# Alcoholism effects on social migration and neighborhood effects on alcoholism over the course of 12 years

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## Abstract

**Background—**Although a short-term effect of neighborhood characteristics on individual alcohol abuse has been demonstrated by a quasi-experimental residential mobility study, the obverse effect of alcohol problem involvement on place of residence and residential character has not been studied. We test the alcoholism effect on place of residence, and also attempt to replicate the neighborhood-to-alcoholism effect.

**Methods—**A sample of 206 Caucasian men (average age was 33) who were systematically recruited for alcoholism through court record search of drunk driving offenses and door to door canvass in a four county-wide area were followed at 3-year intervals in a prospective study of the course and outcomes of alcoholism. Participants' alcoholism diagnoses were made by semi-structured diagnostic interviews. Residential addresses at baseline and at 12 year follow-up were geocoded. Corresponding census tract variables were used as indicators of neighborhood residential character.

**Results—**The regression analysis shows that the more alcohol problems a man has, the more likely he is going to remain in, or migrate into a disadvantaged neighborhood. This effect is only evident when a number of relevant confounding variables, including initial level of socioeconomic status, age, antisocial symptomatology, and spousal AUD status at baseline are controlled. Alcoholics in remission tended to live in neighborhoods whose residential characteristics were not distinguishable from those of nonalcoholics. Unremitted alcoholics, however, tended to stay in or migrate into more disadvantaged neighborhoods.

**Conclusion—**Alcoholic involvement has long-term negative effects on place of residence; involving an elevated likelihood of moving into or remaining in a disadvantaged neighborhood. Recovery from alcoholism is protective against downward social drift on the one hand, and is favorable to improvement in social conditions on the other.

## Keywords

Alcoholism severity; Neighborhood characteristics; Recovery from alcoholism

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## INTRODUCTION

The association between individual substance use and residential neighborhood characteristics has been studied in numerous cross-sectional studies. Neighborhood characteristics demonstrated to be associated with individual substance use include unemployment, poverty, low family cohesion, and residential mobility (Blomgren et al., 2004; Boardman et al., 2001; Karvonen and Rimpela, 1997; Oetting et al., 1998). Although the majority of existing cross-sectional studies aimed to investigate the influence of neighborhood risk factors on individual substance use behavior, they are not sufficient to establish causal relationships between the two constructs for the following reasons. First, cross-sectional studies do not take into account the duration that individuals have actually lived in a neighborhood when they participate in the study (Blomgren et al., 2004). Neighborhoods may have different effects on individuals depending on their exposure time. Second, although individuals are influenced by their environment, they are also able to choose their place of residence (Fauth et al., 2004). Individuals with high rates of substance use may be more likely to migrate to disadvantaged neighborhoods because of economic hardship, or alternatively, because of the convenience of obtaining alcohol or other drugs (Boardman et al., 2001).

Due to the inherent limitations of cross-sectional studies, prospective longitudinal studies are highly desirable in specifying the direction of causal relationship between individual substance use and neighborhood characteristics. A recent study following a sample of disadvantaged women at two time points over a 2 year interval found that participants' perceptions of neighborhood disorganization at Time One predicted their increasing heavy drinking at follow-up (Hill and Angel, 2005). However, a major limitation of that study was that both neighborhood characteristics (10 items) and heavy drinking (1 item) were measured subjectively by way of participant self-report. Women with drinking problems may have been under higher psychological distress and therefore tended to have negative perceptions of their neighborhoods. Thus, the "neighborhood effect" shown in the study may be artificial. Another recent study using data from the National Educational Longitudinal Study employed better measures of neighborhood characteristics based on 1990 U.S. census data (Hoffmann, 2002). Adolescent substance use (including alcohol, marijuana, and cocaine) was measured longitudinally at 10th grade and 12th grade. The longitudinal effect of neighborhood characteristics on substance use was not supported by the national data. One of the possible reasons for the lack of effect is that the study utilized zip codes instead of census tracts as the unit for calculating neighborhood characteristics. In general, a zip code covers a geographic area that is 2 to 3 times the size of a census tract and therefore includes residents with considerable heterogeneity of socioeconomic status (Thomas et al., 2006). Thus, an analysis based on zip codes actually examines *community* effects instead of *neighborhood* effects.

A quasi-experimental residential mobility study provides direct evidence to support short-term effects of neighborhood characteristics on individual alcohol abuse (Fauth et al., 2004). As part of the Yonkers Project, low-income minority families residing in high-poverty neighborhoods were randomly assigned via lottery to relocate to publicly funded houses in middle-class neighborhoods. Two years after the relocation, these "lucky" families reported less alcohol abuse in comparison to families who remained in high-poverty neighborhoods. In short, the presence of a positive neighborhood context ameliorated the alcohol abuse. While manipulation of neighborhood characteristics like the Yonkers Project may benefit both the society and the scientific community, manipulating *individual* substance abuse is both technically and morally unfeasible. Thus, to examine the effects of individual substance use on residential migration and possible downward social drift, prospective observational studies remain the best design.

All three of the existing longitudinal studies reviewed above aimed to test the effect of neighborhood characteristics on individual substance use. Moreover, they all spanned a relatively short period of time (2 years) and therefore tested only short term effects. In contrast, the primary goal of the present study was to examine the long term effect of *individual alcohol* use on social migration. We examined this relationship across five waves of measurement spanning 12 years, using data from the ongoing Michigan Longitudinal Study (MLS) on families at risk for alcoholism and other substance use disorders (Zucker et al., 2000). We measured neighborhood characteristics of study families at baseline and at the 12 year follow-up by matching the U.S. census tract data with their addresses. We also assessed their cumulative level of alcohol problems by conducting semi-structured interviews in their homes at each wave. A 3-year alcohol use disorder (AUD) diagnosis for each adult participant was made by a clinician using DSM-IV criteria (American Psychiatric Association, 1994) at each wave. Thus, the measures on both the predictor and outcome were not subject to the flaws of existing longitudinal studies.

## MATERIALS AND METHODS

### Design and Sample

Alchoholic families were ascertained through men identified by a network covering all district courts in a four county area. All men with drunk driving convictions involving a blood alcohol concentration of at least 0.15% if first conviction (or at least 0.12% if a previous drinking-related legal problem had occurred) were potential enrollees. They also needed to meet diagnosis for probable or definite alcoholism (Feighner et al., 1972) and, due to offspring studies also conducted with this sample, were required to have at least one biological son between 3 and 5 years of age. The men also had to be living with the child and his biological mother at time of family consent, although the unstable nature of some of these relationships is illustrated by the fact that some couples were no longer living together by the end of the baseline assessment protocol. Alcoholic status of the mothers within these families was free to vary. A contrast/control group of nonalcoholic families (neither parent with a substance abuse history), was recruited by exhaustive door to door canvass in the same neighborhoods as the alcoholic families. This canvassing procedure also resulted in recruitment of an intermediate risk group, since some families of parallel composition were identified who had alcoholic fathers, but without a history of alcohol related legal or drunk driving problems occurring during the life of their child. Original recruitment used Feighner criteria (Feighner et al., 1972); thereafter parents were re-diagnosed using DSM-IV AUD criteria. A more detailed description of study method is provided in an earlier report (Zucker et al., 2000).

MLS families receive extensive in-home assessments at baseline, thereafter at three-year intervals. In this study, we only included the 206 families (all Caucasian) who (i) completed both baseline (T1) and the 12 year follow-up (T5) and (ii) had at least two data points where AUD diagnoses were available between T1 and T4. Twelve families were excluded because they did not meet these criteria. Five of them were alcoholic families; 7 were controls. The average age and education years of the men of these excluded families were also comparable to the study sample (33 years old; 14 years of education). Due to the recruitment criteria of the study, the majority of women (more than 70%) maintained negative AUD diagnosis through T4. Thus, we decided to focus our analysis on men because they had greater variance in alcoholism severity.

### Measures

**Alcoholism Severity Index—**This longitudinal measure of alcoholism status was assessed combining information from the Short Michigan Alcohol Screening Test (SMAST; Selzer et al., 1975), the Diagnostic Interview Schedule (DIS; Robins et al., 1980; Robins et al., 1996),

and the Drinking and Drug History Questionnaire (DDHQ; Zucker et al., 1990). The SMAST and DIS are both well validated and widely used diagnostic instruments. The DDHQ incorporates items from national epidemiologic studies of drugs (Johnston et al., 1979) and alcohol (Cahalan et al., 1969) as well as from a structured clinical symptom questionnaire (Schuckit, 1978). Items provide data on quantity, frequency, and consequences of substance use. Based on the composite information of these 3 instruments, a 3-year DSM-IV AUD diagnosis was made by a trained MA or Ph.D. level clinician. When discrepancies were observed among the measures, the more severe pattern was taken as the best estimate. Inter-rater reliability was established by having another clinical psychologist blindly diagnose a subset of the protocols; Kappa was 0.81. In the present study, we computed an alcoholism severity index for each of the 206 men by averaging severity codings across T1 to T4. The severity at each wave was coded as: 0 for negative diagnosis; 1 for alcohol abuse; 2 for alcohol dependence without physical dependence; and 3 for alcohol dependence with physical dependence. The resulting alcoholism severity index, a continuous scale ranging from 0 to 3, is the major predictor for neighborhood characteristics at T5. We also used wives' AUD status (coded as 1 for positive diagnosis; 0 for negative diagnosis) at baseline as a predictor.

**Antisocial Behavior Checklist—**(ASB; Zucker, 1999; Zucker et al., 1996). The ASB measures the frequency of the respondent's participation in a variety of aggressive and antisocial activities over the life span. A series of reliability and validity studies with populations has shown adequate test-retest reliability (.91 over 4 weeks) and internal consistency (alphas = .67 to .93). The instrument differentiates between individuals with histories of antisocial behavior (e.g., convicted felons) versus individuals with minor offenses, versus university students. The instrument also discriminates alcoholic from nonalcoholic male adults. At Wave 1, both childhood and adulthood items were administered, whereas in later waves, only adulthood items were asked. In the present study, the childhood ASB score was used as a predictor of residential neighborhood characteristics at T5.

**Demographic Questionnaire—**This instrument assesses background characteristics of self and family of origin. The following individual level variables for each man were used to predict neighborhood characteristics at T5: age at baseline, years of education, and socioeconomic status (SES). SES was coded based on occupation at baseline (Mueller and Parcels, 1981). The index is a continuous scale ranging from 0 (unemployed) to 904 (law professor).

**Residential Neighborhood Characteristics—**Residential addresses of the 206 men at T1 and T5 were matched with census tract codings at the corresponding census years. At T1, 57% of our participants were assessed in 1980s whereas the rest of them were assessed in 1990s. At T5, 31% were assessed in 1990s whereas the rest of them were assessed in 2000s. If the assessment was done in 1980s, we used 1980 census data. The same rule applied to the assessments conducted in 1990s and 2000s. From T1 to T5, 62.14% of the men had moved to different census tracts, making it likely that their neighborhood characteristics changed. For the men who remained in the same census tracts, census statistics for those neighborhoods also underwent change from T1 to T5 (a 12 year interval) due to changes in local socioeconomic environment and resident composition. Since the interval of the study extended from the late 1980s to early 2000s, the following 5 neighborhood disadvantage variables previously demonstrated to be related to individual substance use (Blomgren et al., 2004; Boardman et al., 2001; Karvonen and Rimpela, 1997; Oetting et al., 1998) were computed for the 1980, 1990, and 2000 census years: (1) percentage of 15+ year old residents who were separated or divorced; (2) percentage of male residents in the labor force who were unemployed; (3) percentage of households that had public assistance income; (4) percentage of residents who

resided in different houses 5 years ago; (5) percentage of residents whose income was below the poverty level.

### Analytic Approach

Although the main focus of the analysis was to test if cumulative alcohol problems from T1 to T4 predicted residential neighborhood environment at T5, we need to control for important individual differences in baseline neighborhood environment, as well as individual SES, age, antisocial symptomatology, and spousal AUD status which could all contribute to downward social migration over time. We regressed each of the 5 neighborhood characteristics at T5 on the alcoholism severity index, the corresponding neighborhood variable at T1, and the other control variables. We hypothesized that higher alcoholism severity at T1–T4 would predict a higher divorce rate, a higher male unemployment rate, a higher percentage of households under public assistance, higher residential mobility, and a higher poverty rate in the neighborhood of residence at T5, controlling for the other variables.

In addition to the cumulative alcoholism effect from T1 to T4 as tested in the regression models, we examined the potentially different longitudinal patterns of alcoholic involvement over this period of time. In particular, we were interested in whether remitted alcoholic men ended up living in different kinds of neighborhoods than unremitted alcoholic men. About 90% of participants had alcoholism diagnostic data on at least 3 out of the 4 possible assessment points and thus these people were used to find reliable patterns. Among these men, we identified 3 alcoholic groups who are of interest for comparison: (1) the **nonalcoholic group** (N=79) never met AUD diagnosis; (2) the **remitted alcoholic group** (N=30) met AUD diagnosis at baseline but recovered in at least 2 consecutive later time points; (3) the **unremitted alcoholic group** (N=38) met AUD diagnosis at all time points. The rest of the 37 men who did not belong to any of these 3 groups had heterogeneous relapsing-remitting patterns so they were not included in the group comparison. The three groups were compared on neighborhood characteristics at baseline and at 12 year follow-up using Tukey's studentized range test (Kramer, 1956) with Type I experimentwise error controlled at the .05 level. Our hypothesis was that these three groups were not different at baseline. However, at 12 year follow-up, the residential neighborhood environment of the unremitted alcoholic group was hypothesized to be more disadvantaged than the neighborhoods in which the other two groups resided.

## RESULTS

Means and standard deviations of both the individual level and census tract variables are shown in Table 1. The men who participated in this study were on average 33 years old with 14 years of education. Their average SES (363) was somewhat lower than the median of the scale (452). Examples of the occupation corresponding to this average SES are therapy assistants (364) and bill/account collectors (359). Their average childhood ASB score, 9.22, was high; a score of 10 or greater is the cut-off needed to qualify for the child conduct problem criterion portion of an antisocial personality disorder diagnosis in DSM-IV (Zucker, 1999). The variance of the alcoholism severity index was high (≈ 1) given that the scale ranges from 0 to 3. The value for this index was 0 (nonalcoholic) for 39% of these men, whereas 25% had index values in the range of 2–3 (alcohol dependence). Although the recruitment protocol allowed the AUD status of the wives to freely vary, only 17% met diagnostic criteria at baseline. About 70% of the women had value 0 on the alcoholism severity index, whereas only 9% of them had index values in the range of alcohol dependence.

A number of the men's residential neighborhood characteristics changed significantly during the 12 year interval, but not all were in the same direction, suggesting heterogeneity of process and also considerable within group heterogeneity. Paired t test results indicated that, at the last follow-up, divorce rate was higher in the neighborhoods where these men ended up than it was

at baseline, there was no change in level of poverty, but other neighborhood characteristics indicated an improvement in surroundings. The male unemployment rate was lower, the percentage of households under public assistance was lower, and residential mobility in the neighborhood was lower.

Table 2 shows the regression coefficients and corresponding statistical significance for the regression models of 12 year residence outcome on alcoholism severity. These analyses provide a clearer picture of change because they controlled for baseline neighborhood level as well as potential confounds. As expected, the alcoholism severity index averaged over 9 years predicted neighborhood environment at T5, conditional on the effects of the other predictors. Men with more alcohol involvement tended to place themselves in more disadvantaged neighborhoods. In addition, neighborhood environment at baseline significantly predicted neighborhood environment at the 12 year follow-up. Childhood ASB and spousal AUD status at baseline did not turn out to be significant predictors for residential characteristics at T5, above and beyond the alcoholism effect. The influence of age was only significant vis a vis divorce rate and male unemployment rate. The older the participant at baseline, the more likely he ended up living later on in a neighborhood with disadvantage markers of higher divorce and higher male unemployment rates. After taking account of the baseline neighborhood environment, education only (negatively) predicted male unemployment rate and baseline SES only predicted the two neighborhood indicators for poverty. The more years of education the participant had, the less likely he would be living in a neighborhood with a high male unemployment rate 12 years later. Those with higher SES were also less likely to be living thereafter in neighborhoods of high poverty.

Table 3 shows means and standard deviations of the neighborhood characteristic variables for three groups who differed in alcoholic diagnosis and course. Table 3 also shows the corresponding statistical group comparison results. At baseline, the three groups were statistically equivalent on all neighborhood characteristics except for the divorce rate within census tract (i.e. nonalcoholics were living in areas that had higher census divorce rates than remitted alcoholics). Although the values of the means for the remitted group were slightly lower (i.e. better) than the other two groups, the group difference was not statistically significant. This overall lack of difference is a further confirmation of the study's original sampling strategy (Zucker et al., 2000), whereby both nonalcoholic controls and community ascertained alcoholics were recruited via door-to-door canvassing out of the same neighborhoods as the court alcoholics – the group that at time of inception was the most actively symptomatic. However, when these three groups were compared at 12 year follow-up, the remitted alcoholic group tended to reside in less disadvantaged neighborhoods with lower divorce rates, lower percentages of households under public assistance, lower residential mobility, and lower poverty rates than the unremitted group. There was no difference between the remitted alcoholic group and the nonalcoholic group in terms of neighborhood environments at 12 year follow-up.

The analyses we have carried out have all been guided by the hypothesis that presence of active AUD will have a long term, negative effect on the alcoholic's residential neighborhood characteristics. At the same time, the obverse relationship may also be operating. In fact, as noted in our review, the Yonkers Project (Fauth et al., 2004) demonstrated short-term effects of neighborhood characteristics on individual alcohol abuse. However the time span of that study leaves open the question of whether such neighborhood effects would be sustained over a longer time interval. Using our study's longitudinal data, we conducted an exploratory analysis to examine this long-term effect. We took the average of the 5 census tract variables at baseline as an index for participants' baseline neighborhood characteristics to predict their DSM IV alcoholism symptom counts (measured by DIS) at the 12 year follow-up, controlling for their baseline AUD statuses, childhood ASB scores, ages, education levels, SES, and

spousal AUD at baseline. The result showed that both positive AUD diagnosis and residency in worse neighborhoods at baseline predicted more alcoholic symptoms 12 years later (see Table 4). This baseline neighborhood effect is not likely to be confounded by baseline AUD status because the alcoholics did not live in worse neighborhoods than the nonalcoholics at baseline under our neighborhood recruitment protocol.

## DISCUSSION

This study has two major findings. First, the more alcohol problems a man has, the more likely he is going to remain in, or migrate into a disadvantaged neighborhood. This effect is only evident when a number of relevant confounding variables, including initial level of socioeconomic status, age, antisocial symptomatology, and spousal AUD status at baseline are controlled. Second, alcoholics in remission tend to live in neighborhoods whose residential characteristics are not distinguishable from those of nonalcoholics. The unremitted alcoholic, however, tends to stay in or migrate into a more disadvantaged neighborhood. This finding implies that recovery from alcoholism is protective against downward social drift on the one hand, and is favorable to improvement in social conditions on the other.

The results shown in Table 2 and Table 3 demonstrate that the relationship between individual alcoholic involvement and neighborhood characteristics can only be understood when both the cumulative effect over a period of time and the longitudinal pattern are characterized. A snapshot at any point in the life course does not shed much light on future outcomes. To demonstrate this, we fitted the regression models shown in Table 2 using AUD status of the men at baseline instead of the alcoholism severity index. With this strategy, after controlling for possible confounds, baseline AUD status was not a significant predictor of neighborhood residential characteristics at T5 ($p>.05$).

The analyses we have carried out have been guided by the primary hypothesis that alcoholism is a proactive disorder, which influences the quality of life the alcoholic individual is able to sustain. We have shown that in its active form, alcoholism has negative impact upon the alcoholic individual's residential quality of life. However, when the diagnosis is in remission, residential neighborhood characteristics are not distinguishable from those of nonalcoholic individuals. We also were able to replicate a previously observed longitudinal effect of neighborhood upon alcoholism, albeit over a considerably longer period of time than in prior work. Over an interval of more than a decade, we also found that disadvantaged residential neighborhood characteristics increased the likelihood of greater severity of alcoholism for its residents.

Our study has three limitations. First, this is an observational study not an experimental one, so it is not the most ideal design for making causal inference. At the same time, as pointed out in the Introduction, it is both technically and morally unfeasible to carry out an experimental manipulation. Nevertheless, we carefully controlled for important confounding factors in the regression model. Moreover, we used earlier alcoholic involvement (T1–T4) to predict neighborhood environment at a later time point (T5); thus, one may argue for the direction of causal relationship based on the time series of events. Secondly, because of the family study design of the MLS, the men recruited into the study had to reside with the male child and his biological mother at time of initial baseline recruitment. This recruitment criterion reduced external validity somewhat, as the results can only be generalized to men in an initially coupled relationship. The third limitation is that, due to the 100% male sample, these results cannot be generalized to women. This restriction came about because alcoholism in women is much less common, and also because marital assortment and MLS recruitment criteria produced a female sample that has a low rate of AUD. Therefore, there was not sufficient variance in alcoholism severity to test the study hypotheses. Although it is a more difficult job because of lower

population frequencies, nonetheless, future studies should recruit women with varying degrees of alcoholic involvement in order to study these longitudinal alcoholism effects.

Another important future direction is to examine the long-term impact of alcoholic social migration on their children's mental health. Although housing mobility studies might be used to test this effect, two recent reviews of the existing studies found that: (1) health related data have been collected in just a few studies; (2) only a handful of studies are methodologically sound; and (3) empirical evidence to support the occurrence of long-term effects is sparse (Acevedo-Garcia et al., 2004; Varady and Walker, 2003). The MLS has been conducting comprehensive assessments on study children's mental health at baseline (3–5 years old) and thereafter, at three-year intervals, as well as conducting annual assessments on offspring during ages 11–23. Thus, future analysis on this sample will have the potential to address this issue.

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**Table 1**

Descriptive statistics for individual level and residential neighborhood census tract variables for 206 men.

| Individual level variables | | |
|---|---|---|
| Alcoholism severity index[1] | 0.96 (1.01) | |
| Childhood antisocial behavior | 9.22 (6.13) | |
| Age at baseline (years) | 32.95 (5.06) | |
| Education (years) | 13.82 (2.24) | |
| Socioeconomic status | 362.71 (192.81) | |
| Wife's AUD status at baseline (% AUD) | 16.99% | |
| Census tract variables | | |
| | At baseline | At 12 year follow-up |
| Percent divorce | 10.16 (4.25) | 11.30 (3.81)* |
| Percent male unemployment | 8.27 (3.66) | 4.64 (3.17)* |
| Percent public assistance | 4.81 (4.65) | 3.49 (3.77)* |
| Percent different residence 5 years ago | 46.70 (9.68) | 43.26 (10.04)* |
| Percent poverty | 8.42 (6.41) | 8.20 (7.62) |

Note: The numbers in each cell are mean and standard deviation (in the parenthesis).

*Neighborhood characteristic significantly improved/worsened from baseline to 12 year follow-up (p <.001).

[1]The alcoholism severity index (range=0–3) is averaged across 4 measurement points over nine years (see text).

**Table 2**

Effects of alcoholism severity on 12 year residential outcome, controlling for baseline residential census variables, demographic characteristics, antisocial symptomatology, and spousal AUD status (N=206).

| | T5 percent divorce | T5 percent male unemployment | T5 percent public assistance | T5 percent in different residence | T5 percent poverty |
|---|---|---|---|---|---|
| Intercept | 5.88 (2.57)* | 4.35 (2.15)* | 4.94 (2.60)* | 17.26 (7.03)* | 2.81 (5.26) |
| Baseline census variable | 0.31 (0.06)* | 0.20 (0.06)* | 0.08 (0.05) | 0.38 (0.07)* | 0.26 (0.08)* |
| Alcoholism severity index | 0.48 (0.28)* | 0.64 (0.23)* | 0.70 (0.28)* | 2.05 (0.73)* | 1.52 (0.57)* |
| Childhood antisocial behavior | −0.01 (0.05) | −0.03 (0.04) | −0.02 (0.05) | 0.03 (0.12) | 0.02 (0.09) |
| Age at baseline | 0.12 (0.05)* | 0.09 (0.04)* | 0.04 (0.05) | 0.03 (0.13) | 0.09 (0.10) |
| Education (years) | −0.10 (0.15) | −0.28 (0.12)* | −0.15 (0.15) | 0.28 (0.40) | 0.07 (0.31) |
| Socioeconomic status | −0.002 (0.002) | −0.001 (0.001) | −0.004 (0.002)* | 0.003 (0.005) | −0.01 (0.004)* |
| Wife's AUD status at baseline | 0.39 (0.70) | −0.67 (0.57) | −0.90 (0.71) | 0.21 (1.82) | −0.93 (1.44) |
| $R^2$ | 16.85% | 20.53% | 11.65% | 18.62% | 12.05% |

Note: The numbers in each cell are regression coefficient and standard error (in parenthesis).

*
The regression coefficient is significantly greater/less than zero (p<.05).

**Table 3**

Residential neighborhood characteristics at baseline and at 12 year follow-up for those who remained nonalcoholic, whose alcoholism had remitted, and for those who were unremitted (N=147).

| | Nonalcoholic (N=79) | Remitted Alcoholic (N=30) | Unremitted Alcoholic (N=38) |
|---|---|---|---|
| Residential Neighborhood Characteristics at Baseline | | | |
| Percent divorce | 11.07 (4.00) | 8.13 (4.15)[*] | 10.14 (3.98)) |
| Percent male unemployment | 7.79 (3.88) | 7.91 (3.03) | 8.68 (3.25) |
| Percent on public assistance | 5.56 (4.87) | 3.95 (5.06) | 4.23 (3.56) |
| Percent different residence | 47.87 (8.50) | 44.40 (10.64) | 47.34 (11.82) |
| Percent at or below poverty level | 8.72 (6.73) | 7.22 (6.35) | 8.51 (5.04) |
| Residential Neighborhood Characteristics at 12 Year Follow-up | | | |
| Percent divorce | 10.95 (3.76) | 10.36 (3.19)[†] | 12.54 (3.89)[†] |
| Percent male unemployment | 3.73 (2.34) | 4.30 (2.40) | 5.98 (4.24)[*] |
| Percent on public assistance | 2.45 (2.50) | 2.47 (1.71)[†] | 4.55 (4.97)[*†] |
| Percent different residence | 42.41 (10.00) | 38.57 (8.65)[†] | 46.93 (11.29)[†] |
| Percent at or below poverty level | 6.97 (5.74) | 6.33 (3.99)[†] | 11.74 (12.26)[*†] |

Note: The numbers in each cell are mean and standard deviation (in the parenthesis).

[*] The mean of the alcoholic group is significantly different from the mean of the nonalcoholic group (p<.05).

[†] The means of the two alcoholic groups are significantly different from each other (p <.05).

**Table 4**

Effects of baseline neighborhood environment on 12 year alcoholism outcome, controlling for self and spousal AUD statuses at baseline, antisocial symptomatology, and demographic characteristics (N=206).

| | Regression coefficient (standard error) |
|---|---|
| Intercept | 4.38 (14.99) |
| Baseline neighborhood characteristics index[1] | 0.77 (0.33)* |
| Self AUD status at baseline | 13.25 (3.25)* |
| Spousal AUD status at baseline | 2.75 (3.98) |
| Childhood antisocial behavior | 0.22 (0.25) |
| Age at baseline (years) | −0.25 (0.28) |
| Education (years) | −0.47 (0.85) |
| Socioeconomic status | −0.004 (0.01) |
| $R^2$ | 18% |

*The regression coefficient is significantly greater/less than zero (p<.01).

[1]The baseline neighborhood characteristics index is averaged across 5 census tract variables at baseline (see text).