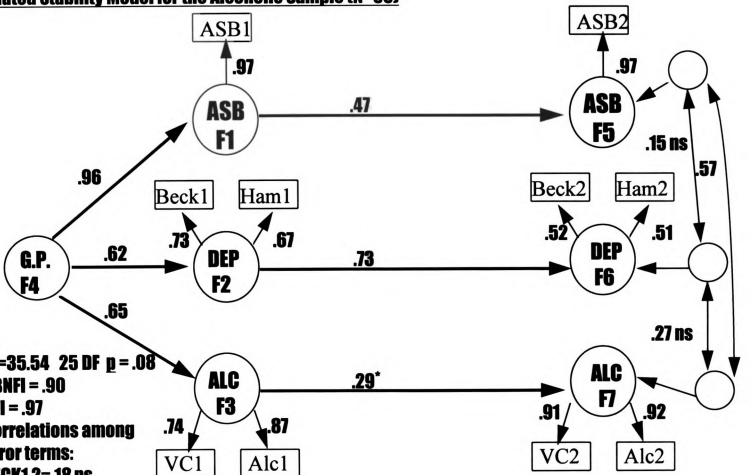
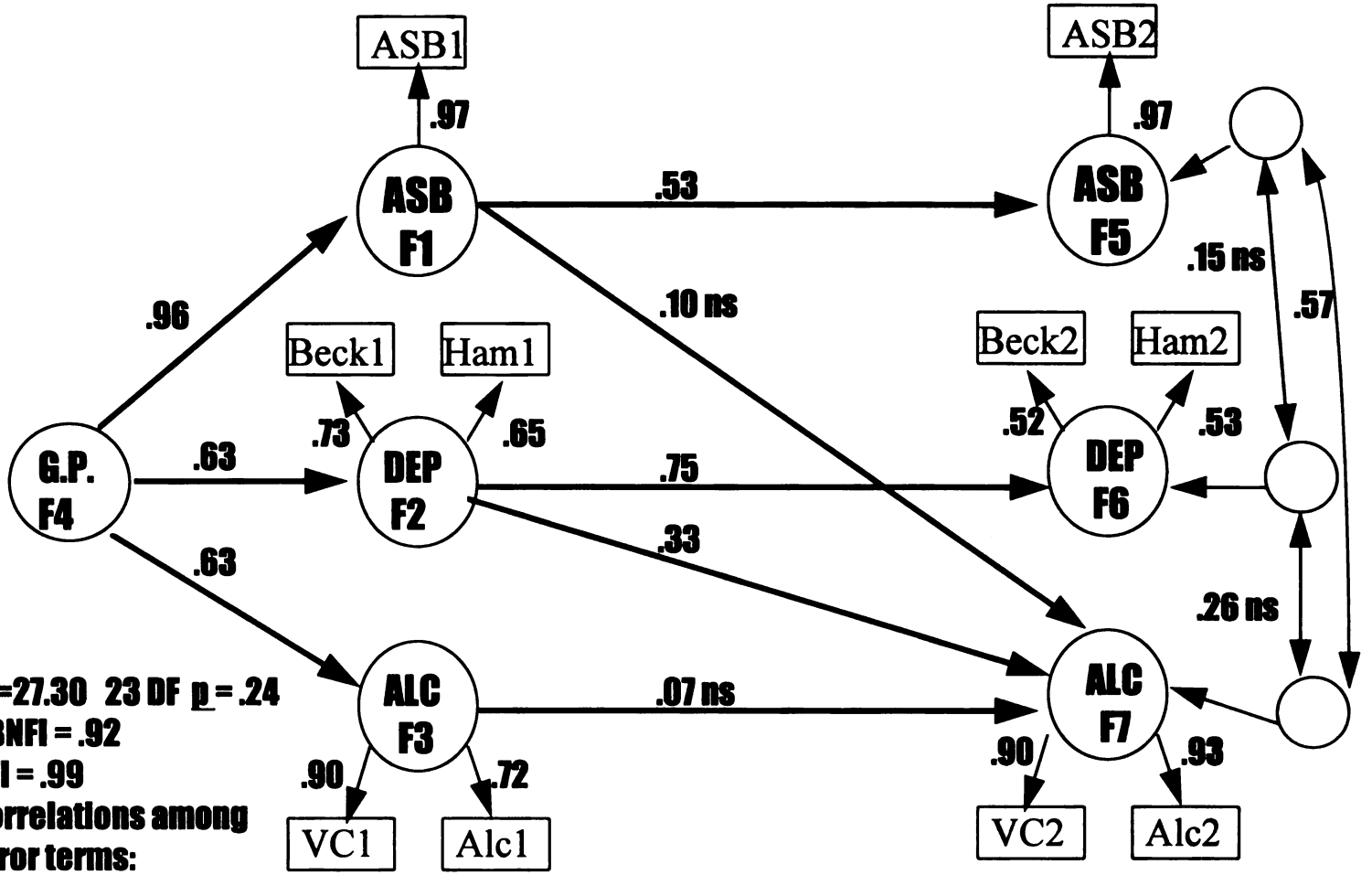


Figure 10
Structural Equation Model for the Alcoholic Sample (N=85)



Antisociality and Alcoholism were considerably lower than the path coefficients found in the analyses of the full sample. In comparing the two models (Full Sample and Alcoholics Only), Depression remained relatively unchanged (*B*= .72 to *B*= .73), while Antisociality dropped from *B*=.56 to *B*=.47, and Alcoholism decreased substantially from *B*=.54 to *B*=.29.

A possible explanation for this decline is that it is a result of the inclusion of nondrinkers in the full sample, individuals who neither displayed problematic alcohol use nor lost their nonalcoholic status at Time 2. Yet the Depression factor remained highly stable, indicating that depression is a stable characteristic for both Alcoholic and Non-alcoholic individuals.

Structural Equation Model for the Alcoholic Sample

The model had a significant CFI of .99, BBNFI of .92 and $X^2(23, N=85) = 27.3$, $p=.24$. In examining the significance levels, many parameters produced nonsignificant results. Most notable was the path from Alcoholism at Time 1 to Time 2 (F3-F7) (*B*=.07), indicating marginal, albeit nonsignificant continuity in patterns of alcoholism over the three-year period. The cross-lagged relationship between Antisociality and Alcoholism (F1-F7) was also nonsignificant (*B*= .10), while Depression at Time 1 had a significant influence on Alcoholism at Time 2 (F2-F7) (*B*= .34; $p<.05$). (Figure 10.) As with the full sample SEM analyses, the Lagrange Multiplier test for adding parameters showed that none of the multivariate multipliers were significant; however, the ordered univariate test recommended including a path from ASB1 to DEP2 (F1

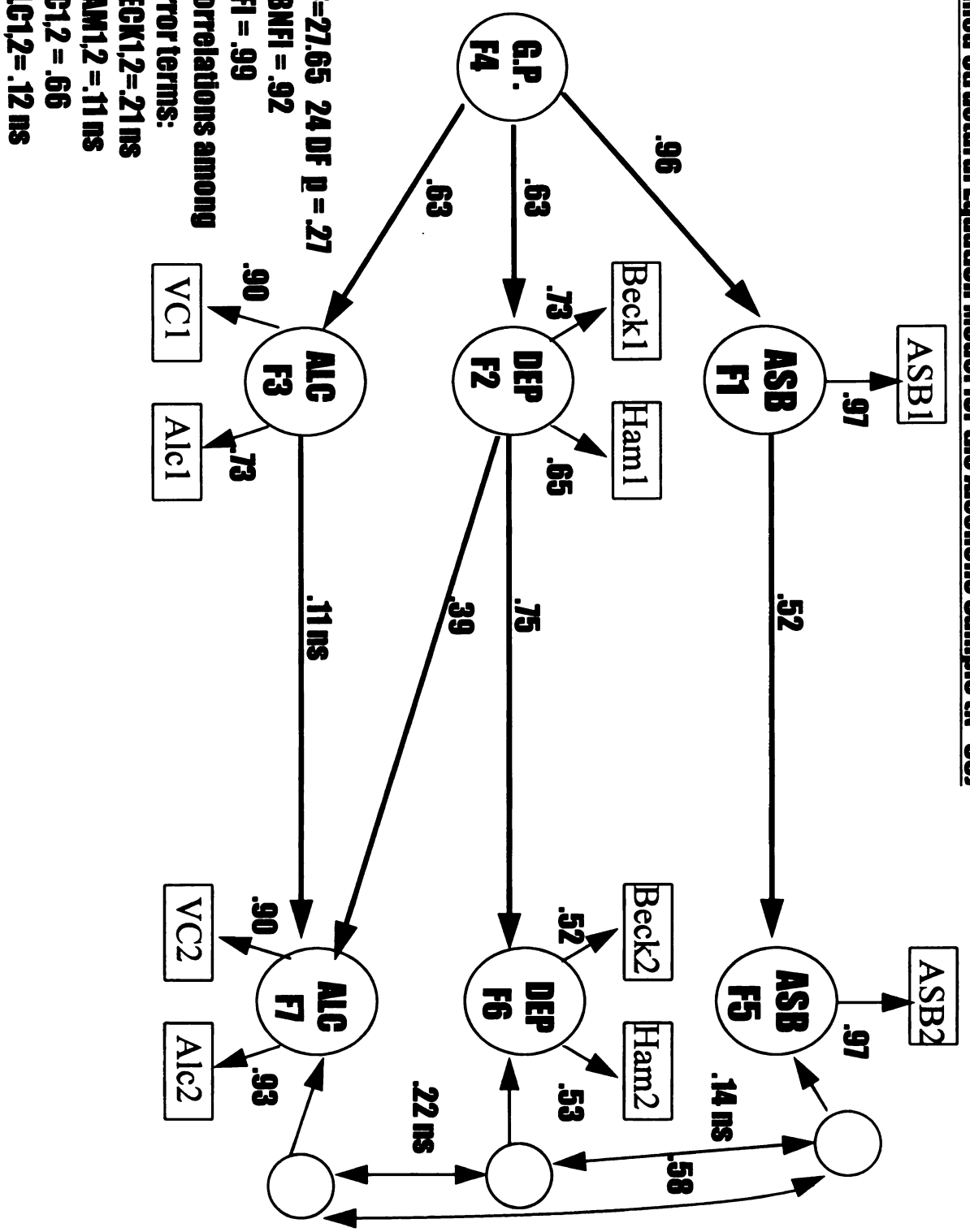
to F6). The addition of this path yielded a nonsignificant path coefficient and did not significantly alter the chi-square; therefore, the path was ultimately excluded. Although the Wald test (multivariate) showed no significant changes in chi-square would have resulted from freeing any of the parameters, an examination of the structural parameter estimates suggested that the path from F1-F7 may be redundant. On the basis of parsimony, it was dropped from the analysis.

The final model presented in Figure 11 assesses the same model as presented above except for dropping the path from Antisociality Time 1 to Alcoholism (ALC) at Time 2. The model had a significant CFI of .99, BBNFI of .92 and $X^2(24, \underline{N}=85) = 27.65$; $\underline{p}= .27$. Although excluding the parameter was based on a univariate test of significance (z statistic) as opposed to the multivariate Wald test, deletion of the parameter resulted in no loss to model fit.

As in the previous analyses using the full sample, the key substantive questions that generated the model were addressed in the cross-time paths of the latent variables in the model (Figure 10). This finding indicated that once an individual becomes Alcoholic, his pattern of drinking is more likely to be influenced by level of depression than by previous drinking habits or difficulties. High levels of Depression (F2) during the first period led to an increase in Alcoholism (F7), defined as more severe DSM-III-R diagnoses and more alcohol related symptoms. Both analyses supported the hypothesis that

depression influences later alcoholism, while providing limited support for the influence of antisociality and prior alcoholism on the later outcome.

Figure 11
Trimmed Structural Equation Model for the Alcoholic Sample (N=85)



X^2=27.65 24 DF p = .27
BBNFI = .92
CFI = .99
Correlations among error terms:
BECK1,2=.21 ns
HAM1,2 =.11 ns
VC1,2 = .66
ALC1,2= .12 ns

CHAPTER IV

DISCUSSION

Historically, there has been a strong interest in the course and mechanisms by which alcoholism escalates, ceases, or is maintained (Valliant, 1983). In contrast to this interest, there is a paucity of empirical literature on the subject, and that which does exist is riddled with inconsistent findings. For this reason, the main purposes of this study were to provide data on the course of alcoholism over time and to examine the pathways and influences of other factors on alcoholism. These questions were to be answered by examining two broad areas:1) stability, by examining latent factors by way of entropic modeling; and 2) change, by exploring cross-lagged paths. Prior to discussion of study findings, it is necessary to examine characteristics of the subjects and the sampling procedures to lend perspective to the study and address the limitations and idiosyncrasies that might color the findings.

The Sample in Perspective

Alcoholics in this study were initially identified after being arrested for driving under the influence and were recruited if they had an intact family (at least at time of first contact) with at least one male child between the ages of three and six. That these men were convicted of driving while intoxicated suggested that for them alcohol use was associated with antisociality (Cloninger, 1987; Zucker, 1987) and they may be more prone to higher levels of depression than control subjects (Gonzalez, 1991; Selzer, Vinokur & Wilson,

1977; Windle & Miller, 1990). However, the use of subjects arrested and convicted for drinking and driving allowed for the attenuation of selection effects usually associated with treatment seeking behavior (e.g., depressed affect) (Schuckit & Miller, 1989). Additionally, the study controlled for family constellation with all subjects being coupled and having a male child of similar age. Using subjects with a young son insured family developmental similarity, reducing the heterogeneity usually found with most studies on alcoholism. As the parent study progresses, it will allow for the examination of the effect of social support on drinking and vice versa. Preliminary examination of the data at later time periods has already begun to show high rates of divorce.

An additional limitation of the work is the small sample given the analytic strategy used. Although the parent study will ultimately have a substantially larger and more diverse sample, the sample used here involved all the subjects who had two waves of data completed at the time the analyses were begun. In this regard, the present work needs to be viewed as a preliminary pass on how these men are moving symptomatically through time. More definitive statements will need to await availability of the full Time 2 data base (expected to be available in another 1-1/2 years). The study sample consisted of 127 subjects from the M.S.U./U.M. Longitudinal Study, of which 85 were alcoholic and the remaining 42 were controls. Of the 85 alcoholics, only 34 met the criteria for Antisocial Alcoholics, such that the remaining 51 Non-Antisocial Alcoholics may have had greater influence or power within the

analyses. Further, the controls were statistically different from the alcoholics on two of three demographic variables, with the controls being more educated and having higher status employment. These differences may reflect the changes and putative effects of problem drinking on life course and trajectory. Though a very powerful and useful statistical tool, structural equation modeling requires relatively large samples as well as very stringent assumptions for identification. As such, the more complicated the design, the larger the sample required. Because the sample size for the analyses examining the Alcoholic Subsample is below the suggested rule of thumb of ten subjects per measures (85 subjects for ten measures), study findings should be regarded as exploratory or hypothesis generating, rather than conclusive or definitive.

Measurement Issues

During the course of a study that uses repeated measurements there are often changes in technology or procedures that change how a problem is measured or perceived. As such, most of the variables used in this study had to be adjusted or altered for reasons of comparability across time periods. The Antisocial Behavior checklist (Zucker & Noll, 1980), for example, was originally developed to get an estimate of lifetime antisocial behavior beginning in childhood. However, at the second wave many of the items from the original questionnaire were deleted and the snapshot of the person's antisocial career became only a picture of the previous three years (versus the

previous 30). In an attempt to remedy the potential differences, only the adulthood items which were asked at both time periods were used in these analyses. However, the lack of significant contribution by the ASB factor may have resulted from not including the childhood items. Previous analyses from the Longitudinal Study database have demonstrated that childhood antisociality was predictive of adult alcohol problems for antisocial alcoholics (Zucker, Ellis & Fitzgerald, 1993a), suggesting that the contribution or life course influence that evolves from childhood plays a significant role. By excluding the childhood items, these contributory influences have been removed. This illustrates the point that how and when a construct or variable is measured greatly influences the results and their interpretability. In the case of the ASB variable, it is plausible that using only the Adulthood item denies the presence or importance of a developmental or life course influence of childhood antisociality. Future analyses using both childhood and adult items may prove useful in further illuminating the influence of antisociality on alcoholism and related difficulty.

Similarly, a lifetime measurement followed by a three year measurement was used for the Hamilton Rating Scale rating of Worst-Ever Depression (HRSD: Hamilton, 1967). The variables used for measuring the Alcoholism Factor only used information about symptoms from the previous three years. Finally, the use of the variety component of LAPS was a compromise. LAPS is derived using three different components two of which are time based, age of

onset and interval between first and most recent symptom, which required using only the variety of symptoms component.

Stability: Full Sample and Alcoholic Subsample

Comparisons of the two sets of analyses (i.e., Full Sample and Alcoholic Only Subsample) confirmed that substantial differences were present in the temporal stability of alcohol related problems in alcoholic as compared to nonalcoholic groups. The initial analyses examining the full sample showed considerable stability across time for Depression and Antisociality, and for Alcoholism factors when assessed without cross-lags. As previously noted, when only the Alcoholics were examined, there was a noticeable drop in the path from Alcoholism at Time 1 to Alcoholism Time 2 (B=.54 to B=.29); whereas Depression remained relatively unchanged and Antisociality dropped only negligibly (B=.56 to B=.47). This finding shows that Depression was a stable characteristic resistant to change for both the controls and the alcoholics. A plausible explanation for this decline is that it reflects a by-product of including "nondrinkers" in the full sample who neither display problematic alcohol use nor lose their nonalcoholic status over the three year interval between the waves. As such, the inclusion of nonalcoholics in the initial analyses would be expected to artificially elevate the path coefficient due to the Controls' lack of early as well as later involvement with alcohol-related difficulties. In other words, individuals who are light drinkers or have unproblematic use do so with greater stability than individuals who have

alcohol-related difficulties. This finding is consistent with the work of Skog and Duckert (1993) who noted that "light drinkers are most likely to continue to drink lightly or to increase only moderately. In fact the transition probability for those who are light drinkers are not very different from the transition of abstainers"(p.183).

Similar results were found by Hasin, Grant and Endicott (1990) in re-analyzing the work of Cahalan and Room (1974). Hasin and her colleagues found that 70 percent of subjects who were initially classified as alcohol abusers (DSM-III-R diagnosis) were still abusers or were classified as remitted. It may, therefore, be more informative to focus only on the Alcoholics who are classified as dependent in the sample because the controls, who have not initiated problem use and are in their early thirties, may have already passed the crucial period where they were most likely to begin problematic alcohol use. Although late-onset alcoholism does occur, the parent longitudinal study was not sufficiently far enough in its course to allow for further consideration of this phenomena.

Fillmore and Midanik (1984) argued that the exceptionally high across-time turnover rate may be due to problem drinking often being defined in terms of harmful events rather than in terms of persistent or chronic problems. Other researchers (e.g., Roizen et al., 1978; Skog & Duckert, 1993; Vaillant, 1983) have noted that much of the variance in estimates of stability may be the result of arbitrary definitions and cut-offs used in classifying subjects. Skog

and Duckert posited that "it may be a better strategy simply to record reductions and increases in consumption and objective consequences of drinking, without resorting to pre-fixed standards for 'normal' drinking" (p.179).

Aneshensel and Huba (1983) estimated their model using Drinkers Only to examine the potential confounding effect of including nondrinkers in their analysis. No significant differences between the full sample model and Drinkers Only model were found. However, differences between the Aneshensel and Huba study and the current study may also be due to differences in sampling technique and/or criteria used for classifying drinkers. The authors used an adult community sample representative of the Los Angeles metropolitan area and made no attempt to classify subjects by diagnosis. Additionally, the shorter interval of four months between measurements points in the Aneshensel and Huba study likely increased the stability coefficient; whereas, in the current study, the measurement points were three years apart.

The issue of interval between temporal points and concurrent changes in developmental or life stages is a critical issue in addressing alcohol use patterns. In the present study, alcoholic subjects may have reacted to their DWI arrest and reduced their alcohol intake and related problems, thus altering their level of alcoholism in the interval between the two measurements. In addition, the length of time between measurements may

have been either too short or long to capture an accurate snapshot of the process. In a similar study, Windle and Miller (1990) who followed a group of subjects arrested for DWI, initially found an inverse relationship between alcoholism and depression between the first two measurement points, but later noted a positive relationship between Time 2 and Time 3, supporting a biphasic pattern in the relationship between alcoholism and depression. Windle and Miller's study was conducted over a one and a half year period with approximately nine months between measurement points, whereas the present study was using a three year interval. These findings illustrated the necessity of multiple data points and longer follow-up to help understand the dynamic nature of these interactions.

Attempts to capture patterns of alcoholism are especially difficult when examining people as they make the transition from one stage to another, such as from adolescence to young adulthood, because the collective mechanisms and processes influencing individual behavior and experience change as the person ages and/or enters a new stage. In reviewing the longitudinal studies on alcoholism, Fillmore et al.,(1991) reported that studies with shorter intervals (1-5 years) may not be applicable to alcoholic subjects in their early 30s. In contrast, research supported both stability and chronicity of problematic use in middle age and older subjects, but with a much lower prevalence rate than younger samples (e.g., Fillmore et al., 1991; Fillmore & Midanik, 1984).

CHANGE

A key substantive question centered on predicting future alcohol use from previous patterns of use, as well as exploring any influence which previous antisociality and depression had on future Alcoholism. In the full sample, which included both alcoholics and nonalcoholics, level of antisociality did not play a significant role in subsequent alcoholism. In contrast, depression was found to play a significant role, as higher levels of depression appeared to induce higher levels of alcoholism. Further, the path from Alcoholism 1 to Alcoholism 2, though significant, may be a by-product of using Controls in the analyses, therefore confounding the results.

Meaningful differences were found in the present study between the Alcoholic subsample model and the full sample model in terms of both clinical implications and theory. With alcoholics, the nonsignificant path from Alcoholism 1 to Alcoholism 2 (b=.07) showed that past alcoholism added little to the prediction of later alcoholism. As such, other factors (e.g., depression, social support) may be influencing the behavior, and alcoholism may not operate in the traditionally assumed linear fashions, a discovery which has been noted by current researchers (e.g., Bachman, O'Malley, Johnston et al., 1992; Cahalan, 1970; Donovan, Jessor & Jessor, 1983; Temple & Fillmore, 1985-86).

Clark and Cahalan (1976) noted "great flux" or instability in the patterns of alcohol problems such that as individuals mature, chronicity of alcohol problems appeared more entrenched with age (Fillmore & Midanik, 1984;

Temple & Leino, 1989). Because of the considerable movement between problematic and nonproblematic alcohol use among the sample, including a diagnoses ranging from no use to severe dependence, it may prove fruitful to examine patterns of change only among alcoholics with the most severe diagnosis.

Though the purpose of this study was to examine the progression of already existing alcohol problems rather than the etiology of alcoholism, these results bring into question the role of depression both in initiating and perpetuating drinking patterns. As noted, later alcoholism may be best predicted by an individual's level of depression. Both previous alcoholism and antisociality were ineffective in predicting later alcoholism. Aneshensel and Huba (1983) found that "feelings of depression may be followed by an attempt on the part of the individual to self-medicate the depression through the increased use of alcohol"(p.149). Further, alcoholics experienced increasing dysphoria as a consequence of alcohol consumption (Freed, 1978), suggesting a self-perpetuating cycle between depression and alcoholism (Peirce et al., 1995). Aneshensel and Huba concluded that drinking alcohol does not alleviate the long-term tendency to become depressed. Despite many attempts to establish the relationship between depression and alcoholism (both cross-sectionally & longitudinally), the role which depression plays at the various stages of alcoholism is not yet well understood.

Developmental theories which define development in terms of "dynamic

processes, organism-environment transactions, and probablistic-contextual influences on organizing systems" (Fitzgerald, Zucker and Yang, 1995, p.8) have received considerable support. Within this framework, the influencing structures for stability and change in alcoholism over time can be conceptualized more broadly. Alcoholism influences the individual at multiple levels, simultaneously affecting the individual physiologically, psychologically and socially. Attempts to dissect the disorder and understand the course of alcoholism are often frustrating due to the pivotal role contextual events play in the organization, reorganization, and disorganization of developmental pathways (Fitzgerald, Zucker and Yang, 1995). Within the more dynamic definition of development, the current study was narrowly focused, concentrating on variables that are more psychological in nature. As such, change or the lack of change may have resulted from the interaction with other events or contexts. However, the effects of many of the variables are often cumulative in nature and their impact can only be ascertained by examining variables that can best be described as markers of the variable's cumulative effects. Variables such as employment status or job loss may be seen as developmental markers or proxies of the damage done by alcoholism or antisociality (Fitzgerald & Zucker, 1995). Other factors such as divorce and social support may also speak to the dynamic interactions that involve change and transformation, where the breakdown of the social support network may increase the likelihood of depression and influence drinking behavior (Peirce et

al., 1995).

> Thus, substance abuse is conceptualized as a life-span problem with origins that to some degree are manifestation of the social structure, well beyond the confines of the individual (e.g., living in a drinking culture, being of lower social status), that begin to play themselves out even at conception. (Fitzgerald & Zucker, 1995, p.6)

Clinical Implications

These results underscore both the need for treatment and assessment of alcoholism to address alcoholic symptomatology, as well as depressive or affective symptomatology which may be at play. To treat the alcoholism without addressing the depression, or vice versa, will increase the likelihood of a relapse. The interrelations between depression and alcohol have often been described in both the cross-sectional (e.g., Gonzalez, 1991; Helzer et al., 1991; Hesselbrock et al., 1985; Regier et al., 1990) and longitudinal literature (e.g., Aneshensel & Huba, 1983; Hartka et al., 1991; Windle & Miller, 1990) with rates of comorbid depression among alcoholics in treatment estimated between 25% to 67% (Schuckit, 1986) and 13.4% in the general population (Regier et al., 1990). In addition, approximately half the reported relapse episodes were associated with stressful life events or negative affective states (Windle & Miller, 1990). So far,"chicken and egg" attempts to establish causality have been ineffective in determining whether alcoholism causes depression or vice versa. The two disorders often co-occur, blending into an inter-dependent

relationship. Put simply, individuals may be depressed because they drink, and often drink because they are depressed (Windle & Miller, 1990). To develop a better understanding of the nature of the alcoholism and depression, further interdisciplinary study is needed where developmental hypotheses can be tested.

Future Directions

Future work to better understand the stability and continuity of alcoholism should extend the dimensions examined to include additional factors and typologies and additional measurement points to more closely chart the process and relationships between the various factors. In particular, the relationship between alcoholism and depression needs further longitudinal tracking to allow for a broader, more comprehensive examination of the process. As subjects age and alcoholism progresses, changes in life situations can be anticipated that will affect later alcohol use, such as social support, stress, illness, divorce, etc.. Direct comparisons of subtypes of alcoholics (such as non-antisocial versus antisocial alcoholics) may prove fruitful in developing treatment programs that may address their respective needs and deficiencies.

Future studies should also explore gender differences in alcoholism. For example, females are often socialized differently and are physically different, exposing them to other forces that may preclude them from fitting neatly into models developed on males. Differences may include variables such as coping styles, familial roles, reproductive cycles, expectations, and differing societal

perceptions. Additionally, because of the higher rates of affective disorders among women (DSM IV, 1994), the association between problem drinking and depressive symptomatology may be considerably stronger for female alcoholics. Also in need of exploration are the processes by which the family system as a whole operates to perpetuate or discontinue dysfunctional behavior. As the Michigan State University/University of Michigan Longitudinal Study progresses, additional longitudinal data will allow for a more definitive causal analysis of the processes involved in the evolution of alcoholism.

APPENDIX A

Antisocial Behavior Checklist *- Adulthood Items

These are the twenty-five Adulthood Items used to assess level of antisocial behavior (Zucker et al., in Progress). T1 signifies the item number for the questionnaire used during the first data collection. T2 signifies the item number for the questionnaire used during the second data collection. The items are scored from 0 to 3, with respondents rating as follows:

0 = Never - you have never done this
1 = Rarely - done only once or twice
2 = Sometimes - done three (3) to nine (9) times
3 = Often - done more than ten (10) times

	T 1	T 2	Question
1)	19	11	Snatched a women's purse
2)	20	12	Rolled drunks just for the fun of it
3)	21	13	Shoplifted merchandise valued over $25
4)	22	14	Shoplifted merchandise valued under $25
5)	23	15	Received a speeding ticket
6)	24	16	Been questioned by police
7)	25	17	Taken part in a robbery
8)	26	18	Taken part in a robbery involving physical force or weapon
9)	27	19	Been arrested for a felony
10)	28	20	Resisted arrest
11)	29	21	Been arrested for any other non-traffic police offenses (except fighting or felony)
12)	30	22	Resisted arrest for non-traffic police offense
13)	31	23	Defaulted on debts
14)	32	24	Passed bad checks for the fun of it
15)	33	25	Used an alias
16)	36	26	Performed sexual acts for money
17)	38	28	Had intercourse with more than one person in a single day
18)	39	29	"Fooled around with another women/men after you were married
19)	40	30	Hit your husband /wife in an argument
20)	41	31	Lied to your spouse
21)	42	32	Spent six month without a job or permanent home
22)	43	33	Been fired for excessive absenteeism
23)	44	34	Been fired for poor job performance (except absenteeism)
24)	45	35	Changed jobs more than 3 times in one year
25)	46	36	Lied to boss

Means, Standard Deviations, Ranges and Correlations Between Full Score and Score using only Adult Items

	Mean	SD	Range
Full Score (Child and Adult Items)			
Time 1	18.32	11.94	2 - 64
Full Sample (Adult Only)			
Time 1	8.45	6.45	1 - 33
Time 2	2.65	3.13	0 - 14
Alcoholic Sample (Adult Only)			
Time 1	10.71	6.63	1 - 33
Time 2	3.36	3.53	0 - 14
Control Sample (Adult Only			
Time 1	3.66	1.86	1 - 8
Time 2	1.17	1.20	0 - 5

Note.
Correlation Between Time 1 Adult Only Score and Time 1 Full Score = .90
Correlation Between Time 1 Child Only Score and Time 1 Full Score = .91
Correlation Between Time 1 Adult Only Score and Time 1 Child Score = .65

APPENDIX B

EQS Program for Final Structural Model

* These items are reproduced from the Antisocial Behavior Checklist (Zucker & Noll, 1980b)

```
/TITLE
Final Structural Equation Model for Alcoholic Sample
/SPECIFICATIONS
 DATA='C:\EQSW402\PHD\Fernalc.ESS'; VARIABLES= 11; CASES=  85;
 METHODS=ML;
 MATRIX=RAW;
/LABELS
V1=family; V2=asb1; V3=asb2; V4=beck1; V5=beck2;
V6=ham1; V7=ham2; V8=nc1; V9=nc2; V10=alc1;
V11=alc2;
/EQUATIONS
  V2  = 1f1 + E2;
  V4  =  1 F2 +  E4   ;
  V6  = * F2  +   E6   ;
       V8  =   1 F3  +   E8   ;
       V10 =    *F3  +  E10  ;
F1=*f4+d1;
F2=*f4+d2;
F3=*f4+d3;
  V3  = 1f5 + E3;
  V5  =  1 F6 +  E5   ;
  V7  = * F6  +   E7   ;
       V9  =   1 F7  +   E9   ;
       V11 =    *F7  +  E11  ;
F5= *F1+ d5;
F6= *F2+ d6;
f7= *F3 + * F2 + d7;
/VARIANCES
       E3= .61 ;
       D5 to D7=  * ;
       F4=     1;
       E2= 2.19 ;
       D1 to D3=  * ;
       E4 to E11=  * ;
/COVARIANCES
  E4,E5=*;
  E6,E7=*;
  E8,E9=*;
  E10, E11=*;
 D5 to D7=*;
/CONSTRAINTS
 (d1,d1)=(d2,d2);
```

```
/LMTEST
     PROCESS=SIMULTANEOUS;
/WTEST
    PVAL=0.05;
     PRIORITY=ZERO;
/PRINT
/End
```

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