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Social support and comfort in AA as mediators of “Making AA Easier” (MAAEZ), a 12-step facilitation intervention

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Abstract

Objective—A trial of “Making Alcoholics Anonymous Easier” (MAAEZ), a group-format 12-step facilitation program, showed significantly higher odds of past 30-day abstinence after 12 months among those who had been treated in MAAEZ compared to usual care, especially for clients with high prior AA/NA/CA meeting attendance (> 90 prior meetings; OR = 2.94, $p = 0.02$). We examined whether MAAEZ effects for this group were mediated by social support for sobriety and comfort with the 12-step fellowship.

Method—Among those with high prior AA/NA/CA attendance, we performed tests of multiple mediation to estimate MAAEZ effects attributable to the combined effect of social network support for sobriety, comfort being at AA/NA/CA meetings, and comfort speaking at AA/NA/CA meetings. To gain some understanding of sustaining these behaviors, we also examined each potential mediating variable measured both prior to, and concurrent with, 12-month outcomes.

Results—Having support for sobriety at 6 months emerged as a mediator of 12-month MAAEZ effects, when controlling for comfort being and speaking at AA/NA/CA meetings at 6 months. The effect remained when controlling for mediator values at 12 months, and explained 44% of the MAAEZ effect.

Conclusions—Results highlight the value of studying specific, modifiable 12-step activities, and demonstrate the importance of exploring subgroups to determine behaviors and attitudes to target for optimal treatment. For example, increasing support for sobriety among those with high prior AA/NA/CA attendance may be especially pertinent.

INTRODUCTION

Twelve-step groups and twelve-step facilitation

Engaging in 12-step groups involves admitting a sense of powerlessness and surrendering to a higher power, while underscoring the value of working “steps,” regularly attending meetings, and engaging with the 12-step fellowship (Alcoholics Anonymous, 2001b; Alcoholics Anonymous World Services, 1991). Although 12-step groups are not really an extension of treatment, they are often used that way, mostly because aftercare support post-treatment is under-funded by both the public and private sectors. While some debate the effectiveness of 12-step groups (Humphreys et al., 2004), a review of the AA effectiveness literature concludes that evidence for AA effectiveness is strong across all causal criteria except experimentation (Kaskutas, 2009). Yet because randomizing people to AA is ethically unfeasible, experimental or quasi-experimental studies of 12-step facilitation (TSF) interventions (which are able to reduce the self-select bias inherent in observational studies)

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offer a strong alternative for determining AA effectiveness. Prominent examples of randomizing participants to TSF include Project MATCH (Matching Alcoholism Treatments to Client Heterogeneity) and Christine Timko's Intensive Referral, which both showed superior outcomes for those randomized to TSF vs. comparison conditions (PMRG, 1997; Timko, 2006).

Mechanisms of twelve-step interventions

While results from clinical trials are considered the gold standard for determining whether treatment is evidence-based, equally important is an understanding of the mechanisms of action that underlie treatment effects, or that fail to materialize when treatment effects do not occur. For example, Project MATCH found that after three years, those with networks supportive of drinking benefitted most from Twelve-Step Facilitation (TSF) compared to MET and Cognitive Behavior Therapy (CBT). Mediation analyses highlighted increases in AA involvement, as measured by the AA Involvement Scale (Tonigan, Connors, & Miller, 1996), as TSF's mechanism of action: among those with high network support for drinking, 62% of TSF clients were highly involved in AA, vs. only 38% of those in MET, and 25% of those in CBT (Longabaugh, Wirtz, Zweben, & Stout, 1998).

Analyses from the Intensive Referral study, which involved arranging for an AA member to meet the client at a meeting (Timko et al., 2006), examined "mediators" that temporally overlapped with outcomes. These analyses showed that a composite measure of AA involvement at *both* the 6- and 12-month interviews was significantly predicted by Intensive Referral *and* significantly predicted 12 month abstinence as well, implying that both 6- and 12-month AA Involvement mediated the Intensive Referral effect (Timko & Debenedetti, 2007). Although inconsistent with classical lagged mediation analyses, the "unlagged" approach is theoretically sound, which should come into consideration when studying the mechanisms of a 12-step facilitation intervention: 12-step groups like AA are seen as an ongoing source of aftercare that needs to be sustained in order to be effective, a view both supported by research (Moos & Moos, 2004) and emphasized in the MAAEZ sessions (Kaskutas & Oberste, 2002).

Current study

This paper examines participation in another 12-step facilitation intervention, MAAEZ ("Making AA Easier"; for details, please see Kaskutas et al., 2009). Briefly, MAAEZ is a manualized group-format intervention designed to help formal treatment centers introduce participants to the 12-step culture. MAAEZ aims to overcome resistance to 12-step groups by changing participants' attitudes toward the people in AA/NA/CA, addressing the perceived social desirability of becoming involved in AA/NA/CA, and increasing participants' ability to control and manage their experiences with 12-step meetings, their choice of people with whom they become involved, and their interpretation of the 12-step philosophy.

MAAEZ consists of six weekly 90-minute group-format sessions run by counselors who are themselves active 12-step members. Each session is outlined on a laminated two-sided sheet that indicates lecture points, issues for discussion, recommended length of time to spend on the issue, take-home messages, and homework assignments for the week. To implement the intervention, two MAAEZ sessions are conducted weekly: the Introductory session (for new clients and clients who have completed the core sessions), and one of the four core sessions ("Spirituality," "Sponsorship," "Principles Not Personalities," and "Living Sober" for continuing clients). The manual is available at no cost from the authors.

MAAEZ appeared superior to usual care both in the sample overall and among a subgroup of individuals with high levels of prior exposure to AA/NA/CA meetings (OR = 1.58 for sample overall; OR = 2.94 for individuals with high levels of prior exposure to AA/NA/CA; Kaskutas, Subbaraman, Witbrodt, & Zembre, 2009). This initial moderation was not hypothesized and thus the current study hopes to further illuminate the nature of why MAAEZ might work better for those with high prior AA/NA/CA attendance, especially in light of past findings. For example, other TSF trials have found the opposite, with clients with less of a 12-step history benefiting more from 12-step facilitation (Kahler, Read, Ramsey, Stuart, & McCrady, 2004; Timko, DeBenedetti, & Billow, 2006). Indirect evidence from Project MATCH also showed TSF condition effect on abstinence in its outpatient arm but not in its aftercare arm (Kaskutas & Subbaraman, 2011; Project MATCH Research Group, 1997a), which represented a sample entering the study after a full month of inpatient treatment encouraging 12-step involvement (Tonigan, Connors, & Miller, 2003).

Since the bulk of patients enter treatment with considerable prior exposure to 12-step meetings (Humphreys, Kaskutas, & Weisner, 1998b; Regier et al., 1990), understanding why MAAEZ would be effective with these individuals is of great interest to providers. A better understanding of TSF mechanisms can alert providers to variables for intervention for recidivistic clients. Our choice of potential mechanisms is driven by MAAEZ's overarching goal, which is to tangibly prepare clients for the culture they will encounter at 12-step groups. Thus we focus on how comfortable clients are being at, and speaking at, 12-step meetings; and the number of individuals supportive of sobriety who comprise the clients' social network of regular contacts. Figure 1 illustrates the conceptual framework.

Our earlier work (Bond et al., 2003; Kaskutas et al., 2002) and that of others (for a recent review, see Groh et al., 2008; Humphreys et al., 1999) have highlighted social networks as a mechanism of action for Alcoholics Anonymous. The fact that these social network effects extend to TSF interventions highlights their pervasive, fundamental importance to recovery. Kelly et al. has similarly found that AA mobilizes social network changes and increases involvement with abstinence supporters, subsequently aiding recovery (Kelly et al., 2010).

Like Timko, 2006, this paper also describes potential mediators measured both *prior* to and *concurrent* with outcomes at 12 months. However, here we use assess multiple mediators simultaneously (Preacher & Hayes, 2008) and estimate the differential and combined effects of a mediator measured at 6 months and at 12 months. Earlier work on MAAEZ mediation found that doing service (such as helping make coffee, cleaning up after meetings, etc.) in AA or another 12-step group at both 6 *and* 12 months helped explain the MAAEZ effect among those with high prior AA/NA/CA, as did having a sponsor at 6 months or at both 6 and 12 months (Subbaraman, Kaskutas, & Zembre, 2011).

The overall goal of these analyses is to elucidate the causal mechanisms for the MAAEZ effects observed among those with high prior AA/NA/CA attendance by assessing multiple mediation via support for sobriety, and comfort being and speaking at meetings. We hypothesize a positive indirect effect attributed to the set of mediators. We also hypothesize that the indirect effect for each individual mediator will be positive and significant when controlling for the others. By establishing treatment mediators for those with high prior AA/NA/CA attendance, we may offer valuable insight into helping this recidivistic patient subgroup.

METHODS

Sample and design

Study participants were recruited from two California public sector treatment centers. Informed consent was received from all participants using an informed consent statement approved by the Institutional Review Board of the Public Health Institute. For details regarding the MAAEZ study, please see (Kaskutas, et al., 2009). Briefly, the study used an “OFF-ON” design, with the OFF condition preceding the ON condition, to avoid contamination arising from MAAEZ clients talking to usual care clients about MAAEZ. There were no significant differences in gender, age, and race between the 508 participants and 114 eligible clients who declined participation in the MAAEZ trial. Those recruited during the OFF condition received usual care ($n=196$ in sample overall; see Kaskutas et al., 2009 for details), while six usual-care sessions were replaced by six MAAEZ sessions during the ON condition ($n=312$ in sample overall). Usual care entailed group-format addiction education, relapse prevention, stress and anger management, family education, introduction to the 12 steps of AA/NA/CA, and process groups. Staff mainly consisted of licensed master’s level counselors and state-certified alcohol/drug counselors. For those in the MAAEZ “ON” condition, six weekly MAAEZ sessions replaced six usual-care 12-step education groups. Participants returned to the usual-care groups after completing the six MAAEZ sessions. We compared outcomes between those recruited during the OFF vs. the ON conditions to assess MAAEZ effectiveness.

Among the group of focus here, those with high prior AA/NA/CA attendance ($n=203$; 119 in MAAEZ “ON” and 84 in MAAEZ “OFF”), 64% completed interviews at both the 6- and 12-month interviews. The sample was 70% male, 66% White, and 28% married. The average age was 38.9. At baseline, the mean ASI (Addiction Severity Index; McLellan et al., 1992) psychiatric severity score was 0.37 ($SD = 0.26$); 25% of the sample had attended 500 lifetime AA/NA/CA meetings; and dependence diagnoses, ascertained using the Diagnostic Interview Schedule Quick Form for Substance Abuse/Dependence (Bucholz, Marion, Shayka, & Marcus, 1996; Bucholz et al., 1991), were distributed as 17% alcohol only, 40% drug only, 32% drug and alcohol, and 11% undiagnosed/no dependence diagnosis.

Regarding attrition, proportionately fewer long-term residential clients interviewed at 12 months (55%) than short-term residential clients and outpatients (70% and 74%, respectively, $p=0.03$); thus, we control for program type in our analyses. Long-term residential participants tended to be less educated and drug-dependent only, which could affect generalizability. However, significant MAAEZ effects were found among those less educated and those with drug-dependent only diagnoses (Kaskutas, et al., 2009), which alleviates concerns regarding attrition bias. Furthermore, although those who were not followed may have more likely relapsed compared to those who were followed, attrition did not differ between MAAEZ conditions. Attrition status also did not interact with MAAEZ condition in predicting mediators or outcomes measured at baseline, implying that attrition probably does not affect these results.

Measurements

All measurements were taken at baseline, six, and 12 months. Using responses from the ASI (McLellan et al., 1992) alcohol and drug problem severity questions, we generated a dichotomous variable reflecting total abstinence for the 30 days prior to the 12-month follow-up interview vs. not. High/low prior AA/NA/CA exposure was based on a meeting attendance question from the AA Affiliation Scale (Humphreys, Kaskutas, & Weisner, 1998a). Other 12-step involvement questions of interest here reflect the areas of 12-step participation emphasized in MAAEZ: (1.) having relationships with individuals supportive

of one's abstinence (including both 12-step and non-12-step members), calculated from the percentage of individuals in the social network of regular contacts who are supportive of abstinence (from the Social Network Assessment; (Bond, Kaskutas, & Weisner, 2003; Kaskutas, 1995; Kaskutas, Bond, & Humphreys, 2002); and feeling comfortable (2.) being at meetings and (3.) speaking at meetings (asked as, "How comfortable do you feel (speaking up) at AA, NA, or CA meetings, on a scale from 1 "Not Comfortable" to 7 "Very Comfortable?" for both measures (new items developed for this study). For information regarding instrument sources and validity, please see (Kaskutas, et al., 2009).

Statistical Analyses

All analyses were performed for those with high prior AA/NA/CA attendance only. Our primary multiple mediation analyses simultaneously examined the six-month values of the three continuous mediators of interest here: the proportion of individuals' social network that supports sobriety, their degree of comfort being at meetings, and degree of comfort speaking at meetings. As noted above, we were also interested in studying sustained behaviors in the context of mediation of the MAAEZ trial. This attention to timing stems from AA's fundamental principles, which recommend continued participation: "We are not cured of alcoholism...what we have is a daily reprieve contingent on the maintenance of our spiritual condition" (Alcoholics Anonymous, 2001a), p. 85). Our secondary mediational analyses therefore simultaneously examined network support for abstinence at both 6 and 12 months; feeling comfortable being at meetings at both 6 and 12 months; and feeling comfortable speaking at meetings at both 6 and 12 months.

The Preacher and Hayes, 2008 macro generates estimates of both specific and total indirect effects; specific indirect effects are the indirect effect specific to a particular mediator while controlling for other putative mediators, whereas the total indirect effect is the indirect effect attributed to the whole group of presumed mediators. Thus, in our primary mediational analyses, we were able to identify the specific indirect effect of being comfortable at meetings (for example) while controlling for the effect of being comfortable speaking at meetings and of support for abstinence from the social network, as well as the total indirect effect of all three variables combined (comfort being at meetings, comfort speaking at meetings, and social support) at 6 months on 12-month abstinence. Similarly, in our secondary mediational analyses, we studied the specific indirect effect of the 6-month value of network support (for example) while controlling for the 12-month value of network support and the 6- and 12-month values of the other mediators, as well as the total indirect effect for the combination of all 6- and 12-month mediators.

To compute total and specific indirect effects, the Preacher and Hayes, 2008 multiple mediation macro estimates coefficients in regression models for each path; logistic regression is used when the dependent variable for the particular path is dichotomous, and linear regression is used when the dependent variable is continuous. We direct the reader to Preacher and Hayes, 2008 for a detailed discussion of this approach for assessing multiple mediation.

Here the paths include MAAEZ's effects on abstinence, MAAEZ's effects on the mediators, the mediators' effects on abstinence, and MAAEZ's effects on abstinence while controlling for the mediators. Regressions are used for coefficient estimation. In addition to the ability to detect mediation effects attributable to multiple continuous mediator variables, the method also allows for control of covariates. We included covariates that related to both treatment condition and outcome (Kaskutas, et al., 2009): marital status, length of stay in treatment, and treatment program type. We also control for baseline values of all three mediators.

The specific indirect effect is computed as a product of coefficients (treatment effect on mediator x mediator effect on outcome, partialled for the treatment effect) while the total indirect effect is computed as the sum of the specific indirect effects. The estimation procedure is repeated 1,000 times to produce 95% bootstrapped confidence intervals for both the specific and total indirect effects. If the 95% interval does not contain zero, then we infer a significant indirect effect. This is equivalent to attributing effects to a particular mediator (specific indirect effect) or group of mediators (total indirect effect), at the $p < 0.05$ significance level.

We also calculated the percent reduction in the MAAEZ odds ratio (OR) when the mediators were included versus not included in the regression model. Specifically, we subtracted the MAAEZ OR with the mediators *in* the model from the MAAEZ OR when the mediators were *not in* the model. This difference was divided by the MAAEZ OR *without* the mediator in the model. This gave us a numeric indication of the proportion of the MAAEZ effect that was essentially explained by the mediators. This approach has been used in our prior work (Bond, et al., 2003; Kaskutas, et al., 2002; Subbaraman, Kaskutas, & Zmore; Subbaraman, et al., 2011; Subbaraman, Kaskutas, & Zmore, in press), and is discussed in the epidemiologic literature (Hafeman, 2009).

RESULTS

The values of the multiple mediator variables (means and standard deviations) at baseline and at each follow-up are included in Table 1, stratified by MAAEZ treatment condition ("ON" and "OFF"). The indirect effect through the multiple mediator combination was not significant among those with high prior AA/NA/CA attendance at 6 months (Table 2). However, one of the mediators considered in the simultaneous pool at 6 months, the proportion of the social network that supports sobriety, had a significant specific indirect effect (95% bootstrapped CI = 0.059, 2.61) while controlling for the other continuous mediator values at 6 months. Here the magnitude of the MAAEZ OR on abstinence decreased by 29% once support for sobriety at 6 months was entered into the model, and changed negligibly once considering the effects of comfort being and comfort speaking at meetings as well; the combination of all three mediators accounted for a 27–29% reduction in the MAAEZ OR.

Secondary mediational analyses examined the potential simultaneous effect of all mediators measured at both the 6- and 12-month timepoints. The specific indirect effect of support for sobriety at 6 months remained significant when controlling for its 12-month value and other mediators measured at 6 and 12 months (95% bootstrapped CI = .066, 2.95). Thus, among those with high prior AA/NA/CA attendance, having a supportive social network at 6 months appears to partially mediate the MAAEZ effect on total abstinence at the 12-month follow-up, when controlling for covariates, mediator baseline values, and other continuous mediators. The mediating effect of having a supportive social network at 6 months persists when controlling for having a supportive social network at 12 months as well as other mediators. Accounting for twelve-month mediators additionally reduced the MAAEZ OR, yielding an overall "proportion explained" of about 44%.

DISCUSSION

Among patients with high prior AA/NA/CA attendance, having a supportive social network at 6 months did significantly partially mediate the MAAEZ effect on total abstinence at the 12-month follow-up, when controlling for other continuous mediators ($p < .05$). This effect remained (and was strengthened) when controlling for having a supportive social network at

12 months, highlighting the importance of social support as a mediating variable of the MAAEZ effect in this patient group.

The MAAEZ treatment main effect was $OR = 2.94$ among those with high prior AA/NA/CA attendance. The magnitude of this effect is much stronger than the typical 10% advantage reported in twelve-step facilitation intervention studies (Project MATCH Research Group, 1997a, 1998; Timko & Debenedetti, 2007; Timko, et al., 2006), and the significance of the effect is bolstered by the small size of the high prior AA/NA/CA attendance group. Social support for abstinence explained over a quarter of this relatively large treatment effect, implying that intervening on this variable could significantly improve outcomes for those with high prior AA/NA/CA attendance. The significance of this finding is strengthened by the control of comfort being and speaking at 12-step meetings, as these comfort variables were highly predictive of abstinence.

Increased social support for sobriety has been linked to better drinking outcomes (Beattie and Longabaugh, 1999). Others have shown that categorical involvement of specific 12-step activities (e.g. sponsorship, service involvement, attending a home group meeting regularly, engaging with 12-step members outside of meetings), independent of meeting attendance, was related to increased social support seeking (Groh, Jason, & Keys, 2008; Majer, Jason, Ferrari, Venable, & Olson, 2002). MAAEZ emphasizes these aspects of AA/NA/CA, and these results empirically show that MAAEZ increases comfort in 12-step groups and social support seeking.

The practicality of intervening on these mediators in 12-step facilitation interventions further underscores their significance in predicting abstinence. Becoming comfortable in meetings and making friends who support sobriety are feasible tasks that treatment providers can easily facilitate; MAAEZ can expedite this facilitation for those with high prior AA/NA/CA attendance. Notably, individuals who had attended more than 90 meetings prior to entering the study represent a high proportion of those seen in treatment (Humphreys, et al., 1998b; Regier, et al., 1990), signaling the need to improve treatment for this key group. We speculate that those in the high prior AA/NA/CA group had attended AA/NA/CA meetings in the past, but had not been able to connect with the members or reach out for support. Because MAAEZ includes homework assignments like asking for someone's phone number at an AA/NA/CA meeting, role-playing exercises like practicing how to deal with rejection from potential sponsors, and ideas about how to have fun without drinking, we believe that MAAEZ offered those in the high prior AA/NA/CA group novel but crucial new tools for reinforcing their social networks and support systems.

Mediated moderation

According to Muller et al. (Muller, Judd, & Yzerbyt, 2005), "mediated moderation" can explain moderated treatment effects by highlighting mediators at work within one particular subgroup but not another. When treatment effects depend on subgroup levels, differential treatment benefits may be attributed to mediated pathways. The presence of pathways through which the added treatment benefit is produced signals mediated moderation.

The MAAEZ trial results showed that MAAEZ effects were moderated by high prior AA/NA/CA attendance (Kaskutas et al., 2009); those with low prior AA/NA/CA attendance did not appear to benefit from MAAEZ while those with high prior AA/NA/CA attendance did. This finding contradicts prior TSF results (Kahler, et al., 2004; Kaskutas & Subbaraman, 2011; Timko, et al., 2006) and thus motivated the current analyses. Post hoc analyses among those with *low* prior AA/NA/CA attendance (not shown) revealed that MAAEZ did not predict higher levels of support for sobriety, comfort speaking or comfort being at 12-step meetings among this group. However, for those with *high* prior AA/NA/CA attendance,

MAAEZ did predict each mediator. Perhaps those with less AA/NA/CA exposure need to focus first on the basic principles of the 12-step program philosophy before they can benefit from approaches like MAAEZ that emphasize comfort with the 12-step fellowship.

Comparison to traditional lagged mediation analyses

To change habitual behavior requires sustained effort, especially when attempting to change addictive behaviors. We therefore felt that we could not fully understand how MAAEZ worked absent some examination of 12-month mediator values. Simultaneous control of 6- and 12-month mediators also allowed us to isolate the mediated effect of the MAAEZ effect in the high prior AA/NA/CA subgroup; we can see that the effect of 6-month support persists when controlling for 12-month support in this group, implying that the mediating effects of the 6-month value are not due to its 12-month value. The 6- and 12-month composite results (which explain 44% of the MAAEZ effect) thus emphasize the importance of securing and sustaining a supportive social network earlier in one's recovery, especially for those with high prior AA/NA/CA attendance; examination of mediators at 6 months only would have obfuscated this finding. Future researchers may consider measuring mediators more temporally proximal to outcomes to alleviate concerns regarding lagged mediators.

Limitations

Type 1 error may stem from our use of multiple tests. However, MAAEZ is a new intervention, our samples are relatively small, and our statistical tests are exploratory. We therefore chose to be liberal and did not perform Bonferroni corrections. We acknowledge that multiple testing may pose problems and therefore urge replication of our findings. Next, we ideally would assess mediators measured more proximally to outcomes, but still lagged (e.g., measure mediator at 11 months and outcomes at 12 months) in order to analyze mediation by sustained behaviors formally. We would also prefer to examine multiple mediation while including both continuous and dichotomous variables simultaneously (please see (Subbaraman, et al., 2011) for discussion of dichotomous mediators). However, the current multiple mediation software cannot compute indirect effects for dichotomous mediators. Perhaps development of more comprehensive macros will permit this type of analysis in the future.

Other potential mediators may be at play as well. For example, increases in meeting attendance could theoretically explain these results. However, MAAEZ did not significantly increase meeting attendance for those with high prior AA/NA/CA attendance, implying that meeting attendance likely does not explain the effects found here; this is consistent with other studies (Groh, et al., 2008; Majer, et al., 2002). Although meeting attendance probably does not confound the current results, we do acknowledge the possibility of other potential mediators.

Mediator measures were based on single, self rated responses for each variable rather than a more complex instrument that might tap into specific behaviors associated with these variables. For example, the network support variable measured overall as opposed to AA-specific support. However, the available data do not include such instruments. Thus we made the best of the available data and plan to interview participants more rigorously in the future. We hope these analyses inspire others to both 1) examine variables like comfort and support and 2) use more robust psychometrics.

Finally, results may not fully generalize to other clinical groups because the current sample consists of west coast, public sector clients. We hope these results encourage others to replicate our findings in broader samples.

Conclusion

We found that social support for sobriety helps explain the MAAEZ effect on abstinence among participants with high prior AA/NA/CA attendance. Although not established as mediators on their own, comfort being at meetings and comfort speaking at meetings also appear to be important variables on the causal pathway between abstinence and AA/NA/CA facilitation. The significance of support and comfort as mechanisms of action for MAAEZ are consistent with MAAEZ' fundamental goal as reflected in its title of Making AA Easier. Other mechanisms (reported in earlier work; see (Subbaraman, et al., 2011) also are grounded in the areas emphasized in MAAEZ session outlines (doing service and having a sponsor). Although the mediators here are likely correlated with service and sponsorship, we do not believe that the effects reported here are redundant because comfort and support significantly predict abstinence in multivariate models controlling for sponsorship and service (results not shown).

Understanding the differences in mediators across subgroups will facilitate information dissemination about MAAEZ, increasing its implementation in treatment programs. MAAEZ is a group format intervention led by recovering counselors that only requires six treatment sessions; is consistent with programs' service delivery, staffing and shortened lengths of stay; and relatively easy for programs to implement with fidelity; 80%–90% of topics were covered in each MAAEZ session observed during the MAAEZ trial (for details see Kaskutas et al., 2009). Furthermore, motivation for 12-step involvement and increasing social support for sobriety are modifiable, highlighting the clinical implications of understanding mediating variables (Project MATCH Research Group, 1997b).

Twelve-step groups are the only widely available source of free aftercare following treatment. Thus we should try to understand what we can do during treatment to successfully inculcate connection with those groups, especially among patients who had already tried attending and yet found themselves back in treatment. These results imply that linking clients to sobriety support networks and helping them become comfortable going to and speaking at 12-step meetings may improve abstinence outcomes, especially for those with high prior AA/NA/CA attendance. The next steps guided by this work are clear, including analysis of all mediators simultaneously in one model and better assessment of mediators more proximal to outcomes in future studies.

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Figure 1.
Conceptualization of multiple mediation

Table 1

Bivariate proportions of abstinent participants and means (SDs) of mediators at baseline and each follow-up by MAAEZ condition

	MAAEZ OFF (n=84)	MAAEZ ON (n=119)
% Abstinent		
Baseline	19.0	26.3
Six months	77.0	86.8 [†]
Twelve months	72.6	87.5 [*]
Proportion of social network that supports sobriety		
Baseline	0.90 (0.25)	0.86 (0.30)
Six months	0.89 (0.27)	0.98 (0.09) [*]
Twelve months	0.89 (0.26)	0.94 (0.20)
Comfort being at meetings (1–7)		
Baseline	5.65 (1.38)	5.46 (1.45)
Six months	6.00 (1.03)	6.10 (1.17)
Twelve months	6.00 (1.33)	6.18 (1.13)
Comfort speaking at meetings (1–7)		
Baseline	4.44 (1.87)	4.38 (1.89)
Six months	4.90 (1.90)	4.93 (1.79)
Twelve months	4.69 (1.96)	4.92 (1.71)

[†]p<0.10

^{*}p<0.05

Table 2

Parameter estimates and 95% bootstrapped confidence intervals for indirect effects of MAAEZ on abstinence via multiple mediators^a

<i>Mediator</i>	6 months only	6 and 12 months
Support _{6 months}	.579 (.059, 2.61)	.700 (.066, 2.95)
Support _{12 months}	--	.327 (–.088, 1.17)
Comfort Speaking _{6 months}	.079 (–.162, .448)	.106 (–.278, .669)
Comfort Speaking _{12 months}	--	.026 (–.725, .758)
Comfort Being _{6 months}	–.061 (–.457, .209)	–.268 (–1.34, .214)
Comfort Being _{12 months}	--	.242 (–.306, 1.06)
COMBINED EFFECT _{6 months}	.366 (–.086, 2.72)	--
COMBINED EFFECT _{6+12 months}	--	1.13 (–.024, 4.10)
% reduction in MAAEZ OR:		
Due to Support _{6 months}	29.1	--
Due to Combination	27.8	44.1

^aModels control for marital status, treatment type (long-term, short-term, outpatient), treatment length of stay, and baseline values of mediators

*
p<0.05