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Does Age Moderate the Effect of Spirituality/Religiousness in Accounting for Alcoholics Anonymous Benefit?

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Abstract

Objective—Gains in spiritual/religious (S/R) practices among Alcoholics Anonymous (AA) members are associated with reductions in drinking. This study had the following aims: (a) examine spirituality/religiousness as a mediator of the relationship between AA attendance and reductions in drinking behavior to replicate past research findings and to (b) examine age-cohort as a moderator of the mediational analyses given that empirical evidence (e.g., generational differences in spirituality) suggests that age may influence the *acquisition* of gains in spirituality/religiousness during AA as well as the *expression* of these gains on drinking behavior.

Method—Measures were administered to 253 participants recruited from community-based AA and outpatient treatment programs at baseline, 3, 6, 9, and 12-months, and 210 (83%) participants provided complete data to test study aims.

Results—Gains in S/R practices mediated the relationship between AA attendance and increased abstinence, but not drinking intensity. Simple slopes analyses indicated a positive association between AA attendance and gains in S/R practices among younger AA affiliates but not older AA affiliates in the moderated-mediational analyses. However, age was not found to moderate the global mediational effect.

Conclusions—The results from the current study inform efforts to increase positive change in AA affiliates' drinking behavior by highlighting specific aspects of S/R practices that should be targeted based on the age of an AA affiliate.

Keywords

spirituality/religiousness; change mechanisms; moderated-mediation; Alcoholics Anonymous

Referring a client to Alcoholics Anonymous (AA) is one evidence-based practice that clinicians commonly use when a client presents with an alcohol-related problem. Approximately 9% of adults in the United States have attended AA, and almost 80% of adults who have sought help for alcohol-related problems have participated in AA (Dawson, Grant, Stinson, & Chou, 2006; Moos, 2008). The high rate of AA participation is partially attributable to the widespread availability of AA programs around the world, and more importantly, AA referral is grounded on the recommendations of five meta-analytic studies

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that have consistently reported positive associations between frequency of AA attendance and increased abstinence (Emrick, Tonigan, Montgomery, & Little, 1993; Forcehimes & Tonigan, 2008; Magill, Kiluk, McCrady, Tonigan, & Longabaugh, 2015; Tonigan, Toscova, & Miller, 1996).

Religiosity/Spirituality as a Mechanism of Change

Substantial gains have been made in identifying the mechanisms or change processes in AA that account for increased abstinence. For example, along with increased self-esteem and perceived social support (Laudet, Cleland, Magura, Vogel, & Knight, 2004; Moos, 2008; Moos & Moos, 2004), AA attendance has been purported to be associated with gains in spiritual/religious (S/R) practices. In terms of the distinct between spirituality and religiosity, religion is defined as an "adherence to a belief system and practices associated with a tradition in which there is agreement about what is believed and practiced" whereas spirituality has been defined as a "more general feeling of closeness and connectedness to the sacred" (Hill et al., 2000; Worthington, Hook, Davis, & McDaniel, 2011, p. 205; Hill et al.). Gains in S/R practices have been found to be predictive of reductions in drinking behavior (Robinson, Cranford, Webb, & Brower, 2007; Tonigan, 2007; Tonigan, Rynes, & McCrady, 2013; Zemore, 2007). Interestingly, using meta-analytic techniques (Tonigan, 2015; in Magill et al., 2015), Tonigan reported that the magnitude of the association between frequency of AA attendance and later gains in AA-prescribed S/R practices such as prayer and meditation was homogeneous in nine AA studies. It would appear, then, that the spiritually/religiously based prescriptions and messages of AA are both consistently expressed in AA meetings as well as adopted by early AA affiliates. In contrast, the studies summarized by Tonigan (2015) varied significantly in their estimate of the magnitude of the prognostic effect of S/R gains on later increases in alcohol abstinence (Tonigan, 2015; in Magill et al., 2015). Here, estimates ranged from a negligible effect (Tonigan, 2003, $\beta = -.06$) to a significant and positive association (Tonigan et al., 2013, $\beta = .30$). The focus of this paper is to investigate the factors that may account for the mixed findings across studies.

AA is grounded in S/R practices where the use of prayer/meditation is judged to be instrumental in the development of a personal relationship with God or "Higher Power". While it is recommended in AA that these core practices are applied throughout the day, the reciting of formal (e.g., Serenity prayer) and informal (self-generated) prayer and meditation are especially encouraged when strong negative affect, uncertainty, and alcohol craving are experienced (Alcoholics Anonymous, 2001). Understandably, the *expression* of these acquired skills and beliefs is complex and is contingent upon a number of factors including but not limited to AA affiliate motivation, perceptions of utility, and the ability to appropriately discern states of unease, anger, and drinking urges.

Age as a Moderator of the Mediational Effect

Given that gains in spirituality have been found to mediate the relationship between AA attendance and reductions in drinking outcomes, it is surprising that moderators of this mediational process have yet to be fully explored. For example, gender has been examined as a moderator of AA mediational models (Kelly & Hoeppner, 2013), but other

sociodemographic and clinical characteristics have not been extensively examined. Similar to Kelley et al.'s examination of gender as a moderator of multiple mediation models, it is important for new lines of research to be parsimonious by focusing solely on one moderator of critical interest. Although yet to be empirically tested, the age of an AA affiliate may serve as one potential moderator. In a Pew Research Center series, younger adults (e.g., 18–29 years of age) reported being less religious than older adults (e.g., 30 years of age or older; Pew Research Center, 2010). Moreover, in the examination of generational differences in religiosity, millennials (born 1982 – 1999) have been found to be significantly less religious than Boomers (born 1946–1964) and Generation Xers (born 1965–1981); thus, it appears that there may be a religious floor effect where calls to increase one's religiousness in AA may be more salient for younger AA affiliates (Twenge, Exline, Grubbs, Sastry, & Campbell, 2015). Additional evidence for this supposition can also be found in the AA literature where the positive association between AA attendance and gains in spirituality was strongest among AA affiliates with lower initial spirituality at baseline (Kelly, Stout, Magill, Tonigan, & Pagano, 2011). Taken together, these findings suggest that younger AA affiliates, who are reportedly less religious than older AA affiliates, may engage in the use of more S/R practices as a result of AA attendance than older AA affiliates.

The age of an AA affiliate may also explain the variability in past estimates of the influence of AA-related gains S/R practices on drinking behavior (Tonigan, 2015; in Magill et al., 2015). General population surveys consistently report that frequency of prayer and age are significantly and positively associated, with individuals younger than 30 years of age reporting qualitatively fewer prayer occasions than older adults (e.g., Levin & Taylor, 1997). In a recent national survey, for example, about 16% of adults between the ages of 18 and 29 reported daily prayer in comparison to 34% of the adults between the ages of 30 and 49 (Pew Research Center, 2014). In conducting a secondary analysis of the Project MATCH data set, we found that this age-cohort pattern appears to extend to alcohol treatment seeking adults. Specifically, adults 30 years of age and younger in Project MATCH reported at the three-month interview practicing prayer, on average, about twice a month while adults older than thirty reported praying about once a week. Considering only those adults randomized in Project MATCH to Twelve-Step Facilitation (TSF) which encouraged active AA attendance, no difference in frequency of prayer was observed between age cohorts at the three-month follow-up. Noteworthy, however, at the three-month follow-up older TSF study participants (30 years of age or older) reported significantly higher rates of meditation relative to younger adults assigned to TSF. Taken together, these findings suggest that older AA affiliates may utilize gains in spiritual practices derived from AA to a greater extent than younger AA affiliates to reduce drinking behavior or maintain abstinence.

Current Study

This study investigated if the age of an AA affiliate moderated the indirect effect of S/R practices in accounting for the association between AA attendance and reductions in drinking behavior (e.g., increase in PDA and decrease in DPDD; see conceptual model in Figure 1). Strong evidence suggests that gains in S/R practices should mediate the relationship between AA attendance and reductions in drinking behavior, and as a preliminary step our first goal will be to replicate this finding in a community-based AA

sample. In terms of the age moderating effect, we hypothesize that a stronger association will be found between AA attendance and gains in S/R practices among younger AA affiliates (i.e., 29 years of age or younger). This prediction is based on past empirical evidence where younger AA affiliates have been found to present with lower levels of spirituality/religiosity in AA (e.g., Kelly et al., 2011) and would thus benefit from the S/R aspects of AA to a greater extent than older AA affiliates. In addition, we hypothesize that a stronger association will be found between the expression of gains in S/R practices and reductions in drinking outcomes among older AA affiliates (i.e., 30 years of age or older). This prediction is based on empirical evidence that older adults are more likely to utilize their spirituality/religiosity than younger adults (e.g., Levin & Taylor, 1997; Pew Research Center, 2014). Although the dichotomization of age leads to a loss of statistical power, the cutoff used in the current study is consistent with how age-cohort differences have been examined in past studies (Pew Research Center, 2010; Pew Research Center 2014) and also provides a framework from which to examine S/R practices as mediator of AA-related benefit from a generational perspective (e.g., comparing the efficacy of AA among millennials and non-millennials).

Method

Participants

A total of 253 participants agreed to take part in the study. Eligibility criteria were rigid in terms of lifetime and recent treatment and AA exposure, so that we could investigate how AA mobilized behavior, unconfounded by prior AA-related histories. Prospective participants were excluded if they reported more than 16 weeks of lifetime AA exposure or if they had achieved 12 or more months of abstinence following their initial alcohol problem recognition. To be included, participants had to meet Diagnostic and Statistical Manual of Mental Disorders-IV-TR (DSM; American Psychiatric Association, 2000) criteria for alcohol abuse or dependence, must have had consumed alcohol in the prior 90-days, and attended at least one AA meeting in the prior three months. Meeting DSM criteria for illicit drug abuse or dependence was not an exclusionary criterion, nor was any history of exposure to a twelve step programs other than AA. Data were collected starting in 2004 and ended in 2006.

Measures

Demographics—A 17-item demographics questionnaire was administered at baseline. In addition to collecting participant age, sex, and ethnicity, this measure also identified participants' employment, marital, living status, and language preferences.

Form 90—The interviewer-administered Form 90 (Miller, 1996) was used to measure 12-step attendance, alcohol use, and formal treatment attendance. This calendar-based method collects drinking data for the previous 90 days (baseline) or the time since the last assessment (3, 6, 9, and 12 months) and has demonstrated good test-retest reliability (ICCs = .71–.85; Rice, 2007; Tonigan, Miller, & Brown, 1997). Both 12-step meeting and formal treatment attendance (summation of inpatient and outpatient treatment for alcohol, drug, or emotional problems) was calculated by dividing the number of days participants attended

12-step meetings (or had treatment sessions) in an assessment period by the number of days in that assessment period. Similarly, drinks per drinking day (DPDD) refers to the total number of drinks in an assessment period divided by the number of days on which alcohol was consumed during that period (abstinent days removed from the denominator). Percent days abstinent from alcohol (PDA) refer to the number of days on which no alcohol was consumed divided by the total number of days in that assessment period.

Alcohol Dependence Scale (ADS): Alcohol problem severity was measured using the ADS (Skinner & Allen, 1982). This self-report tool includes 25 items and the total score can range from 0 to 47. According to ASAM recommendations, total scores equal to or exceeding 31 indicate severe alcohol dependence.

Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES; Miller & Tonigan, 1996): Readiness for behavioral change was evaluated using a 19-item self-report measure that yields 3 scales: *Ambivalence* (A; four items), *Problem Recognition* (PR; seven items), and *Taking Steps* (TS; eight items). We used the *Problem Recognition* scale to represent participant readiness for change because, unlike the *Taking Steps* scale, it is an unambiguous measure of motivation that does not include assessment of change behaviors. While not central to the aims of this study, SOCRATES scales scores are reported at baseline for descriptive purposes.

Spiritual/Religious Practices: The 13-item Religious Background and Behavior (RBB) measure was administered to participants (Connors, Tonigan, & Miller, 1996). On the first item, participants identified the term that best described their religious orientation: atheist, agnostic, unsure, spiritual, religious. On the following six items, the participants indicated the frequency with which they had engaged in the following behaviors during the past 90 days: thought about God, prayed, meditated, attended religious services, read/studied holy writings, and had direct experiences of God. The RBB captures both spiritual (direct experiences of God) and religious (e.g., attended religious services) but predominately focuses on religious practices. The response options ranged from 1 = "*Never*" to 8 = "*Once a day or more*" which were recoded to 0 = "*Never*" to 7 = "*Once a day or more*". Participants were not asked to complete the remaining six items of past year engagement in spiritual practices on subsequent assessments. As a result, only the 6-items pertaining to spiritual practices that participants engaged during the past 90-days at baseline and 6-month follow-up were examined. Cronbach alpha ranged from .77 (baseline) to .81 (6-month follow-up).

General Alcoholics Anonymous Tools of Recovery: (GAATOR; Greenfield & Tonigan, 2013; Montgomery, Miller, & Tonigan, 1995) consists of 24 self-report items that indirectly assess the extent to which a participant has practiced the 12 steps. Each item represents one step and multiple items are summed to summarize a participant's overall endorsement of a given step (e.g., "I have told others about my spiritual experience" corresponds with Step 11; "I have found character defects I am willing to give up" corresponds with Step 6). Using a four-point Likert scale (definitely false, false, true, and definitely true), participants indicate the degree to which they have practiced a given step-related behavior in the previous 90

days. Item responses were summed to derive an overall GAATOR score, with total possible scores ranging from 24 to 96.

Procedures

All procedures and assessments were approved by the IRB at the University of New Mexico. Breathalyzers were used to ensure that participants' BAC did not exceed .05 prior to the consent process or at any assessment interview. A broad net was cast in recruitment locations: as examples, 58 participants were recruited as they presented for outpatient treatment, 18 from a publically-funded detoxification center, 69 directly from community-based AA meetings, 19 responded to newspaper ads and posted flyers, and 60 participants contacted staff through "word of mouth". Study recruitment started in August of 2004 and ended in December of 2006. After consenting, participants were administered a baseline interview that included self-report questionnaires, semi-structured interviews, and a urine toxicology screen. Follow-up interviews were conducted in 3-month increments for one year (i.e., 3, 6, 9, and 12 month follow-ups). No intervention was offered in this assessment-only study, although clinical referrals were made upon participant request, or when deemed warranted by clinical staff. Follow-up rates for the 3, 6, 9, and 12 month interviews were 94%, 94%, 94%, and 92%, respectively.

Analytic Plan

In terms of outliers, five outliers in the DPDD variable were winsorized such that all outliers were recoded to one unit more extreme than the last value not considered an outlier (Tabachnick & Fidell, 2007). With respect to normality, all key variables were found to be non-normally distributed (i.e., skewness and kurtosis values that exceeded +1 and −1). In response, we used a square root transformation on all non-normally distributed variables and re-analyzed the models with the transformed variables to evaluate whether the results of the analyses with the transformed variables were substantively different from the analyses with non-transformed variables. Because the results were not substantively different, the current study analyzed and interpreted models with untransformed variables.

The Hayes PROCESS macro was used to examine mediation and moderated-mediation in two models predicting the percentage of days abstinent (PDA) and the number of drinks participants consumed per drinking day (DPDD). For the continuous dependent variables in the current study, coefficients were modeled using ordinary least squares regression. PROCESS generates direct and indirect effects in the mediational analyses as well as conditional indirect effects in the moderated-mediation analyses. Statistically significant moderator effects were examined through the evaluation of simple slopes. The mediation and moderated-mediation results were examined such that the a-path represented the relationship between the predictor and the mediator, the b-path represented that relationship between the mediator and dependent variable, and the c-path represented the relationship between the predictor and the dependent variable. In terms of control variables, baseline measures of the mediator (i.e., spiritual practices) and dependent variables (i.e., PDA and DPDD) were controlled for along with participants' gender[1]. Due to missing data on key study variables, only data from 210 participants were analyzed. There were no statistically significant differences on key study variables between the 43 participants whose data were

excluded and the 210 participants (n = 45 under 30, n = 165 over 30) whose data were retained and analyzed in the current study. Of the 45 participants under 30 years of age, 71% were born during the millennial generation (born after 1979)[2]. Thus, a majority of the younger AA affiliates in the current study were born in the millennial generation.

Results

Table 1 displays the baseline characteristics of the younger and older AA cohorts as well as the 43 adults excluded from the study's primary analyses. Between-group baseline differences were slight, with the younger cohort reporting significantly lower problem recognition and RBB scores at baseline relative to the older and excluded cohorts. Common to the three groups in Table 1, a majority of the participants were unemployed and were severely alcohol dependent as measured by the ADS. Study participants reported drinking about every other day and, when drinking occurred, participants consumed over a dozen standard drinks. On average, AA was attended about once every eight days and about 56.9% of the participants reported attending at least one formal therapy session for alcohol problems in the 90-day period before study recruitment.

Spiritual Gains as a Mediator of AA Attendance and Drinking Behavior

In terms of the full sample, gains in spiritual practices was a statistically significant mediator of the relationship between AA attendance and PDA, but not AA attendance and DPDD (see Table 2). That is, AA affiliates who attended AA more frequency reported experiencing statistically significant gains in spirituality, with spiritual gains associated with a higher proportion of PDA (b = .005, p = .05; β = .15).

Age as a Moderator of the Mediational Effect

The examination of the a-path in both models (i.e., the a- and b-path in the moderated-mediational analyses where PDA [Model 1] and DPDD [Model 2] were examined) indicated that AA attendance was positively related to, and a statistically significant predictor of the use of more S/R practices (See Table 3). The AA Attendance × Age interaction effect was also statistically significant in both models. The examination of simple slopes indicated that there was a statistically significant positive relationship between AA attendance and gains in S/R during AA among younger AA affiliates (b = 13.32, SE = 4.55, p = .01), but not older AA affiliates (b = 2.53, SE = 1.87, p = .17; see Figure 2). To further probe the statistically significant simple effects, age-stratified bivariate correlations were conducted on S/R practices change scores at the item level. The relationship between AA attendance and changes in meditation from baseline to six months was stronger in magnitude and statistically significant among younger AA affiliates (r(44) = .43, p = .01) but not older AA affiliates (r(165) = .13, p = .11). Moreover, at the item level, change scores were calculated

[1]We also controlled for alcohol treatment that participants reported receiving outside of AA during the study as this could potentially explain reductions in drinking outcomes not attributable to AA attendance. The results with treatment added as a covariate in the model did not substantively differ from the results presented in the current study where treatment was not controlled; thus, treatment outside of AA was not included as a covariate in the final analyses.

[2]Generational cutoffs have little empirical basis but have been used to label those born in different decades. In Twenge et al.'s (2015) study, millennials were identified as those born between 1982–1999 whereas others suggest that the millennial generation begins at age 1980 (Rosen, 2010). Millennials in the current study were identified as those participants who were born between 1980–1999.

for each item on the RBB to identify where differences may exist in S/R practices between age cohorts (see Table 4). The results indicated that older AA affiliates exhibited a statistically significant change in their use of meditation from baseline to six months relative to younger AA affiliates. Specifically, older AA affiliates reported greater increases in meditation from baseline to six months relative to younger AA affiliates.

In terms of the b-path, gains in S/R practices and AA were positively related, and a statistically significant predictor of PDA (9 months) but not DPDD (9 months; see Table 5). Age was not a statistically significant moderator of the b-path in both models. In terms of the omnibus test for moderated-mediation, age was not found to be a statistically significant moderator of the mediational effects in both models (see Table 6).

Discussion

It is well documented that AA attendance is associated with reductions in drinking behavior (Kelly, Hoeppner, Stout, & Pagano, 2012; Tonigan et al., 2013). The mechanisms associated with this benefit, specifically gains in spirituality/religiosity, have been rigorously examined (e.g., Kelly et al., 2012; Robinson et al., 2007; Tonigan et al., 2013; Zemore, 2007) although moderators of these mechanisms have not received as much research attention (Blonigen, Timko, Finney, Moos, & Moos, 2011; Kelly & Hoeppner, 2013). To fill this gap, the current study examined age as a moderator of AA-related benefit associated with gains in S/R practices attributed to AA attendance. The results from the current study indicate that: (a) gains in S/R practices mediated the relationship between AA attendance and positive drinking outcomes (i.e., increase in PDA) in the full sample, and that (b) age-cohort did not moderate this overall mediational effect. Our finding that younger AA affiliates reported engaging in fewer S/R practices at baseline compared to older AA affiliates is consistent with past research (Kelly et al., 2011). This finding may reflect generational differences in religiosity where it has been reported that millennials are less religious, and therefore would be less likely to engage in religious practices, relative to older generations (Twenge et al., 2015).

Gains in S/R practices were a statistically significant mediator of the relationship between AA attendance and PDA, with AA attendance found to be associated with increased gains in S/R practices, and with gains in S/R practices associated with increased abstinence during the assessment period. Along with this finding being consistent with past research (Robinson et al., 2007; Tonigan, 2007; Tonigan et al., 2013; Zemore, 2007), the magnitude of the prognostic effect of gains in S/R practices on later increases in alcohol abstinence observed in the current study fell within the range explicated in a reported by Tonigan (2015, in Magill et al., 2015).

Partial support was found for the assertion that AA affiliate age would moderate the association between AA attendance and gains in S/R practices. Specifically, AA attendance was positively associated with gains in S/R practices, but only for younger AA affiliates. Correlations conducted at the item-level between age cohorts revealed that AA attendance and changes in meditation (i.e., baseline to 6-months) were positively associated and statistically significant suggesting that AA attendance was associated with gains in spiritual

practices (e.g., meditation), rather than religious practices, among younger AA affiliates. It could be that calls to increase spiritual practices, rather than religious practices, are especially salient for younger AA affiliates born in the millennial generation who appear to be more spiritual than religious (Pew Research Center, 2010). Interestingly, when mean differences in change scores were calculated (i.e., baseline to 6-months), only older AA affiliates reported engaging in more meditative practices. The increase in meditative practices among older AA affiliates is consistent with the secondary data analysis that we conducted from Project MATCH, but appears to be incongruous with the simple slopes results in the current study. Although the conflicting results appear, at first, to be difficult to reconcile, it may be that the role AA meeting attendance serves in mobilizing spiritual practices differs as a function of an AA member's age. Among younger AA affiliates, for example, AA meeting attendance was associated with gains in spirituality. In contrast, while older AA affiliates reported greater absolute gains in spiritual gains (e.g., meditation) relative to younger AA affiliates, these gains did not appear to be related to AA meeting attendance. Future investigations are warranted to better understand the conditions under which spiritual practices are mobilized among younger AA affiliates in AA as well as how older AA affiliates derive spiritual gains outside of AA.

In the examination of the path between gains in S/R practices and positive drinking outcomes, age was not found to be a statistically significant moderator of this path. This finding suggests that gains in spirituality/religiosity mobilize positive change in drinking behavior (e.g., increases in PDA and decreases in DPDD) in both younger and older AA affiliates in a similar manner. Given that past meta-analytic studies report great heterogeneity on this path (Tonigan, 2015; in Magill et al., 2015), it may be that other moderators (e.g., social stigma associated with the expression of spirituality/religiosity in public; level of a county's religious tolerance) could explain variability on this path. Lastly, although AA attendance was not found to be a robust predictor of the S/R gains that older AA affiliates reported experiencing in the current study, it may be that other aspects of AA (e.g., degree of social connectedness with AA affiliates who are spiritual, reading AA information online or in print related to importance of spirituality/religiosity during recovery) may better explain this effect.

Clinical Implications

The results herein appear to indicate that AA groups which encourage younger AA affiliates to engage in more S/R practices, specifically meditation, may produce greater positive change in drinking behavior. As older AA affiliates report being more religious than younger AA affiliates (Pew Research Center, 2010), it may be that AA groups which encourage older AA affiliates to engage in more religious practices may be an effective approach to promote positive change in drinking behavior. Experimental and non-experimental methods to test this claim would shed considerable light on the differential effect of AA attendance on gains in S/R practices between younger and older AA affiliates, and how gains in spirituality (in particular, meditation) produce positive change in drinking behavior. For example, randomly assigning younger and older AA affiliates into three AA groups that focus predominately on either gains in spirituality, gains in religiosity, or gains in both spirituality and religiosity and would provide a fundamental test as to whether AA groups should focus on specific aspects

of spirituality or religiosity based on the age of an AA affiliates. More directly, AA groups could ask AA affiliates if they consider themselves to be more spiritual or religious so as to guide new affiliates in the selection of a AA group that is aligned with the affiliate's S/R practices and beliefs.

Limitations

Several limitations in this study should be noted. Foremost, findings may differ when a different age-split is used to define AA age-cohorts. Our selection was based upon commonly used categories in the literature and may have masked important differences that may have elucidated if age was treated as a continuous variable. Second, future investigations may profit by assessing the types of prayer and meditation reported by early AA affiliates. We acknowledge that the measurement of only the sheer frequency of these S/R practices leaves much to be desired. And, third, AA-related benefit in this study was defined using only two measures of alcohol use, PDA and DPDD. Additional outcome measures such as quality of life and general life functioning would be useful to assess the broader implications of increased S/R practices among AA members. Fourth, it may that age serves as a proxy for deficits in S/R practices at baseline, with S/R at baseline being a more proximal and influential moderator of the mediational effects observed in the current study. Future research is needed to examine these models in groups of AA affiliates with varying levels of engagement in S/R practices at baseline. And, last, individuals were excluded from this study if they reported AA lifetime histories that exceeded 16 weeks. Given that many individuals cycle in and out of AA over the course of several years, findings may not generalize to a majority of problem drinkers with AA experiences.

Conclusion

The results from the current study indicate that (a) gains in S/R practices mediated the relationship between AA attendance and positive drinking outcomes (i.e., increase in PDA) in the full sample, and that (b) age-cohort did not moderate the S/R mediational effect. Taken together, gender was found to moderate the *acquisition* of S/R practices as a function of AA attendance but was not found to moderate the *expression* of gains in S/R practices attributable to AA attendance on drinking behavior. Despite the limitations of the current study, the findings shed light on the effect generational differences may have on the acquisition of S/R practices associated with AA and how S/R practices are utilized to influence drinking behavior.

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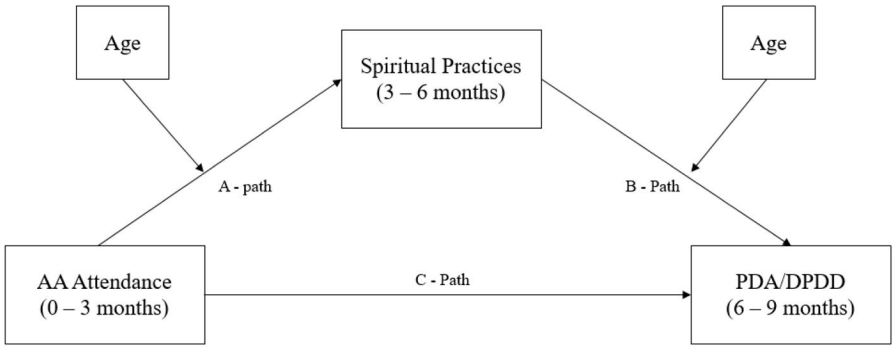

Figure 1.

Conceptual path model of moderated-mediation. PDA = Percent days abstinent; DPDD = Drinks per drinking day.

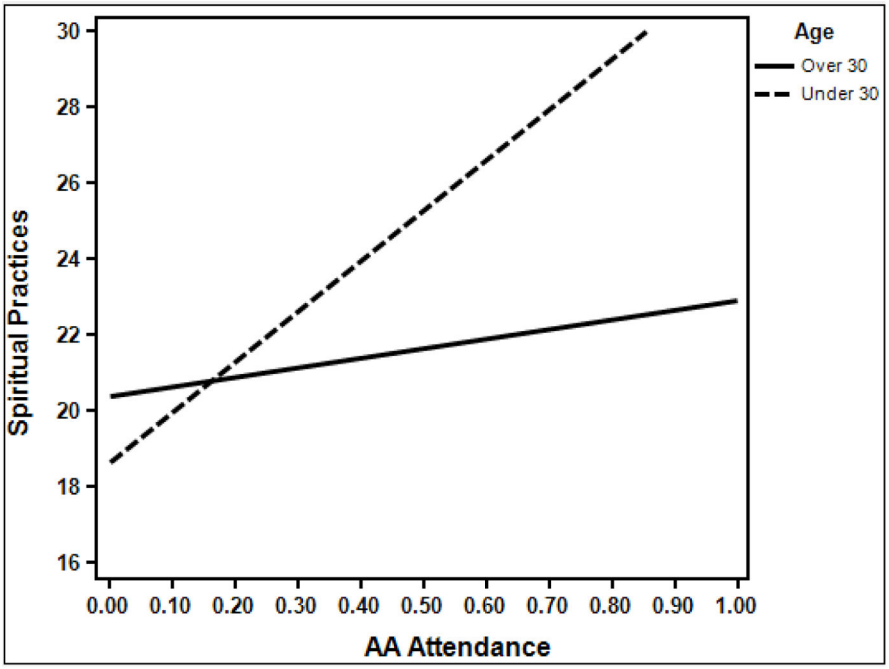

Figure 2.
Age as a moderator of the relationship between AA attendance and spiritual practices.

Table 1

Sample Characteristics of Baseline Measures

	Younger Cohort *n* = 45	Older Cohort *n* =165	Excluded *n* = 43	*p*
Demographics				
% Male	57.8% (26)	66.1% (109)	76.7% (33)	.16
Age	24.91 (3.11)	42.81 (7.13)	36.91 (9.56)	.01
% Not Married	72.1% (31)	84.1% (138)	90.7 % (43)	.07
Yrs Education	12.56 (2.35)	12.96 (2.99)	12.19 (1.65)	.21
% Unemployed	64.4% (29)	65.0% (106)	62.8% (29)	.96
Help-Seeking Behaviors				
Proportion AA Days	.14 (.19)	.16 (.18)	.21 (.18)	.25
GAATOR	63.04 (13.00)	64.34 (10.97)	63.93 (15.89)	.83
RBB	16.00 (8.28)	19.62 (8.66)	20.60 (9.64)	.03
Proportion Days Treatment	.08 (.17)	.07 (.14)	.11 (.16)	.36
Motivation and Self-Efficacy				
Ambivalence	15.36 (3.78)	14.81 (4.20)	14.91 (4.02)	.73
Problem Recognition	28.60 (6.20)	30.76 (5.08)	30.79 (5.07)	.01
Taking Steps	34.89 (5.64)	34.33 (5.64)	34.11 (6.69)	.80
AASE-Confidence	61.09 (16.31)	61.11 (20.01)	61.44 (19.28)	.99
AASE-Temptation	56.53 (16.23)	57.01 (19.54)	59.98 (20.09)	.64
Substance Use				
ADS	47.02 (9.45)	49.56 (8.72)	47.26 (10.97)	.15
PDA	.56 (.31)	.54 (.30)	.54 (.32)	.84
DPDD	14.81 (9.72)	18.55 (13.18)	17.68 (13.16)	.21

Note. Chi-square test were conducted for categorical baseline measures and *t*-test we conducted for continuous baseline measures. Younger cohort = 29 or younger; Older Cohort = 30 and over. GAATOR = General AA Tools of Recovery. RBB = Religious Background and Behavior; AASE = Alcohol Abstinence Self-Efficacy; ADS = Alcohol Dependence Scale; PDA = Percentage of Days Abstinent; DPDD = Drinks Per Drinking Day.

Table 2

Bootstrap Coefficients, Standard Errors, and Confidence Intervals for Mediation

	Spiritual Practices (PDA)		**Spiritual Practices (DPDD)**	
	***b*(SE)**	***p***	***b*(SE)**	***p***
AA Attend (a-path)	3.96(1.78) *	.03	3.99(1.79) *	.03
	PDA		**DPDD**	
	b(SE)	*p*	*b*(SE)	*p*
Spiritual Practices (b-path)	.005(.002)	.05	−.08(.07)	.24
	Omnibus Mediation (PDA Model)		**Omnibus Mediation (DPDD)**	
	b(SE)	CI	*b*(SE)	CI
Full Sample	.021(.02)	(.007, .06) *	−.34(.36)	(−1.37, .128)

Notes. PDA = Percent Days Abstinent, DPDD = Drinks Per Drinking Day. AA = Alcoholics Anonymous, AA attend = AA attendance (%). *b* represents the unstandardized path coefficient in the model. Confidence intervals (CI) were estimated using 1,000 bootstrap samples with 95% CI (Lower, Upper). Asterisks denotes a significant indirect effect,

* $p < .05$,

** $p < .001$.

Table 3

Predictive Relationship of AA Attendance (0 – 3 months) and Age on Spiritual Practices (3 – 6 months)

	AA Outcomes			
	Spiritual Practices (PDA Model)		Spiritual Practices (DPDD Model)	
	***b*(SE)**	***t*(*p*)**	***b*(SE)**	***t*(*p*)**
AA Attend	4.55(1.81)	2.52(.01) *	4.73(1.81)	2.61(.01) *
Age	1.34(1.34)	1.00(.32)	1.63(1.34)	1.21(.22)
AA Attend × Age	−9.93(4.86)	−2.04(.04) *	−10.36 (4.83)	−2.14(.03) *
Constant	−8.03(2.04)	−3.93(.01) **	−7.13(2.21)	−3.23(.01) *

Notes. AA = Alcoholics Anonymous, AA attend = AA attendance (percentage), PDA = Percent Days Abstinent (6 – 9 months), DPDD = Drinks Per Drinking Day (6 – 9 months). *b* represents the unstandardized path coefficient in the model. SE represents the standard error of *b*. PROCESS was used to test the direct effects. PROCESS was used for the mediational analyses,

* $p < .05$,

** $p < .001$.

Table 4

Item-Level RBB Change Scores from Baseline to 6-Months by Age

	Age		
	Under 30 *M*(*SD*)	**Over 30 *M*(*SD*)**	***t* (*p*)**
1. I thought about God	−.27(2.45)	−.03(1.81)	−.71(.474)
2. I prayed	.44(2.26)	.25(2.11)	.55(.587)
3. I mediated	−.04(2.08)	.75(2.48)	−1.97(.049) *
4. I attended religious services	−.07(1.91)	−.04(1.97)	−.07(.941)
5. I read or studies holy writings	.04(2.68)	.14(2.48)	−.22(.823)
6. I had direct experiences of God	.22(2.57)	.04(2.38)	.46(.648)

Notes. RBB = Religious Background and Beliefs. *M* = Mean; *SD* = Standard Deviation,

* $p < .05$,

** $p < .001$.

Table 5

Predictive Relationship of AA Attendance (0 – 3 months) and Spiritual Practices (3 – 6 months) on Drinking Outcomes (6 – 9 months)

	AA Outcomes			
	Pct Days Abstinent (PDA)		Drinking Intensity (DPDD)	
	***b*(SE)**	***t*(*p*)**	***b*(SE)**	***t*(*p*)**
AA Attend	.17(.07)	2.44(.02)*	−4.18(1.87)	−2.23(.03)*
Spiritual Practices	.06(.03)	2.03(.04)*	−.08(.07)	−1.21(.23)
Spiritual Practices × Age	.006(.01)	1.08(.28)	−.13(.15)	−.84(.40)
Constant	.63(.08)	7.57(.000)**	.63(2.37)	.27(.79)

Notes. AA = Alcoholics Anonymous, AA attend = AA attendance (%), DPDD = Drinks Per Drinking Day. *b* represents the unstandardized path coefficient in the model. SE represents the standard error of *b*. PROCESS was used to test the direct effects in the mediational analyses,

* $p < .05$,

** $p < .001$.

Table 6

Bootstrap Coefficients, Standard Errors, and Confidence Intervals for Moderated-Mediation Tests

	Pct Days Abstinent (PDA)		Drinks Per Drinking Day (DPDD)	
	Spiritual Practices		Spiritual Practices	
	***b*(SE)**	**95% CI**	***b*(SE)**	**95% CI**
Age (Under 30)	.01(.08)	(−.19, .13)	.15(2.15)	(−3.39, 5.49)
Age (Over 30)	.02(.02)	(−.01, .06)	−.29(.33)	(−1.30, .07)

Notes. AA = Alcoholics Anonymous, AA attend = AA attendance (%). *b* represents the unstandardized path coefficient in the model. Confidence intervals (CI: Lower, Upper) were estimated using 1,000 bootstrap samples with 95% CI. Asterisk denotes a significant indirect effect,

* $p < .05$,

** $p < .001$.