Participation in Treatment and Alcoholics Anonymous: A 16-Year Follow-Up of Initially Untreated Individuals

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This study focused on the duration of participation in professional treatment and Alcoholics Anonymous (AA) for previously untreated individuals with alcohol use disorders. These individuals were surveyed at baseline and 1 year, 3 years, 8 years, and 16 years later. Compared with individuals who remained untreated, individuals who obtained 27 weeks or more of treatment in the first year after seeking help had better 16-year alcohol-related outcomes. Similarly, individuals who participated in AA for 27 weeks or more had better 16-year outcomes. Subsequent AA involvement was also associated with better 16-year outcomes, but this was not true of subsequent treatment. Some of the association between treatment and long-term alcohol-related outcomes appears to be due to participation in AA. © 2006 Wiley Periodicals, Inc. J Clin Psychol 62: 735–750, 2006.*

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Introduction

Most of the extensive literature on the outcome of treatment for alcohol use disorders (Finney & Monahan, 1996; Miller & Wilbourne, 2002) has focused on individuals who have had one or more earlier episodes of treatment. Accordingly, much of the information we have on the outcome of treatment for alcohol abuse is based on studies of individuals who have not responded to prior episodes of care or have relapsed. Relatively little is

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known about the duration of initial or subsequent episodes of treatment, their long-term outcomes, or the extent to which longer treatment episodes confer a benefit over shorter episodes or over remaining untreated.

Because so many individuals with alcohol use disorders participate in self-help groups, especially Alcoholics Anonymous (AA), another question involves the extent to which treatment has an effect on outcome that is independent of AA. Prior studies have focused on participation in AA as a dichotomous variable and on the amount of participation in relation to short-term outcomes (Emrick, Tonigan, Montgomery, & Little, 1993; Kownacki & Shadish, 1999; Tonigan, Toscova, & Miller, 1996), but there is relatively little prospective information about the duration of initial and subsequent episodes of participation, the effect of duration on long-term psychosocial as well as alcohol-related outcomes, or the extent to which AA has effects on outcomes that are independent of treatment.

We focus here on participation in professional treatment and AA among previously untreated individuals after these individuals initially sought help for their alcohol use disorders and address three sets of questions:

1. Is the duration of treatment obtained in the first year after seeking help, and the duration of subsequent treatment, associated with individuals' long-term (16-year) alcohol-related and psychosocial outcomes? Is participation in treatment in the second and third years (or the fourth to eighth years) after initiating help seeking associated with additional benefits beyond those obtained from participation in the first year?
2. Is the duration of participation in AA in the first year, and the duration of subsequent participation, associated with individuals' long-term (16-year) outcomes? Is participation in AA in the second and third years (or the fourth to eighth years) associated with additional benefits beyond those obtained from participation in the first year?
3. Many of the individuals who participate in one modality of help (professional treatment or AA) also participate in the other modality. Accordingly, we focus on whether the associations between the duration of participation in treatment and AA and 16-year outcomes are independent of participation in the other modality of help. We also consider interactions between the duration of treatment and AA in that, for example, one modality could compensate for or amplify the influence of the other.

Duration of Participation in Treatment and Outcome

Patients with substance use disorders who receive more extended episodes of outpatient care tend to have better short-term outcomes (Fiorentine & Anglin, 1996; Moos, Finney, Federman, & Suchinsky, 2000; Moos, Schaefer, Andrassy, & Moos, 2001; Ouimette, Moos, & Finney, 1998), and are more likely to be remitted 2 years after discharge from residential care (Ritsher, Moos, & Finney, 2002) than are patients who have outpatient care for a shorter interval. Prior studies of variations in the duration of care have focused primarily on individuals with severe and chronic substance use disorders. Many of these patients likely need longer episodes of care, whereas individuals who enter treatment for the first time and have less chronic disorders may respond more quickly and experience good outcomes with briefer treatment (Moyer, Finney, Swearingen, & Vergun, 2002). Another issue is that prior studies have examined relatively short-term outcomes. Here, we consider the long-term contribution of the duration of treatment among initially untreated individuals with alcohol use disorders in the first few years after they first sought help.

Duration of Participation in Alcoholics Anonymous and Outcome

Self-help groups play a key role in contributing to positive alcohol-related outcomes (Fiorentine, 1999; Humphreys, 2004; Watson et al., 1997). For example, in all three Project MATCH treatments, participation in AA in the first few months after treatment was associated with a higher likelihood of abstinence in the subsequent 6 months (Connors, Tonigan, & Miller, 2001; Tonigan, Connors, & Miller, 2003). In two other multisite studies, patients who attended more self-help group meetings had better 1-year outcomes than did patients who were less involved in such groups (Moos et al., 2001; Ouimette et al., 1998). Patients who attended more self-help groups in the first year after acute treatment were more likely to be in remission at 2 years (Ritsher, Moos, & Finney, 2002) and 5 years (Ritsher, McKellar, Finney, Otilingam, & Moos, 2002).

These studies indicate that participation in 12-step self-help groups and, up to a point, the number of meetings attended, are associated with abstinence and remission. However, little is known about the association between the duration of participation in 12-step self-help groups and individuals' outcomes, or about whether the duration of initial and subsequent episodes of participation makes a long-term contribution to alcohol-related and psychosocial outcomes.

Independent Contribution of Treatment and Alcoholics Anonymous

Patients who participate in both self-help groups and treatment tend to have better outcomes than do patients who are involved only in treatment (Fiorentine, 1999; Fiorentine & Hillhouse, 2000). According to Moos et al. (2001), patients with substance use disorders who attended more self-help group meetings had better 1-year outcomes after controlling for continuing outpatient mental health care. Similarly, among patients discharged from intensive substance use care, participation in self-help groups was associated with better 1-year (Ouimette et al., 1998), 2-year, and 5-year (Ritsher, Moos, & Finney, 2002; Ritsher, McKellar, et al., 2002) outcomes, after controlling for outpatient mental health care. We focus here on whether the duration of participation in one modality of help (treatment or AA) contributes to long-term outcomes beyond the contribution of participation in the other modality.

Prior Findings With This Sample

In prior work with the current sample, we found that individuals who entered treatment or AA in the first year after seeking help had better alcohol-related outcomes and were more likely to be remitted than were individuals who did not obtain any help. Individuals who participated in treatment and/or in AA for a longer interval in the first year were more likely to be abstinent and had fewer drinking problems at 1-year and 8-year follow-ups (Moos & Moos, 2003; 2004a; 2005b; Timko, Moos, Finney, & Lesar, 2000). In this article, the distinctive focus is on associations between the duration of participation in treatment and AA and 16-year outcomes. We also consider the independent contribution of participation in treatment and AA to 16-year outcomes.

Method

Sample and Procedure

The participants were individuals with alcohol use disorders, who, at baseline, had not received prior professional treatment for this disorder. These individuals had an initial

contact with the alcoholism treatment system via an Information and Referral (I&R) center or detoxification (detox) program. The four I&R centers involved in the study provided services over the telephone or in person during information and referral sessions. The three detox programs provided detoxification services to individuals in the three counties in which they were located. One program was for women only, and the other two admitted both women and men.

At baseline, data were collected from 628 eligible individuals. After providing informed consent, these individuals completed a baseline inventory described below. The initial data collection process is described in Finney and Moos (1995). Individuals who entered the study had an alcohol use disorder, as determined by one or more substance use problems, dependence symptoms, drinking to intoxication in the past month, and/or perception of alcohol abuse as a significant problem.

At 1, 3, 8, and 16 years after entering the study, participants were located and contacted by telephone and asked to complete an inventory that was essentially identical to the baseline inventory. One hundred twenty-one of the 628 baseline participants (19.3%) had died by the 16-year follow-up. At baseline, compared with the individuals who survived, those who died were older (40.1 vs. 33.4 years, $t = 7.39$, $p < .01$), less likely to be married (13.2% vs. 22.9%, $t = 2.35$, $p < .05$), and consumed more alcohol (14.9 vs. 12.7 ounces of ethanol on a typical drinking day; $t = 1.99$, $p < .05$).

Of the remaining 507 individuals, 422, 391, 408, and 405 completed the 1-year, 3-year, 8-year, and 16-year follow-ups, respectively. We focus here on the 461 (90.9%) surviving individuals who completed two or more follow-ups or the 16-year follow-up. Compared with the remaining 46 surviving individuals, these 461 individuals were more likely to be women (50.3% vs. 32.6%; $t = 2.30$, $p < .05$) and to be employed at baseline (44.3% vs. 21.7%; $t = 2.97$, $p < .01$).

The 461 previously untreated individuals were almost evenly divided between women (50.3%) and men (49.7%). Most were White (80.0%), unmarried (76.4%), and unemployed (55.7%). On average, at baseline, these individuals were in their mid-30s ($M = 33.5$; $SD = 8.8$) and had 13 years of education ($M = 13.1$; $SD = 2.2$) and an annual income of $12,800. They consumed an average of 12.5 ounces of ethanol ($SD = 11.2$) on a typical drinking day, were intoxicated on an average of 13.0 days ($SD = 10.8$) in the last month, and had an average of 5.0 dependence symptoms ($SD = 2.9$) and 4.8 drinking problems ($SD = 2.4$).

Measures

At baseline and at each follow-up, we assessed respondents' drinking patterns and problems, self-efficacy to resist pressure to drink, depression, and social functioning. In addition, we obtained information about respondents' participation in treatment and AA. We dichotomized the baseline and follow-up values of the outcomes to provide more clinically meaningful indices of functioning.

Drinking patterns and problems. Respondents who noted that they had abstained from alcohol during each month for the past 6 months were categorized as abstainers. An Index of Drinking Problems was drawn from the Health and Daily Living Form (HDL; Moos, Cronkite, & Finney, 1992). Respondents rated how often (on a 5-point scale varying from 0 = *never* to 4 = *often*) in the last 6 months they had experienced each of nine problems (e.g., with health, job, money, family arguments) as a result of drinking. Participants were categorized as having no drinking-related problems or one or more problems.

Collaterals and participants showed significant agreement at baseline on these two alcohol-related indices (Finney & Moos, 1995).

Psychological functioning. Information was obtained on two indices. Self-efficacy to resist alcohol was assessed with 10 items (Cronbach's alpha at baseline = .93) adapted from the Situational Confidence Questionnaire (Annis & Graham, 1988). The items covered situations involving negative and positive emotions, interpersonal conflict, and testing one's self-control. Each item was rated on a 6-point scale varying from 0 = *not at all confident* to 5 = *very confident*. Based on evidence that maximum levels of self-efficacy are the strongest predictors of alcohol-related outcomes (Ilgen, McKellar, & Tiet, in press), respondents were considered to be self-confident if they rated themselves as confident or very confident on all 10 of the items; otherwise they were classified as not self-confident.

Depression was based on a measure included in the HDL and derived from the Research Diagnostic Criteria (Spitzer, Endicott, & Robins, 1978). Respondents rated how often (on a 5-point scale with 0 = *never* and 4 = *often*) they experienced each of nine symptoms of depression in the last month, such as feeling sad or blue; feeling guilty, worthless, or down; thoughts about death or suicide (Cronbach's alpha at baseline = .92). This measure is relatively stable (*r*s = .54, .52, and .49 over 3-year, 5-year, and 8-year intervals, respectively). Based on the criteria for minor depression in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994), respondents were considered to be experiencing depression if they answered "often" or "fairly often" to four or more items; otherwise they were classified as not depressed.

Social functioning. This domain was assessed by four items drawn from the Life Stressors and Social Resources Inventory (LISRES; Moos & Moos, 1994). Based on LISRES norms for a community sample, respondents were considered to have adequate social functioning if they met each of three criteria: had one or more close friends, participated in one or more social activities with family members or friends in the last month, and belonged to one or more clubs or social organizations. Otherwise, they were classified as not having adequate social functioning.

Participation in Treatment and Alcoholics Anonymous. At each follow-up, participants were asked whether they had obtained professional treatment for their drinking habits or drinking-related problems since they completed the last questionnaire. They also were asked whether they had participated in AA. The month and year when the last questionnaire was completed were provided. If participants answered "yes," for each episode of treatment, they were asked to record the agency and type of treatment; month and year; and number of weeks. In addition, they were asked to record the month and year, and number of weeks, for each episode of participation in AA.

Analytic Plan

After describing the extent of individuals' participation in treatment and AA, we conducted preliminary logistic regression analyses to examine the separate associations between the duration of participation in treatment and AA in the first year, the second and third years, and the fourth to eighth years, after initiating help seeking, and the 16-year outcomes. Next, we conducted logistic regression analyses to focus on the independent effects of participation in treatment and AA in the first year on 16-year outcomes. We

then calculated logistic regression analyses to identify independent effects of the duration of participation in AA in year 1, years 2 and 3, and years 4 to 8. These analyses controlled for three baseline variables that tended to be associated with 16-year outcomes: gender, marital status, and the baseline value of the outcome criterion. Preliminary analyses had shown only a few scattered associations between other baseline demographic and alcohol problem variables (age, education, employed status, income, frequency of intoxication) and the outcome indices in the context of these regressions. Thus, these variables were not included in subsequent analyses.

When the duration of participation in treatment or AA was significantly associated with a 16-year outcome, we conducted follow-up logistic regression analyses to describe the extent of the difference in 16-year outcomes between individuals who remained untreated and those who participated in treatment for different lengths of time in the first year. We conducted comparable analyses to examine differences in the 16-year outcomes between individuals who did not enter AA and those who participated in AA for different lengths of time in the first year. The chi square analysis reflecting improvement in the model was used to index the significance of group differences in the outcomes, and partial regression coefficients were used to determine the significance of differences between individuals who obtained no help (treatment or AA) and groups of individuals who varied in the duration of help they obtained.

We used a regression-based maximum likelihood model (Hill, 1997) and information from baseline and completed follow-ups to impute missing values for the duration of treatment and AA and the 16-year outcomes for surviving individuals, more than 90% of whom had completed at least two of the four follow-ups. Multiple imputation procedures were used to impute 16-year outcomes for 56 (12.2%) of the 461 surviving individuals.

Results

In the first year after initiating help-seeking, 273 (59.2%) of the 461 individuals entered professional treatment and 269 (58.4%) entered AA. In the second and third years of follow-up, 167 individuals (36.2%) were in treatment and 176 (38.2%) participated in AA. In years 4 to 8, 144 individuals (31.2%) were in treatment and 166 (36.0%) participated in AA.

Duration of Participation in Treatment and Alcoholics Anonymous

The 273 individuals who entered treatment in the first year were in treatment for an average of 20.0 weeks ($SD = 17.6$) in this year. To consider relatively broad and distinct treatment groups, we compared participants who remained untreated in the first year ($N = 188$ or 40.8%) with three subgroups of treated individuals who were in treatment for between 1 and 8 weeks, 9 and 26 weeks, or 27 weeks or more (Table 1). These categorizations reflect designations of brief, moderate, and long-term treatment and the empirical distribution of the duration of treatment (Bien, Miller, & Tonigan, 1993; Moos et al., 2000; Moyer et al., 2002). We used these categories to provide meaningful and easily interpretable information about distinctive episodes of treatment.

We compared participants who did not obtain treatment in years 2 and 3 ($N = 294$ or 63.8%) with three subgroups of individuals who were treated in these years for between 1 and 8 weeks, 9 and 26 weeks, or 27 weeks or more (Table 1). In addition, we compared the 317 individuals (68.8%) who did not obtain treatment in years 4 through 8 with individuals who had 1 to 8 weeks of treatment, 9 to 26 weeks, or 27 weeks or more of treatment in these years (Table 1).

Table 1
Percentage of Individuals Who Entered Treatment and Alcoholics Anonymous and Length of Participation in Year 1, Years 2 and 3, and Years 4 to 8 (N = 461)

Time interval	None	1–8 Weeks	9–26 Weeks	27+ Weeks	*M* Weeks	*SD*
Treatment						
Year 1	40.8%	23.9%	14.8%	20.6%	20.0	17.6
N	188	110	68	95		
Years 2–3	63.8%	12.8%	8.5%	15.0%	31.4	33.5
N	294	59	39	69		
Years 4–8	68.8%	8.9%	7.2%	15.2%	48.2	59.9
N	317	41	33	70		
Alcoholics Anonymous						
Year 1	41.6%	14.3%	19.1%	24.9%	26.3	18.0
N	192	60	188	115		
Years 2–3	61.8%	9.1%	5.9%	23.2%	55.4	42.2
N	285	42	27	107		
Years 4–8	64.0%	3.3%	4.8%	28.0%	134.6	93.7
N	295	15	22	129		

The 269 individuals who entered AA in the first year participated for an average of 26.3 weeks ($SD = 18.0$). Again, to consider relatively broad and distinct AA groups, we compared participants who did not enter AA in year 1 (41.6%) with three subgroups of individuals who attended AA meetings for between 1 and 8 weeks, 9 and 26 weeks, or 27 weeks or more. The duration of treatment and of AA were moderately positively correlated ($r = .22$; $p < .01$). Sixty-six percent of the individuals who participated in treatment also participated in AA; 30% of these individuals participated in AA for 27 weeks or more.

We compared participants who did not participate in AA in years 2 and 3 ($N = 285$ or 61.8%) with three subgroups of individuals who were in AA during these years for 1 to 8 weeks, 9 to 26 weeks, or 27 weeks or more (Table 1). In addition, we compared the 295 individuals (64.0%) who did not participate in AA in years 4 through 8 with individuals who engaged in AA for 1 to 8 weeks, 9 to 26 weeks, or 27 weeks or more in these years. In years 2 and 3, 51% of the individuals who participated in treatment also participated in AA; 33% of these individuals participated in AA for 27 weeks or more. In years 4 to 8, these percentages were 47% and 35%, respectively.

Duration of Treatment and Alcoholics Anonymous in Year 1 and 16-Year Outcomes

We first conducted logistic regression analyses to separately examine the duration of participation in treatment and AA in year 1 as a predictor of 16-year outcomes after controlling for participants' gender, marital status, and the baseline value of the outcome criterion. Preliminary analyses showed that the five 16-year outcomes were moderately positively correlated (average $r = .27$) and that, after controlling for participants' gender, marital status, and the baseline values of the outcome criteria, there were no significant differences on the 16-year outcomes between individuals recruited from the different I & R and detox programs.

Next, we conducted logistic regression analyses controlling for gender, marital status, and the baseline value of the outcome criterion, to examine the independent effects of

the duration of treatment and AA in the first year on 16-year outcomes. A longer duration of treatment was independently related to a higher likelihood of 16-year abstinence and a lower likelihood of 16-year drinking problems, whereas a longer duration of AA was independently related to a higher likelihood of 16-year abstinence, enhanced self-efficacy, and good social functioning, and less likelihood of 16-year drinking problems (Table 2).

In subsidiary analyses, we found that, among individuals who entered treatment in the first year but did not participate in AA ($N = 93$), the duration of treatment in year 1 was not significantly associated with any of the 16-year outcomes (not shown). We also found that the duration of AA mediated 33% and 22%, respectively, of the association between the duration of treatment and 16-year abstinence and drinking problems.

Differences Between First Year Duration of Treatment and Alcoholics Anonymous Groups

When we found significant independent associations between 1-year duration of treatment or AA groups and 16-year outcomes, we conducted follow-up logistic regression analyses to examine differences between individuals who had no treatment (or AA) and those who obtained different durations of treatment (or AA). Individuals who received 27 weeks or more of treatment in the first year were more likely to be abstinent and less likely to have drinking problems at 16 years than were individuals who remained untreated in the first year (Table 3). Compared to individuals who did not enter AA in the first year, individuals who participated in AA for 9 weeks or more had better 16-year alcohol-related and self-efficacy outcomes (Table 3). Some of these differences were quite substantial; only 34% of individuals who did not participate in AA in the first year were abstinent at 16 years, compared to 67% of individuals who participated in AA for 27 weeks or more.

Table 2
Logistic Regression Analyses Predicting 16-Year Dichotomous Outcomes From Personal Characteristics at Baseline and the Duration of Treatment and Alcoholics Anonymous (AA) in Year 1

	16-Year outcomes				
Predictors	Abstain	Drinking problems	Self-efficacy	Depression	Social functioning
Personal factors					
Gender (Female = 1)	.11	−.43*	.66**	−.38	.27
Marital status (Married = 1)	.00	−.38	.57*	−.42	.12
Baseline value of Outcome	.95	.98	.34	.58*	1.40**
Duration of help in year 1					
Duration of Treat	.17*	−.20*	.05	.03	.05
Duration of AA	.41**	−.27**	.30**	−.13	.26**
Intercept	−.95	−.60	−.81	−1.67	−1.69
Model χ^2	40.92**	31.73**	36.68**	12.31*	39.04**
Nagelkerke R^2	.11	.09	.10	.04	.12

Note. Partial regression coefficients are shown; $N = 461$ and $df = 5$ for each analysis.
*$p < .05$. **$p < .01$.

Table 3
Alcohol-Related Outcomes at 16 Years by the Duration of Participation in Treatment and Alcoholics Anonymous (AA) in the First Year

Outcome (% of patients)	Duration of help in year 1				
	None	1–8 Weeks	9–26 Weeks	27+ Weeks	χ^2
By duration of treatment	($N = 188$)	($N = 110$)	($N = 68$)	($N = 95$)	
Abstinence	38.8[b,c]	44.6	57.4[b]	55.8[c]	10.68*
Drinking problems	44.2[c]	39.1	32.4	26.3[c]	9.06*
By duration of AA	($N = 192$)	($N = 66$)	($N = 88$)	($N = 115$)	
Abstinence	33.9[b,c]	37.9	53.4[b]	67.0[c]	33.39**
Drinking problems	45.8[b,c]	42.4	31.8[b]	25.2[c]	15.04*
Self-efficacy	42.7[b,c]	56.1	62.5[b]	65.2[c]	16.16**
Social functioning	24.5[c]	25.8	31.8	40.0[c]	10.05*

Note. For each χ^2, $df = 3$; $N = 461$. Means that share the same superscript differ significantly ($p < .05$). Superscripts a, b, and c denote differences between the no help (treatment or AA) group and the 1–8 week, 9–26 week, and 27+ week duration of help groups, respectively.
* $p < .05$. ** $p < .01$.

Independent Contributions of Alcoholics Anonymous

In preliminary analyses, we found that the duration of treatment in the second and third years was associated only with 16-year abstinence (partial regression coefficient = .19; $p < .05$), and that the duration of treatment in years 4 through 8 was not significantly associated with any of the 16-year outcomes. The duration of participation in AA in years 2 and 3 was associated with a higher likelihood of abstinence, self-efficacy, and good social functioning (partial regression coefficients = .44, .48, and .23; all ps $< .01$) and with less likelihood of drinking problems (partial regression coefficient = −.34; $p < .01$). In addition, the duration of participation in AA in years 4 through 8 was associated with a higher likelihood of 16-year abstinence and self-efficacy and a lower likelihood of 16-year drinking problems (partial regression coefficients = .35, .17, and −.16, respectively; all ps $< .05$).

We next conducted logistic regression analyses to examine whether participation in AA in year 1, years 2 and 3, and years 4 to 8 was independently associated with 16-year outcomes after controlling for gender, marital status, and the baseline value of the outcome criterion. The duration of participation in AA in year 1 and years 2 and 3 was independently related to a higher likelihood of 16-year abstinence, self-efficacy, and good social functioning, and a lower likelihood of 16-year drinking problems (Table 4). In addition, the duration of participation in AA in years 4 through 8 was independently related to 16-year abstinence.

In follow-up regressions, we found that the benefit of a longer duration of participation in AA in years 2 and 3 on 16-year outcomes was limited to individuals who attended meetings for 27 weeks or more (Table 5). Similarly, the benefit of a longer duration of AA in years 4 through 8 on 16-year abstinence was limited to individuals who participated for 27 weeks or more. In additional analyses, we found that attending AA meetings for more than 52 weeks in years 2 and 3 was not associated with better 16-year outcomes than attending for between 27 and 52 weeks. However, attending AA for more than 52 weeks in years 4 to 8 was associated with a higher likelihood of 16-year abstinence than was attending for between 27 and 52 weeks (70.7% vs. 38.5%, respectively; $p < .05$).

Table 4
Logistic Regression Analyses Predicting 16-Year Outcomes From Personal Characteristics at Baseline and the Duration of Alcoholics Anonymous (AA) in Year 1, Years 2–3, and Years 4–8

	16-Year outcomes				
Predictors	Abstain	Drink problems	Self-efficacy	Depression	Social functioning
Personal factors					
Gender (Female = 1)	.06	−.39	.60**	−.37	.24
Marital status (Married = 1)	.01	−.36	.55*	−.41	.07
Baseline value of outcome	1.23	1.13*	.44	.58*	1.49**
Duration of AA					
Duration in Year 1	.30**	−.22*	.19*	−.13	.25**
Duration in Yrs 2–3	.29**	−.26**	.43**	−.01	.20*
Duration in Yrs 4–8	.19*	−.02	−.03	.02	−.13
Intercept	−1.02	−.81	−.93	−1.15	−1.66
Model χ^2	59.35**	35.79**	60.61**	12.27	43.99**
Nagelkerke R^2	.16	.10	.17	.04	.13

Note. Partial regression coefficients are shown; $N = 461$ and $df = 5$ for each analysis.
*$p < .05$. **$p < .01$.

Subsidiary Analyses

We conducted two subsidiary analyses. First, to identify potential interactions between treatment and AA, we calculated logistic regression analyses comparable to those shown in Table 2 with an added term to reflect the zero-centered interaction between the duration of participation in treatment and AA. One of these interactions was significant: A longer combined duration of treatment and AA in year 1 was associated with fewer drinking

Table 5
Alcohol-Related and Social Functioning Outcomes at 16 Years by the Duration of Participation in Alcoholics Anonymous (AA) in Years 2 and 3 and Years 4 to 8

	Duration of AA				
Outcome (% of patients)	None	1–8 Weeks	9–26 Weeks	27+ Weeks	χ^2
By duration					
In years 2–3	($N = 285$)	($N = 42$)	($N = 27$)	($N = 107$)	
Abstinence	37.9[c]	42.9	40.7	72.0[c]	37.90**
Drinking Problems	43.2[c]	40.5	48.2	18.7[c]	22.92**
Self-Efficacy	45.3[c]	45.2	55.6	80.4[c]	39.28**
Social Functioning	27.0[c]	26.2	22.2	41.1[c]	9.66*
By duration					
In years 4–8	($N = 295$)	($N = 15$)	($N = 22$)	($N = 129$)	
Abstinence	39.3[c]	33.3	27.3	67.4[c]	33.86**

Note. For each χ^2, $df = 3$; $N = 461$. Means that share the same superscript differ significantly ($p < .05$). Superscript c denotes differences between the no AA group and the 27+ week duration of AA group.
*$p < .05$. ** $p < .01$.

problems ($\beta = -.15$; $p < .05$). There were no significant interactions between the duration of treatment and AA in years 2 and 3, or in years 4 through 8, and 16-year outcomes.

Second, we conducted logistic regression analyses to examine the contribution of treatment in year 1 among individuals who obtained no further treatment in the subsequent 15 years. The 95 individuals who remained untreated for 16 years were compared with 93 individuals who obtained treatment only in year 1. Among these individuals, a longer duration of treatment in year 1 was associated with two 16-year outcomes: a higher likelihood of abstinence ($\beta = .31$; $p < .05$) and a marginally lower likelihood of drinking problems ($\beta = -.27$ $p < .10$). In both cases, when the duration of AA in the first year was entered into the regressions, the contribution of treatment was no longer significant. Follow-up analyses showed that the duration of AA mediated more than 40% of the contribution of treatment to 16-year abstinence and drinking problems (49% and 38%, respectively).

Discussion

Compared to individuals who did not enter treatment in the first year after they sought help, individuals who obtained treatment for 27 weeks or more experienced better 16-year alcohol-related outcomes. Individuals who participated in AA for 27 weeks or more in the first year, and in years 2 and 3, had better 16-year outcomes than did individuals who did not participate in AA. Some of the contribution of treatment reflected participation in AA, whereas the contribution of AA was essentially independent of the contribution of treatment.

Participation in Treatment and 16-Year Outcomes

About 60% of individuals who sought help for their alcohol use problems entered professional treatment within one year. These individuals obtained an average of 20 weeks of treatment. Compared to untreated individuals, individuals who obtained 27 weeks or more of treatment in the first year were more likely to be abstinent and less likely to have drinking problems at 16 years than were individuals who remained untreated. These findings extend earlier results on this sample (Moos & Moos, 2003; 2005b; Timko et al., 1999) and are consistent with prior studies that have shown an association between more-extended treatment and better substance use outcomes (Moos et al., 2000, 2001; Ouimette et al., 1998).

About 35% of the individuals in our sample obtained treatment in years 2 and 3 and/or years 4 to 8. Relatively few individuals entered treatment for the first time after the first year; thus, almost all of those in treatment after the first year obtained additional treatment. Among these individuals, more extended treatment in years 2 and 3 was associated with a higher likelihood of 16-year abstinence. However, more extended treatment in years 4 to 8 was not associated with better 16-year outcomes. This finding likely is due to a need-based selection process in which individuals who have recurrent relapses and worse prognoses re-enter treatment (Moos & Moos, 2004b).

The findings highlight the limitations of a short duration of treatment in producing better long-term outcomes. Although we noted a positive influence of short treatment on 8-year abstinence (Moos & Moos, 2003), this contribution did not hold over the longer term. Accordingly, although a short episode of treatment may produce a time-limited benefit over remaining untreated (Moyer et al., 2002), in and of itself, it may not contribute to better long-term alcohol-related outcomes even among individuals with less severe and chronic disorders who have never been in treatment before.

Participation in Alcoholics Anonymous and 16-Year Outcomes

The findings extend earlier results on this sample (Moos & Moos, 2004a; 2005b) and those of prior studies (Connors et al., 2001; Fiorentine, 1999; Ouimette et al., 1998; Watson et al., 1997) by showing that more extended participation in AA is associated with better alcohol-related and self-efficacy outcomes. The results support the benefit of extended engagement in AA, in that a longer duration of participation in the first year, and in the second and third years, was independently associated with better 16-year outcomes. In addition, our findings indicate that attendance for more than 52 weeks in a 5-year interval may be associated with a higher likelihood of abstinence than attendance of up to 52 weeks.

Part of the association between AA attendance and better social functioning, which reflects the composition of the social network, likely is a direct function of participation in AA. In fact, for some individuals, involvement with a circle of abstinent friends may reflect a turning point that enables them to address their problems, build their coping skills, and establish more supportive social resources (Humphreys, 2004; Humphreys, Mankowski, Moos, & Finney, 1999). Participation in a mutual support group may enhance and amplify these changes in life context and coping to promote better long-term outcomes. More broadly, the finding that the length of time individuals receive help for alcohol-related disorders is closely related to outcome is consistent with the fact that the enduring aspects of individuals' life contexts are associated with the recurrent course of remission and relapse (Moos, Finney, & Cronkite, 1990).

Independent Contribution of Treatment and Alcoholics Anonymous

Consistent with prior studies (Fiorentine, 1999; Fiorentine & Hillhouse, 2000; Moos et al., 2001; Ritsher, McKellar, et al., 2002; Ritsher, Moos, & Finney, 2002), longer participation in AA made a positive contribution to alcohol-related, self-efficacy, and social functioning outcomes, over and above the contribution of treatment. An initial episode of professional treatment may have a beneficial influence on alcohol-related functioning; however, continued participation in a community-based self-help program, such as AA, appears to be a more important determinant of long-term outcomes. Moreover, compared with individuals who participated only in treatment in the first year, individuals who participated in both treatment and AA were more likely to achieve 16-year remission (Moos & Moos, 2005a).

In interpreting these findings, it is important to remember that participation in treatment likely motivated some individuals to enter AA; thus, some of the contribution of AA to 16-year outcomes should be credited to treatment. Another consideration involves the differential selection processes into treatment versus AA. Individuals with more severe alcohol-related problems tend to obtain longer episodes of treatment, but this selection and allocation process is much less evident for AA. More specifically, there is a need-based model of professional treatment in which more treatment is allocated to individuals with more severe problems, versus an egalitarian model of self-help in which need factors play little or no role in continued participation (Moos & Moos, 2004b). These divergent selection processes may help to explain the finding that AA is more strongly associated with positive long-term outcomes than is treatment.

Limitations and Future Directions

Our findings are of potential clinical interest, but some limitations should be noted. We conducted a naturalistic longitudinal study in which we assumed that individuals who

contacted I & R or detox centers were seeking help; however, we did not have a direct measure of their help-seeking intentions or motivations. In addition, individuals self-selected into treatment and AA and, based on their experiences, decided on the duration of participation. Thus, in part, the benefits we identified are due to the influence of self-selection and motivation to obtain help as well as that of longer participation per se. Although our findings probably reflect the real-world effectiveness of participation in treatment and AA for alcohol use disorders, the naturalistic design precludes firm inferences about the causal role of treatment or AA. Each individual's personal and social resources impel and interact with participation in treatment and AA to jointly influence remission and relapse and, over the long-term, individuals' help seeking and drinking careers (Hser et al., 1997).

Another limitation is that we obtained information only on 6-month windows of alcohol-related outcomes at each follow-up, and thus cannot trace the complete drinking status of respondents over the 16-year interval. In addition, our data were based on self-report. We obtained some evidence for the validity of respondents' self-reports at baseline, but did not gather subsequent information from collaterals. However, self-reported alcohol-related outcomes appear to be reasonably valid, especially when they are obtained independently of treatment providers and with assurance of confidentiality, as was the case here (Babor, Steinberg, Anton, & Del Boca, 2000; Babor, Stephens, & Marlatt, 1987). In addition, there is some support for the reliability and validity of self-reports of episodes of treatment (Adair, Craddock, Miller, & Turner, 1996; Keller et al., 1983) and of AA (Morgenstern, Labouvie, McCrady, Kahler, & Frey, 1997; Tonigan et al., 2003).

Another issue involves the lack of data on the content of treatment, which might have enabled us to examine whether aspects of psychological and social functioning changed less because they were not addressed adequately in treatment. It also is important to consider indicators of AA involvement other than meeting attendance, such as working the steps, relationship with a sponsor, and number of friends in 12-step groups (Morgenstern, Kahler, Frey, & Labouvie, 1996; Tonigan et al., 2000) that may contribute uniquely to better outcomes.

Our findings on the benefits of entry into treatment and AA support the value of strengthening the referral process for individuals who seek help. Some useful procedures include providing personal introductions to treatment staff, arranging immediate initial intake assessments or regular clinic visits (Festinger et al., 1995; Stasiewicz & Stalker, 1999), and regular telephone reminders to sustain motivation (Gariti et al., 1995). With respect to AA, providers can introduce patients to an AA sponsor or recovery guide, address potential barriers such as lack of transportation and childcare services, and maintain contact to enhance continuing attendance (Johnson & Chappel, 1994). More detailed assessments of clients' motivations and readiness for change in specific life domains may help to target high-risk individuals for these interventions (Brown, Melchior, Panter, Slaughter, & Huba, 2000; Marlowe et al., 2001).

The findings also imply that a longer duration of treatment for alcohol use disorders is associated with better outcomes and that providers should structure treatment programs to ensure continuing care and ongoing affiliation with AA. A cost-effective approach for some patients may be to provide brief, telephone-based monitoring spaced out over several months (McKay et al., 2005). Although some patients benefit from brief interventions, booster sessions and more extended care may be needed for individuals who have difficulty establishing a working treatment alliance and lack adequate family and community support.

A high priority for future research is to specify the characteristics of individuals who are most likely to benefit from treatment or AA and the optimal combination of

participation in treatment and AA for individuals who vary in the severity of their disorder and level of community resources. Other issues to address include identifying key personal and social context predictors of the duration of treatment and AA, and formulating an integrative model of the role of treatment, AA, and life context factors as independent and joint influences on the long-term process of relapse and remission.

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