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The role of daily goal setting among individuals with alcohol use disorder

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A R T I C L E   I N F O

A B S T R A C T

Introduction: Individuals with alcohol use disorder (AUD) who seek help to reduce their drinking are expected to vary with respect to drinking goal with some choosing abstinence and others moderation. The present research explored whether drinking goals vary day to day among individuals with AUD who plan to enter treatment and the relationship of specific daily goals to actual drinking behavior in daily life.

Methods: Participants were 153 individuals with AUD who enrolled in a study of stepped care brief interventions and completed smartphone momentary assessments in daily life. Drinking goals and actual number of standard drinks consumed were reported daily for 21 consecutive days after receiving brief advice but prior to assignment to further treatment. Daily drinking goals were coded as (a) complete abstinence (b) moderation, i.e., 2 or fewer standard drinks, or (c) other. Mixed-effects models nested daily drinking goals within individuals to consider both individual and daily patterns in daily goal setting.

Results: Complete abstinence was the most common daily drinking goal and showed greater day-to-day stability than setting a moderation goal. Setting an abstinence goal in the morning was also most successful in limiting alcohol consumption for the remainder of that day, relative to other goals. Those individuals who set abstinence goals more often, however, were also those who drank more per drinking occasion.

Conclusions: Findings support the clinical benefit of mapping daily goal setting and strategizing for specific circumstances. Future research may track the relation of abstinence and moderation drinking goals to successful goal achievement during treatment and compare to overall treatment goals.

1. Introduction

Research on treatment outcomes for individuals with alcohol use disorder (AUD) demonstrates high success rates across both moderation- and abstinence-based reduction goals with higher goal achievement among both those who are able to participate in their goal setting and/or specifically set abstinence as a goal (Adamson et al., 2010b; Berger et al., 2016; Berglund et al., 2019; Dunn and Strain, 2013; Enggasser et al., 2015; van Amsterdam and van den Brink, 2013). While abstinence is still considered the safest treatment goal, moderation is increasingly recognized as a viable pathway to reduce alcohol use and its related negative health and social consequences among individuals with AUD (Rosenberg and Melville, 2005; van Amsterdam and van den Brink, 2013). Treatment programs and other settings that offer brief interventions for AUD (e.g., brief advice in primary care) are increasingly providing individuals the opportunity to choose their drinking reduction

goals as a way to increase engagement and reduce harm (Rosenberg and Melville, 2005). Further, reductions in drinking risk levels are important outcomes for alcohol pharmacotherapy trials and may be more consistent with patient goals (Falk et al., 2019). As a result, there is a strong need to understand and develop goal setting guidelines for drink reduction.

1.1. Goal setting for alcohol reduction

The importance of evaluating goal setting for drinking is bolstered by studies supporting associations of goal setting and drinking in the context of pharmacological and psychosocial treatments for at-risk drinking and AUD (DeMartini et al., 2018; Levak et al., 2020; Meyer et al., 2014). While goal choice at treatment initiation is the subject of several studies (e.g., Adamson et al., 2010a; Adamson and Sellman, 2001), some studies have investigated changes in goal setting for alcohol reduction over time. By assessing goals set at baseline, mid-treatment, and then end

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of treatment, these studies demonstrate that shifts in the characteristics of goal setting over time played a key role in predicting outcomes. For example, increasing level of ambition of a goal or goal difficulty is associated with some positive drinking outcomes (DeMartini et al., 2018; Levak et al., 2020). Other studies demonstrate that setting a goal of abstinence at end of treatment, even when the goal at the beginning of treatment is moderated use, predicts optimal post-treatment outcomes (e.g., Haug et al., 2018; Meyer et al., 2014).

Interestingly, extant studies generally demonstrate that most participants have relatively stable goals from admission to end of treatment and beyond. For example, Enggasser et al. (2015) found high stability in goal preference among 305 veterans participating in an eight-week randomized controlled trial of a web-based intervention for hazardous drinking. Participants completed online modules weekly. In the third week, they chose an initial abstinence or moderation goal for the upcoming week, and this goal was updated weekly thereafter. Results showed that the greatest shifts in goals occurred towards a preference for abstinence by the end of the eight weeks of treatment (from 13% at week three to 31% at week eight) across condition assignment. Thus, only about a fifth of participants shifted their goals over time. In addition, a naturalistic, longitudinal panel study (Haug et al., 2018) followed 543 participants in outpatient alcohol use treatment at four timepoints: admission, discharge (average of 7.5 months), 6-month follow-up, and 12-month follow-up. Goals set at admission (i.e., abstinence, controlled drinking, unrestricted, or undecided) were relatively stable over time (just under 70% did not alter their goal) with shifts between abstinence and controlled drinking or the reverse occurring at about the same rate. In sum, trajectories of goal setting among individuals with AUD are relatively stable, though they do vary for a minority, across time and individual, and this variability is predictive of treatment success. Across studies, a goal of abstinence emerges as the strongest predictor of positive outcomes.

1.2. Daily goal setting

Although prior studies provide important information about goal setting dynamics intermittently over the course of weeks or months, little is known about daily goal fluctuation and its effects on drinking outcomes. For a person with an overall goal of abstinence, the daily goal (specifically, the amount one plans to drink) should always be the same. For a moderation goal, however, the daily goal may change, depending on the patterns of drinking one starts with and what one aims to achieve. For example, one study demonstrated that, among individuals with AUD who were attempting to moderate their drinking, those who committed to at least one or more days of abstinence during the week were more likely to achieve their goal of moderation by the end of eight weeks compared to those who did not (Kuerbis et al., 2014). In the context of moderation, decisions about drinking are made at least every day, and the nature and impact of these goals remains wholly unexplored.

1.3. This study

There are no studies known to these authors that examine daily goal setting, either in the context of attempting to moderate drinking or outside formal treatment. Much remains unknown about the fluctuation of daily goal setting and its impact on drinking outcomes. Given these gaps in the literature, we set out to explore daily goal setting among individuals with AUD who received brief advice and were assessed for three weeks using ecological momentary assessment (EMA). Specifically, we explored the questions: (1) What were the patterns of daily goal setting? (2) Were drinking goals dynamic or static, i.e., did they show day-to-day variability? And (3) did setting daily goals for abstinence or low-risk drinking (i.e., 2 or fewer standard drinks) relate to goal achievement and/or actual drinking behavior?

2. Method

Secondary data analysis was implemented to answer these research questions. Data used were from a sequential multiple assignment randomized trial (SMART) (Registration no.: NCT02511808) that tested stepped care brief interventions for AUD (Morgenstern et al., 2021). During the trial, 153 participants contributed EMA data. To capture goal setting dynamics prior to formal intervention, this analysis only considered EMA data from the first 21 days of the study (i.e., after participants received brief advice but prior to specialized treatment).

2.1. Participants

2.1.1. Recruitment
Advertising, both online and in local media, was used to recruit participants nationally who sought to reduce their drinking.

2.1.2. Study eligibility
Eligible participants: (1) were between ages 18 and 75 and (2) for those assigned female at birth: reported an estimated average weekly consumption of $\geq$ 15 standard drinks per week or 12–15 standard drinks per week with more than two heavy drinking days (four or more standard drinks per sitting); for those assigned male at birth: reported an estimated average weekly consumption of $\geq$ 24 standard drinks per week, or 14–25 drinks per week with more than two heavy drinking days (five or more standard drinks per sitting). Ineligible participants: (1) had a substance use disorder (for any substance other than alcohol, marijuana, or nicotine) or used mood altering substances more than once weekly; (2) had a serious psychiatric disorder; (3) demonstrated clinically severe physiological dependence on alcohol, as evidenced by physical withdrawal symptoms or a history of serious withdrawal symptoms; (4) ever received inpatient treatment for alcohol use (e.g., detoxification) or (5) were actively involved in another treatment for alcohol use (i.e., self-help groups, outpatient therapy) in the past 90 days.

2.2. Procedures

Initial eligibility criteria were assessed briefly via phone screening. All following assessments were conducted via telehealth (remotely online) or in-person, depending on preference and availability. To verify eligibility, participants completed a screening interview. One week after screening, all eligible participants: (1) completed their baseline assessment, (2) were trained on the EMA protocol (described below), and (3) received initial brief advice (BA). BA involved providing brief feedback about risk for AUD, determining motivation to reduce drinking, setting drinking goals, and discussing strategies and potential challenges for reducing drinking. Twenty-one days later, participants were reassessed before proceeding to the SMART trial.

2.2.1. EMA
EMA was implemented via online surveys through Research Electronic Data Capture (Harris et al., 2009). Text messages prompted participants to complete surveys three times per day, with prompts randomly delivered within three windows of time: morning (between 6 am and 12 pm), afternoon (between noon and 6 pm), and evening (between 5 pm and 11 pm). Only the morning survey was used for this analysis. The morning survey had 18–25 items, depending on skip patterns, and took 5–7 min to complete. Items utilized for this analysis asked about alcohol consumption in the last 24 h and one's goal for drinking in the next 24 h.

2.2.2. Compensation
Participants received escalating compensation for longitudinal assessments, starting at $20 for the screening to $75 for follow-up assessments. Participants also received $1–4 for each EMA survey (plus bonuses for weeks with complete data).

Table 1
Descriptive information for morning reports of drinking plans.

Response set to "Do you have a plan with regard to your drinking over the next 24 h?"	n	%
I have a plan to not drink	858	30.72
I have no plan but I do NOT want to drink	256	9.17
I have no plan and may or may not drink depending on many factors	407	14.57
I have a plan to drink but limit my drinking to 2 or fewer drinks	604	21.63
I have a plan to drink but limit my drinking to 5 or fewer drinks	618	22.13
I have a plan to get drunk but try and limit the consequences (e.g., hangover) the next day	43	1.54
I have a plan to get drunk	7	0.25

2.3. Measures

2.3.1. Daily goal for drinking

One item asked "Do you have a plan with regard to your drinking over the next 24 h? (Plan here refers to having a specific strategy or number of drinks predetermined in your mind prior to starting drinking)." Descriptors of the response set are listed in Table 1. To create clinically meaningful comparison categories, responses were dummy coded to indicate a moderation drinking goal, abstinence drinking goal, or all other goals.

2.3.2. Drinking outcomes

Drinking was assessed via three EMA questions that asked participants to report the number of standard drinks of wine, beer, and liquor, respectively, they consumed in the last 24 h. Three variables indicating three distinct aspects of drinking were utilized in this analysis to better understand how goals impact daily drinking patterns. First, to align the measure with reduction goals, an outcome variable was recategorized into a dichotomous variable (1=Abstained or drank 2 or fewer standard drinks, 0=Drank 3 or more standard drinks). Second, a dichotomous variable indicating any drinking was created (1=Any drinking, 0=abstained). Third, daily number of standard drinks was calculated by summing standard drinks across the three alcohol types for each day. As an outcome, this variable was calculated for drinking days only (i.e., drinks per drinking day). As a covariate, this variable was calculated for all days.

2.3.3. Weekend

A variable for weekend was created: Sunday through Thursday were coded as weekday, and Friday and Saturday were coded as weekend.

2.3.4. Additional covariates

Additional demographic covariates were age and gender. To account for drinking and problem severity, (average) drinking over the 21 days and the sum score from the baseline Alcohol Dependence Scale (ADS, Skinner and Allen, 1982) were employed as covariates. The ADS included 25 items assessing alcohol withdrawal symptoms, tolerance to alcohol's effects, impaired control over drinking, awareness of a compulsion or want to drink, and alcohol-seeking behavior. Scores above 9 are indicative of alcohol-related problems, and scores above 13 are indicative of meeting criteria for AUD (Doyle and Donovan, 2009; Ross et al., 1990).

2.4. Analytic plan

All analyses were conducted with SAS 9.4 (SAS Institute Inc, 2002). Research questions were addressed through a combination of descriptive information and formal statistical tests. First, overall patterns of daily goal setting were illustrated through calculating person-level frequencies of each goal type, averaged across the entire monitoring period. Next, patterns of daily goal setting across time were explored graphically via percentage of participants reporting each goal type for each of the 21 days in the monitoring period. Within-person variability in daily drinking goal setting was also visually inspected through individual plots of goal choices over time for each participant.

Mixed-effects models with days (level 1) nested within persons (level 2) formally evaluated the ratio of between-person variability in daily goal setting to within-person variability. Herein, "between-person" refers to level-2 effects (i.e., person-level individual differences), and "within-person" refers to level-1 effects (day-to-day differences for the same person). Mixed-effects models account for the non-independence of observations and are generally robust to missing data (Gibbons et al., 2010; Raudenbush and Bryk, 2002; Singer and Willett, 2003). All mixed-effects models listed herein utilized the GLIMMIX procedure with maximum likelihood estimation, Laplace approximation, and the between-within method of calculating degrees of freedom. Two initial binary, logistic mixed-effects models modeled the probability of setting an abstinence goal versus all other goals, as well as the probability of setting a moderation drinking goal versus all other goals. Models included only random intercepts and excluded any fixed-effect predictors in order to calculate intraclass correlation coefficients (ICC), which reflect the ratio of between-person variance to total variance. For binary, logistic models, the total variance is calculated as the between-person estimate + $\pi^2/3$. ICCs estimated the relative degree to which daily goal setting was influenced by within-person and between-person factors.

Next, a series of models related daily drinking goals to three distinct daily drinking outcomes: (Model 1) any alcohol consumption, (Model 2) exceeding 3 drinks, and (Model 3) number of drinks on drinking days. Models 1 and 2 had a binary response distribution and logit link function. Model 3 had a negative binomial (count) distribution and log link function. Intercepts were modeled as random effects, and focal variables and covariates were modeled as fixed effects.

3. Results

3.1. Sample description

A description of all participants enrolled in the study is published elsewhere (Morgenstern et al., 2021). Participants ($n = 153$) contributing EMA data during the 21-day period and included in this analysis were 22 to 73 years old (M age = 50.90 years; SD = 11.94). The majority identified as White (90.9%), did not identify as Hispanic or Latinx (93.5%), and identified as female gender (68.0%). Most had a graduate degree or some graduate school (47.1%) or Bachelor's degree (26.8%), and the majority were employed full time (61.2%) and married (60.5%). The average ADS sum score was indicative of AUD, i.e., 13.1 (SD = 5.5). The majority of participants indicated moderation drinking goals at the initial, brief advice session ($n = 136$; 88.9%).

3.2. EMA compliance and drinking description

Most participants ($n = 150$; 98.0%) remained in the study through the full 21-day pre-treatment period. Three participants stopped completing EMA reports at day 3, 11, and 12, respectively. Of the resulting 3176 potential morning reports, only 383 were missing reports of daily goals, reflecting high EMA compliance (87.9%). The majority of days were drinking days (76.5%), and participants reported from 0.5 to 20.0 drinks on drinking days ($M = 4.78$; SD = 2.88). Drinking less than 3

drinks per drinking day was less common (20.5%) than drinking 3 or more drinks per drinking day (79.5%).

3.3. Daily goal setting

3.3.1. Between-person patterns and variability

Table 1 describes the frequencies of participants' responses for the daily drinking goal question. The most common goal was a plan for abstinence, accounting for 30.7% of morning reports. Goals to limit drinking to 2 or fewer or 5 or fewer were also common (21.6 and 22.1% of morning reports, respectively). Not having a drinking goal was less common, and having a plan to get drunk was very infrequent (see Table 1). Notably, there were only 3 participants (2.0%) whose daily goal never deviated from complete abstinence, and 40 participants (26.1%) who never set an abstinence goal.

Between-person average variability in daily drinking goal setting over the 21-day pre-treatment period is depicted graphically in Fig. 1. The percentage of participants reporting each goal type is reflected in a line graph (Panel A) and relative percentage of participants reporting each goal type is reflected in a stacked bar graph (Panel B). These patterns over time demonstrate the considerable day-to-day variability in goal setting for all goal types.

3.3.2. Within-person variability

Within-participant variability in daily drinking goal setting over the 21-day pre-treatment period is depicted graphically in Fig. 2 for a subset of nine participants. Plots for all participants are included in Supplemental Fig. 1. Some participants reported relative consistency in goal or at least stretches of goal consistency (e.g., Participant examples A, D, E, and I), where others are less consistent. Together, Figs. 1 and 2 demonstrate the importance of considering both between- and within-person patterns in daily goal setting. Where between-person patterns may suggest similar variability across goal types, within-person patterns may reveal stretches of consistency in goal setting that vary across person and goal type.

The ICC for a binary variable reflecting complete abstinence vs. all other goals is 0.58. This indicates that the majority 58% of the variability in abstinence goal setting is due to between-person individual differences, where the remaining 42% is due to within-person day-to-day fluctuations in goal setting. The ICC for a binary variable reflecting a moderation drinking goal vs. all other goals is 0.46. This indicates that 46% of the variability in moderation drinking goal setting is due to between-person individual differences, where the majority 54% is due to within-person day-to-day fluctuations in goal setting.

3.4. Relation of daily goal setting to drinking behavior

Table 2 provides fixed effect estimates from mixed-effect models relating daily drinking goals to daily drinking outcomes, accounting for covariates. Of covariates tested, age, female gender, average number of drinks, and weekends were associated with greater likelihood of any alcohol consumption and greater likelihood of exceeding a specific moderation goal (see Table 2). Average number of drinks and weekend were also associated with the number of drinks consumed on drinking days (see Table 2). Model 1 demonstrates the effect of setting a goal of abstinence in the morning on the odds of any alcohol consumption in the next 24 h. The odds ratio (OR) of 0.11 indicates that the odds of drinking are reduced by 89% when an abstinence goal is set relative to when any other goal is set, $p < 001$. When considering least squares means on the probability scale, the probability of any alcohol consumption in the next 24 h was 0.63 when an abstinence goal was set and 0.94 when any other goal was set.

Model 2 demonstrates the effects of both abstinence goals and the effect of setting a goal of moderation (i.e., limiting drinking to 2 or fewer drinks) in the morning on the odds of exceeding that goal (i.e., drinking 3 or more drinks) in the next 24 h. For those setting abstinence goals, the

OR of 0.14 indicates that the odds of consuming 3+ drinks are reduced by 86% when an abstinence goal was set relative to when any other goal was set, $p < 001$. In contrast, when a moderation goal was set, the odds of drinking 3 or more drinks were 3.28 times the odds when any other goal was set, accounting for abstinence goal effects, OR = 3.28, $p < 001$. This model was explored further through removing days where abstinence goals were set. The resulting effect of setting a moderation goal was not significantly related to the odds of exceeding that goal, OR = 0.92, $p = .63$.

Model 3 demonstrates the effects of abstinence and moderation goals on the total number (i.e., count) of standard drinks consumed on drinking days. The rate ratio suggests that, for those setting abstinence goals, the expected count of drinks is 0.43 times the expected count when any other goal is set, $p < 001$. Likewise, for those setting moderation goals, the expected count of drinks is 0.90 times the expected count when any other goal is set, $p = .017$. Alternatively, the predicted count of drinks consumed on a drinking day was 1.68 when an abstinence goal was set in the morning and 3.92 when any other goal was set in the morning. Likewise, the predicted count of drinks consumed on a drinking day was 2.44 when a moderation goal was set in the morning and 2.70 when any other goal was set in the morning.

Person-level aggregates of abstinence and moderation goals were calculated as the average across the entire monitoring period, which results in a proportion of days where abstinence or moderation goals are set. For example, the average of 0's (no, abstinence goal) and 1's (yes, abstinence goal) across the entire monitoring period for some participant may be 0.33, suggesting that this participant set abstinence goals on about 1/3 of study days. Although the person-level aggregates are primarily included to disaggregate daily goal setting from typical goal setting over the entire period, we might also consider the interpretation of these effects. For Model 1, participants with a greater proportion of days where abstinence goals were set were less likely to drink, on average, across the 21 study days, OR = 0.33, $p = .017$. For Model 2, participants with a greater proportion of days where moderation goals were set were more likely to drink 3+ drinks per drinking day, on average, across the 21 study days, OR = 6.55, $p = .007$. Finally, for Model 3, participants with either a greater proportion of days where abstinent goals were set tended to drink more on drinking days, RR = 1.73, $p < 001$, and participants with a greater proportion of days where moderation goals were set also tended to drink more on drinking days, RR = 1.32, $p = .011$.

4. Discussion

Reducing harm from at-risk drinking involves setting and achieving goals for reduced alcohol consumption. The present study aimed to fill a clinically meaningful gap in understanding the day-to-day connection of setting goals for abstinence or moderation and successful achievement of these drinking goals and rates of alcohol consumption.

4.1. Frequency of distinct daily goals

Consistent with other studies that explored more general goal setting over time (e.g., Haug et al., 2018), our findings demonstrated that when setting daily goals for alcohol consumption, specific abstinence- or moderation-based drinking goals were the most common category types, making up over two thirds of the daily goals set across the 21 days. Interestingly, our findings also demonstrated ambivalence in goal setting about a quarter of the time, with participants reporting a desire to avoid drinking or uncertainty about drinking plans but no specific goal for limiting their drinking. This aspect of goal setting is not previously reported in other studies. Patterns of daily goal setting illustrate that for majority of pre-treatment days, individuals attempting to reduce their drinking set a specific intention to do so on a daily basis.
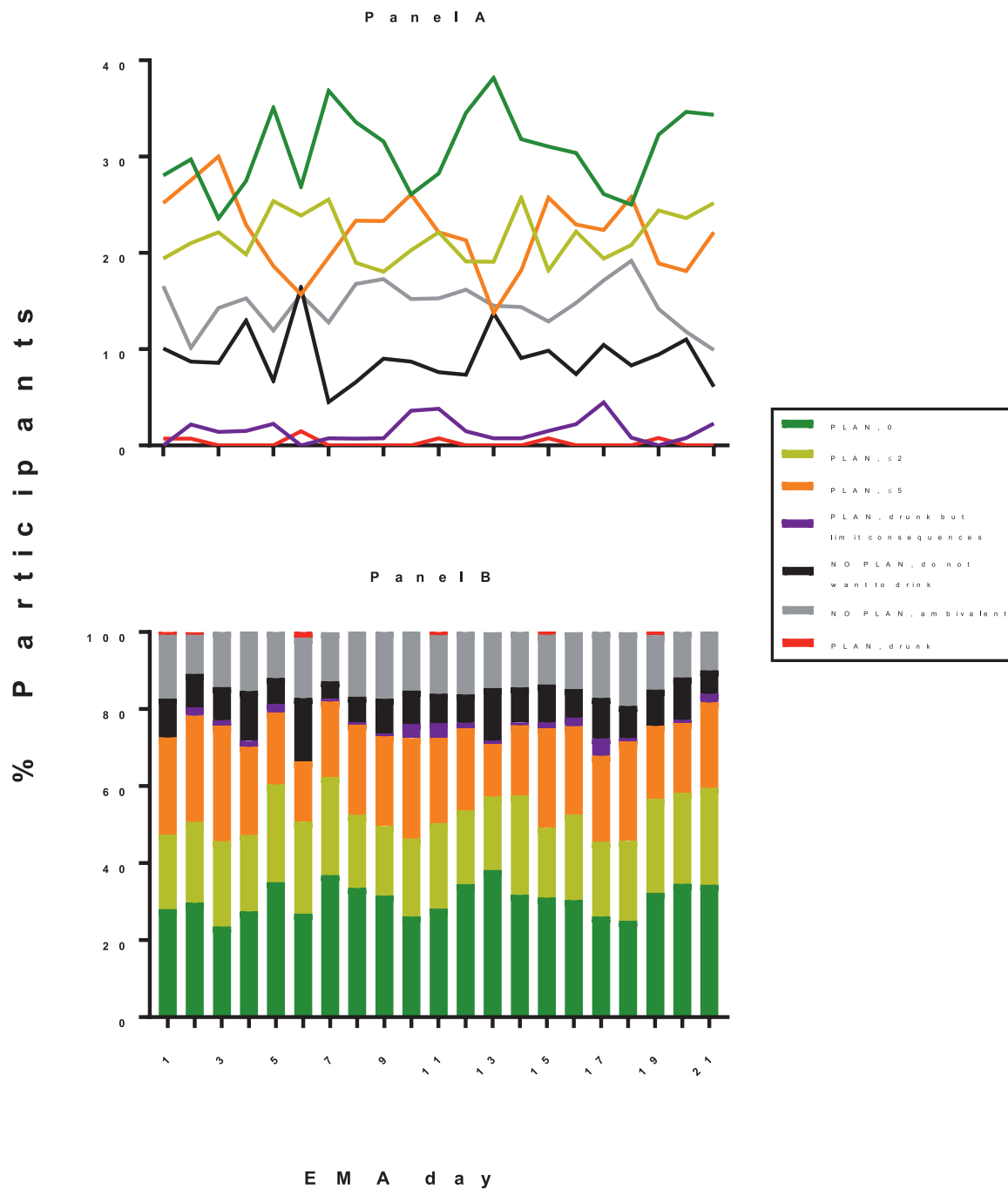
Fig. 1. Percentage of participant-reported drinking goals across the 21-day pre-treatment period.

4.2. Patterns of goal setting

Regarding day-to-day fluctuations in abstinence- versus moderation-based drinking goals, thought-provoking differences emerged. In this study, abstinence goals may be characterized as more attributable to person-level, individual differences—a person willing to set daily abstinence goals may use this as a primary strategy. Understandably, moderation goals were more likely to be influenced by day-to-day situational factors. This may be due to differing strategies to reducing harm (i.e., individuals who incorporate abstinent goal days periodically versus those who intend to drink every day and thus have different moderation goals by day). In the few studies that have looked at goal setting over time

(e.g., weekly in Enggasser et al., 2015), there is some evidence to suggest that proportion of people who choose abstinence increases over time, perhaps due to positive rewards gained by experimenting with abstinence or due to continued struggles with negative consequences of not setting a goal of abstinence. Abstinence inherently is a goal to not drink despite circumstances. As such, our findings reveal that once abstinence is chosen as a daily goal, there is less variability within-person or the goal becomes more consistent. Alternatively, individuals who generally chose moderation-based goals fluctuated daily, perhaps being more influenced by external factors of the day. Clinically, this supports a need for detailed mapping of daily goals for moderation, as well as strategizing for specific days and circumstances. Abstinence goals may require
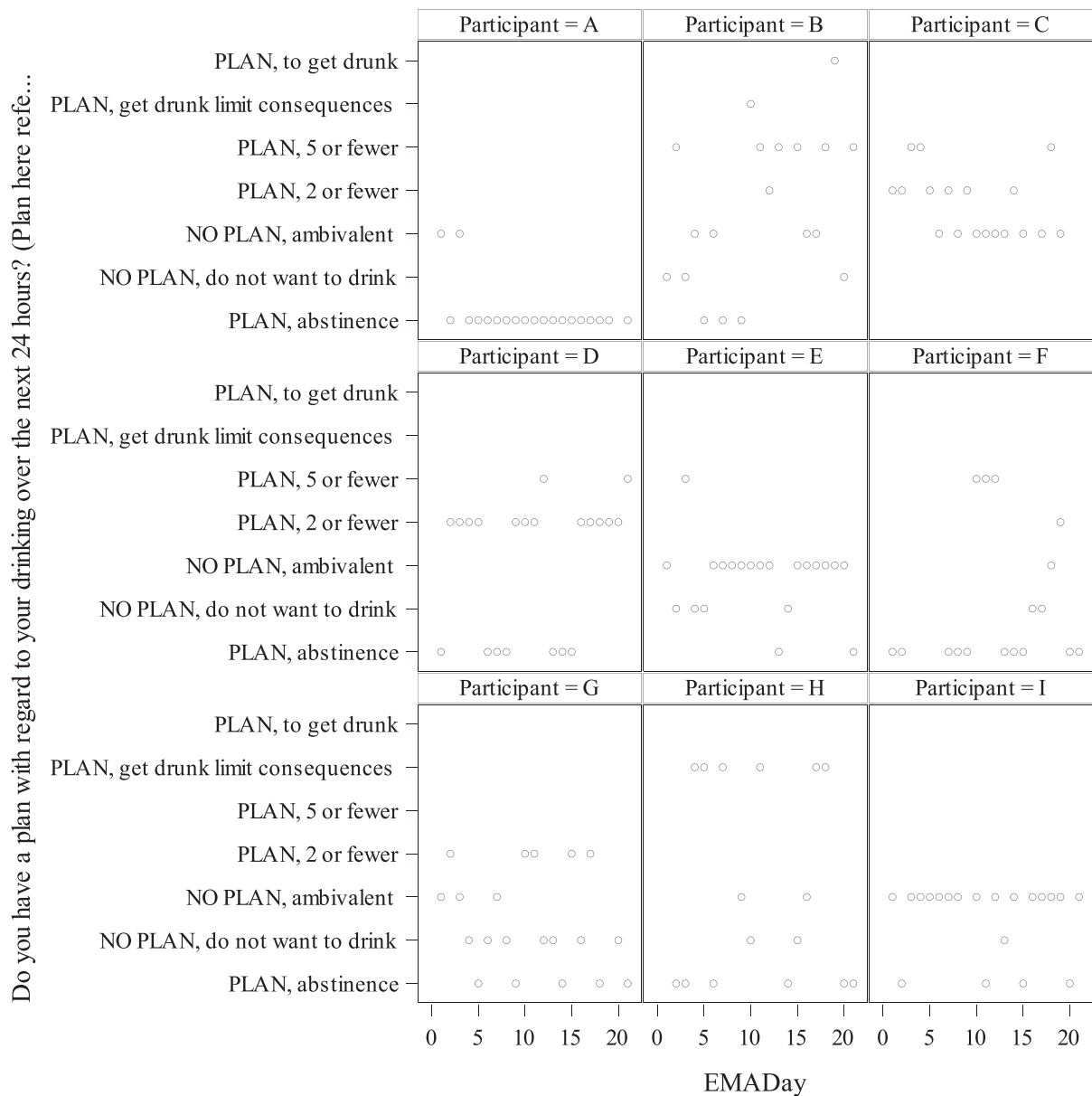
Fig. 2. Within-participant daily goal setting patterns.

less of this kind of work within treatment, as they appear to build momentum over time.

4.3. Daily goal setting's impact on drinking

Setting specific goals, whether a daily abstinence goal or low-risk moderation goal, led to fewer drinks overall compared to the other goal categories. Consistent with the current literature (Adamson, Heather, et al., 2010; Bujarski et al., 2013), participants who set a goal for abstinence had better abstinence outcomes (i.e., greater likelihood of achieving goals and/or more days of not drinking) than those who aimed for moderation. Furthermore, the significant influence of abstinence goals overshadowed the effect of moderation goals. Importantly, with abstinence-goal days removed, setting a moderation goal was not related to successful achievement of that goal.

While not a primary focus of our analyses, important findings regarding between-person differences related to daily goal setting emerged. When the proportion of abstinence days overall increased, then drinking was reduced overall. When the proportion of moderation days overall was dominant, then the drinking increased overall (when abstinence goal days were included). This is understandable, as individuals who have a daily moderation goal are inherently exposed to alcohol cues and alcohol itself that may enhance the likelihood of any drinking or the intensity of drinking on any given day (Naqvi and Morgenstern, 2015). Despite these rather clear cut and intuitive findings, results from these analyses also indicated that among those who set a larger proportion of abstinent days were more likely to drink more *on the days they drank*, suggesting a potential floodgates effect—once they had any alcohol, they were likely to drink more heavily. Those who set predominantly moderation goals on average did not demonstrate the same intensity of drinking on the days they drank. Thus, there may be a therapeutic trade-off between daily abstinence and moderation goals.

4.4. Clinical implications

Overall, prior to treatment, abstinence-based daily goals appear to lead to the greatest reduction in at-risk drinking and quantity of alcohol consumption overall. It is common for individuals to struggle with ab-

Table 2
Fixed Effects (and 95% Confidence Intervals) from mixed-effects models relating daily drinking goals to daily drinking outcomes.

Fixed Effects	Model 1 Any Alcohol Consumption OR	(95% CI)		Model 2 Exceeds Specific Moderation Goal (3 or more drinks) OR	(95% CI)		Model 3 Number of Drinks on Drinking Days RR	(95% CI)	
Intercept	4.86***	(3.23,	7.32)	4.40***	(2.91,	6.66)	3.55***	(3.29,	3.83)
Covariates									
Age	1.04***	(1.02,	1.06)	1.03**	(1.01,	1.05)	1.00	(1.00,	1.00)
Alcohol Dependence Score	0.96	(0.92,	1.00)	0.97	(0.93,	1.01)	1.00	(0.99,	1.01)
Female *(Male, ref.)*	4.69***	(2.88,	7.63)	3.49***	(2.20,	5.54)	1.07	(0.99,	1.16)
Average Number of Drinks	1.81***	(1.58,	2.08)	1.87***	(1.64,	2.13)	1.30***	(1.27,	1.32)
Number of Drinks Yesterday	0.97	(0.93,	1.01)	0.97	(0.93,	1.01)	1.00	(0.99,	1.01)
Study Day	1.00	(0.98,	1.02)	1.00	(0.98,	1.02)	1.00	(0.99,	1.00)
Weekend *(Weekday, ref.)*	2.36***	(1.71,	3.26)	2.36***	(1.71,	3.26)	1.27***	(1.19,	1.34)
Goals *(All Other Goals, ref.)*									
Abstinence Goal Today	0.11***	(0.08,	0.15)	0.14***	(0.10,	0.19)	0.43***	(0.39,	0.47)
Average Abstinence Goals	0.33*	(0.14,	0.82)	0.72	(0.28,	1.83)	1.73***	(1.46,	2.05)
Moderation Goal Today				3.28***	(1.72,	6.25)	0.90*	(0.83,	0.98)
Average Moderation Goals				6.55**	(1.68,	25.57)	1.32*	(1.07,	1.63)

Note. OR = odds ratio; CI = confidence interval; *b* = unstandardized fixed effect estimate.

* $p < 05$.

** $p < 01$.

*** $p < 001$.

stinence as a long-term choice, especially for those who are in the mild to moderate range of AUD (i.e., experiencing fewer consequences from use) and/or only beginning treatment (Rosenberg and Melville, 2005; van Amsterdam and van den Brink, 2013). Therefore, it may be important for providers to deliver more pointed interventions around moderating use across different daily situations and, perhaps, emphasizing and advising the patient on the challenges of daily, moderation-based goals. While abstinence may be a more guaranteed trajectory to reduce drinking overall, individuals who incorporate abstinence days into their moderation repertoire will also need to be more prepared for days they do drink in order to not exceed safety guidelines. Still, professionals advising a patient in primary care or in a more specific alcohol-use treatment setting, may suggest incorporating at least some abstinent days to yield the greatest likelihood of reducing one's quantity of drinking both overall and on any given day.

4.5. Strengths and limitations

4.5.1. Sample diversity

The present work must be interpreted considering its strengths and limitations. Our sample demonstrate limited diversity with regard to gender, ethnicity, and education. With our participants being mostly female, middle-aged (i.e., between 40 and 60 years old on average), White, educated, and employed, there are important limits to generalizability of our findings to the general population of those with AUD. Similarly, our sample largely consisted of individuals with severe AUD (i.e., 7.5% had mild AUD, 21% moderate, and 71.2% severe). As such, our findings demonstrating abstinence as a favorable daily goal may be most relevant to individuals who drink at higher levels or experience more negative consequences for use. In a sample with less severe AUD, moderation-based daily goals may have demonstrated greater success in goal achievement and/or general drinking reduction.

4.5.2. Measurement

Our study's findings were also limited by the measures for goal setting. The measure used to capture goal setting was not optimally specific; response categories were not continuous, such that moderation goals consisted of a range of drinking behavior rather than a specific number of drinks. We made the *a priori* decision to use the EMA morning report response option of, "I have a plan to drink but limit my drinking to 2 or fewer drinks," as indicative of a moderation drinking goal. To align with this specific goal, one of our outcomes was set as exceeding the planned limit (i.e., consuming 3+ drinks). It is imperative to

note, however, that the risks associated with different drinking levels and patterns depend on the health and functioning of the individual, and other clinically relevant outcomes may have also been considered. For example, the likelihood of heavy drinking is a common outcome in treatment research with varied definitions (e.g., 4+, 5+, 6+ drinks). In our analysis, drinking level was evaluated on a continuum as the number of standard drinks per drinking day to avoid selecting among these cutoffs. While the response options for drinking goals in our EMA battery captured low-risk and no-risk drinking goals, a more sensitive approach may be to allow participants to specifically choose the number of drinks they plan to consume that day. Thus, our EMA measure limited our ability to capture success of specific moderation-based goals. In addition, the wording of some items may have pointed to different constructs. That is, some response choices asked about goals whereas others asked about plan and/or consequences. Plan may point to strategy surrounding a goal rather than the goal itself. Similarly, goals for reducing consequences of heavy drinking may differ from goals for quantity of drinking.

4.5.3. Pre-treatment versus in-treatment goals

This study focused on daily goals prior to treatment initiation among treatment seekers. Change and effects of such goals are important markers to how people change on their own and/or what may be useful to focus on when entering treatment. However, they do not capture what occurs with goals and drinking reducing during treatment, which is often the focus of other goal setting studies. Comparing pre-treatment and in-treatment goals may provide valuable information overall to the process of change, which was not captured in this study.

4.5.4. Daily goal setting versus overall treatment goals

Our findings did not compare overall treatment goals to daily goals. Overall treatment goals are commonly measured in studies and used to guide success. Daily goals capture changes in behavior and track success over time. However, we could not glean from these findings how these goal types relate and how they may guide success and/or treatment. In addition, it would allow us to better compare to other goal setting studies and draw overall conclusions.

4.6. Future directions

Our findings have important implications for future research. First, the dynamic nature of drinking goals in predicting successful achievement of those goals should be further assessed. While clinicians and

researchers may readily recognize that drinking goals change over time and with intervention, goals are still most frequently assessed as static traits. Our data suggest that daily variability in drinking goals may be an important clinical predictor in future treatment models. Future research should utilize goal setting measures that allow for better goal specificity of moderation-based goals (i.e., a continuous capture of drinking) and separately capture different moderation constructs (i.e., reduction in drinking quantity versus negative consequences from heavy drinking). Lastly, to better guide the utility of goals for successful reduction in drinking, further research should be done comparing pre-treatment to in-treatment goals, as well as daily goals to overall goals for treatment. Such investigation would assist in establishing better treatment guidelines planning, skill building, and motivation.

5. Conclusion

Daily goal setting is an important aspect of alcohol reduction. Individuals tend to set daily goals as they pursue change in alcohol use. Abstinence- and moderation-based goals are commonly pursued, but daily abstinence-based goals prior to treatment appear to yield greater likelihood of reduced drinking. Notably, abstinence- and moderation-based goals may require unique coping skills and support in treatment to yield successful outcomes. Future research should investigate the effect of daily goal setting during treatment and compare to overall treatment goals.

Contributors

HTP, SL and AK researched literature and conceived the present analysis. HTP implemented the data analysis. NV provided graphing expertise and consulted on analysis. JM was the principal investigator of the parent study thus involved in protocol development, gaining ethical approval, patient recruitment and data collection. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

Role of funding source

Declaration of Competing Interest

There are no conflicts of interest to report.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.dadr.2022.100036.

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