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“FINDING THE POSITIVE” IN RECOVERY: PSYCHOMETRIC PROPERTIES OF A MEASURE OF HUMAN FLOURISHING IN AN ALCOHOL USE DISORDER RECOVERY SAMPLE

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ABSTRACT

The fields of alcohol use disorder (AUD) recovery and positive psychology have both rapidly grown in recent years, are paralleled in their philosophy and goals, but have scarcely overlapped. An important first step to applying positive psychology to addiction treatment and recovery is quantifying the extent that treatment-as-usual encourages human flourishing (i.e., holistic well-being and adequate functioning). The PERMA Profiler is a measure based on the PERMA model of flourishing, captured across five positive psychology domains (i.e., **P**ositive Emotions, **E**ngagement, **R**elationships, **M**eaning, and **A**ccomplishments), and has been validated in a wide variety of samples. The psychometric properties of the PERMA Profiler among a sample of individuals in AUD recovery are unknown, and thus the present study sought to address this gap. This online, two wave panel survey study administered the PERMA Profiler and related recovery- and positive psychology-oriented measures to a sample of *n*=250 people in AUD recovery. We examined reliability (internal and test-retest) and validity (construct and criterion), as well as a reflexive thematic analysis (RTA) of open-ended qualitative

questions (e.g., “what else has helped you experience positive emotions, specifically during alcohol recovery?”). Results showed evidence for reliability, but only partial support for validity, of the PERMA Profiler. While we expected to replicate the five-factor PERMA structure, the five-factor model did not show adequate fit with our data, and an alternative single-factor structure showed worse fit. Criterion (i.e., convergent and predictive) validity of PERMA scales with hypothesized related measures was mostly moderate-to-strong. Qualitative themes (e.g., “mutual help,” “helping others,” “mindfulness”) that were identified from the RTA perhaps aid in explaining the lack of accuracy of the PERMA Profiler, and also suggest ways that the measure could be adapted to validly capture flourishing for those in AUD recovery. Given the unexpected quantitative findings, possible future research directions are discussed, as well as recoommendations for adapting the PERMA Profiler for those in AUD recovery.

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Introduction

Background

The recovery movement surrounding alcohol use disorder (AUD) is a grassroots effort with two major objectives: (1) to increase access to care for those with AUD, and (2) to improve quality of life (QoL) for those recovering from AUD (White, 2000). In recent years, a paradigm shift has occurred: many addiction researchers agree that policies and treatments based on a disease model of addiction could be significantly improved by incorporating the lived experiences of persons with addiction and their communities, thus considering the *entire individual*, not simply the disease (White & Evans, 2013). Paralleled in philosophy to the recovery movement is the field of positive psychology, which can be broadly defined as the study of the strengths that allow individuals and communities to flourish (Csikszentmihalyi & Larson, 2014). Positive psychology interventions (PPIs) are treatments that target constructs central to human flourishing (e.g., positive affect, optimism, meaning). PPIs have been applied to a variety of behaviors and problems, including smoking cessation (Hoeppner, Hoeppner, et al., 2019; Kahler et al., 2014), chronic pain management (Hausmann et al., 2014), and improving health behaviors in cardiac patients (Huffman et al., 2011). The recovery movement and the field of positive psychology have grown exponentially in recent years, yet they remain relatively siloed, despite aligning ideologically (Krentzman, 2013). Some have even argued that at-risk individuals, such as those suffering from AUD, perhaps have more to gain from PPIs than the general population, both due to these ideological parallels and the deficits in positive psychology-related constructs (e.g., QoL) observed in addiction populations (Krentzman, 2013).

The Grassroots Addiction Recovery Movement

In the years following World War II, a shift occurred in how American researchers and practitioners conceptualized addiction, particularly AUD. As psychiatric care was perceived more favorably during the years following World War II, the 12-Step Model of Alcoholics Anonymous (AA; a mutual-help organization focused on healing those with alcohol-related problems) emerged, and researchers began intellectualizing AUD as a "disease" rather than a moral failing (e.g., Jellinek, 1960). This disease model conceptualizes addictions as brain diseases with discrete symptomology that cannot be regulated by the individual without treatment (Volkow et al., 2016). While this ideological transformation succeeded in mostly discouraging the idea that addictions are a moral failing, a consequence of the disease model adoption was a complete reliance on acute models of care, or treatments that target disease symptomology in the short-term with the ultimate goal of sustaining abstinence from alcohol (Kaskutas et al., 2014; Mann et al., 2017). This over-reliance on acute care models has carried over into the 21st century. In recent decades, researchers and practitioners have become skeptical of acute care models for several reasons. First, it has been found that many individuals in remission from AUD relapse back into problematic drinking, even after sustaining abstinence for several years (De Bruijn et al., 2005; Tuithof et al., 2014). Indeed, neurobiological evidence has characterized AUD as a *chronically relapsing* disorder that requires long-term maintenance (i.e., chronic care models), rather than a disease which requires acute episodes of care (Dennis & Scott, 2007). As such, the traditional disease model of AUD treatment, which typically comprises assessment, treatment, and discharge in a span of one to three months (often because Medicaid and Medicare only

fund 190 days of inpatient substance use rehabilitation for one's entire lifetime; McGinty, 2020), started to be regarded as nonsensical by researchers and practitioners. Second, the recent influx of evidence regarding harm reduction approaches demonstrates that many individuals are able to achieve QoL and well-being through low or moderate alcohol use rather than complete abstinence (Hasin et al., 2017; Witkiewitz & Tucker, 2020). Relatedly, recent work has found that most individuals who seek treatment are not interested in abstinence-related goals (DeMartini et al., 2014), and that many individuals with AUD specifically fail to seek treatment because they do not want to fully abstain from alcohol (Substance Abuse and Mental Health Services Administration, 2021). Still, the lens through which 21st century researchers and practitioners view AUD is mostly the disease model, and this model subscribes to an acute model of care, offering abstinence as the only endpoint in treatment. Therefore, it stands to reason that neglecting the *whole person* in addiction treatment, and simply targeting the "disease," might contribute to the relapse rates and disease burden so characteristic of addiction, and in particular, AUD (McKay & Hiller-Sturmhöfel, 2011).

As a result, the grassroots addiction recovery movement gained traction in recent decades. The recovery movement advocates that addiction treatment should (in addition to mitigating distress and impairment) also promote long-term recovery, build one's resilience, and leverage one's personal strengths, thereby taking into account the entire individual (White, 2000). One of the core ideals of this movement is that there are multiple paths to recovery and not solely abstinence (White, 2007). Often, the term "recovery" is incorrectly equated with abstinence from substance use, likely due to the popularization of abstinence-focused 12-step models in the United States (Laudet, 2008).

Many policy and funding organizations also follow this abstinence definition; the American Society of Addiction Medicine has defined the term "recovery" as "overcoming both physical and psychological dependence to a psychoactive drug while making a commitment to sobriety" (Mee-Lee, 1996). The addiction recovery movement asserts that it goes *beyond* abstinence to define recovery as improving functioning in many areas of life that may have been affected by problematic substance use (e.g., social relationships, well-being, positive emotions).

As previously referenced, another key feature of the addiction recovery movement is the recognition that AUD is a chronically relapsing disorder (Dennis & Scott, 2007), one that requires long-term, rather than acute, care. As a result, recent policy developments have promoted a more integrative approach to addiction care, one which combines mental health, addiction treatment, and primary care in an effort to encourage long-term recovery management (i.e., recovery-oriented appraoches to care; Davidson & White, 2007). Recovery-oriented approaches to care emphasize resilience, rather than vulnerability, thereby making use of the psychological, cultural, social, and material resources one already possesses (i.e., "recovery capital") to maximize autonomy and maintain recovery (Best & Laudet, 2010). In AUD treatment research, it is argued that using abstinence-based outcome variables alone (e.g., abstinence, no heavy drinking days) might neglect the full picture of treatment success, and that holistic measures such as QoL should be employed as well (Witkiewitz et al., 2018). Research has shown that QoL can predict sustained abstinence from substance use (Laudet et al., 2009), and yet QoL (and other holistic recovery indicators, such as well-being) are scarcely examined as outcome variables in addiction treatment research (Witkiewitz et al., 2018). Given that

current empirically supported treatments for AUD are largely restricted to a focus on changing drinking behavior and tend to last a relatively short amount of time, it is necessary for the field to focus on identifying factors, possibly non-treatment factors, that better capture recovery and help maintain treatment benefits long after completion.

Why Positive Psychology for AUD?

Positive psychology, rather than a grassroots movement, is a social science with theoretical frameworks, defined constructs, validated tools, positive interventions, and has rapidly gained momentum in recent years. While the field also encourages community- and institution-level change, positive psychology is closely focused on individual-level change through utilizing one's preexisting strengths to work toward human flourishing. Martin Seligman, a leader in positive psychology, refers to traditional psychological practices as psychology-as-usual: the work that has, historically, solely aimed at mitigating suffering and targeting pathology (Seligman & Pawelski, 2003). Importantly, and contrary to many criticisms (e.g., Lazarus, 2003), the positive psychology movement is not meant to replace psychology as usual, but rather to supplement it, sharing the goal of reducing human suffering. Positive psychology takes this goal one step further, however, and emphasizes working toward holistic well-being, or human flourishing, after mitigating pathology. Relatedly, positive psychology did not originate constructs such as positive emotion and well-being; rather, positive psychology attempts to gather these concepts that constitute human flourishing under a single umbrella and bring them to the main stage of scientific discovery with specific definitions, theoretical frameworks, and empirically supported interventions (Duckworth et al., 2005).

A positive psychology approach aimed at enhancing flourishing matches the goals of the addiction recovery movement (e.g., joy in life, personal growth, inner peace) (Kaskutas et al., 2014). In fact, those with substance use disorder (SUD) have expressed a preference toward focusing on healing and optimism about the future rather than solely on pathology elimination (White, 2000). Relatedly, meaning-centered approaches to addiction care, or approaches that emphasize finding meaning in life after experiencing hardship, have been proposed as alternatives to the more disease-based acute approaches described previously (Carreno & Pérez-Escobar, 2019). Positive psychology themes are already prevalent in recovery research, including but not limited to the importance of spirituality (Galanter & Kaskutas, 2008), altruism (Pagano et al., 2011), and QoL (Laudet et al., 2009). Additionally, the 12-Step Model of AA, though ironically at the quintessence of abstinence-based approaches, is rife with positive psychology themes, including spirituality and faith, gratitude, and the encouragement of prosocial behaviors. A systematic review that summarized the scant overlap between positive psychology and addiction posits that at-risk individuals, such as individuals with AUD, may have more to gain from applying positive psychology to addiction treatment and recovery (Krentzman, 2013). What is more, qualitative research among addiction counselors has found that counselors *already* tend to address positive themes in treatment and use variations of PPIs, though they still appreciate the utility and importance of targeting pathology and distress (Krentzman & Barker, 2016),

An approach to AUD care that seeks to facilitate human flourishing as a supplement to targeting pathology could aid in sustaining long-term recovery and protecting individuals against some of the pitfalls of a typical AUD recovery trajectory. It

is well-documented that flourishing is linked to a wide range of physical, occupational, and psychosocial benefits (e.g., Keyes, 2005). Research has demonstrated that flourishing has a protective nature against some of the mental health issues commonly comorbid with AUD, such as depression, anxiety, and suicidal ideation (Keyes & Simoes, 2012; Schotanus-Dijkstra et al., 2017). Additionally, those who are flourishing have exhibited a lower likelihood of engaging in alcohol and tobacco use, and a simultaneous higher likelihood of engaging in health-promoting behaviors like physical activity (Keyes & Simoes, 2012). Importantly, it is believed that flourishing can be achieved in both the presence and absence of mental illness-related pathology (Keyes, 2002), and therefore it stands to reason that all individuals in recovery, even those who are still experiencing symptoms of AUD, are able to flourish (McGaffin et al., 2015). It is expected, for these reasons, that positive psychology approaches to care would resonate well among individuals with AUD, particularly given the broader focus on promoting human flourishing. As such, a necessary first step to overlapping the fields is to quantify the extent that AUD "treatment as usual" already embodies positive psychological constructs, such as flourishing (Krentzman, 2013).

The PERMA Model and PERMA Profiler

The PERMA model is an existing theoretical framework derived from positive psychology that comprises the five hypothesized elements necessary to achieving human flourishing: Positive Emotions, Engagement, Relationships, Meaning, and Accomplishments (Seligman, 2018). "Positive Emotions" comprises feelings of optimism and positivity. "Engagement" can be equated with notions of mindfulness and remaining present in the moment; the concept of "flow" (i.e., the capacity to be fully involved in a

given activity) is subsumed by this category of PERMA (Nakamura & Csikszentmihalyi, 2014). “Relationships” are the social connections that are crucial to human flourishing, including social support. “Meaning” involves the ability of humans to find purpose in a chaotic and often meaningless world, perhaps through spirituality or religiosity, or through any activity that affords a sense of fulfillment (Carreno & Pérez-Escobar, 2019). “Accomplishments” means the achievement of realistic goals. Taken together, maximizing these five constructs is hypothesized to result in sustained human flourishing (Seligman, 2018).

The PERMA Profiler (Butler & Kern, 2016) is a validated, comprehensive measure of human flourishing rooted in the PERMA model. It has been compared cross-culturally (Khaw & Kern, 2014) and validated in diverse settings, such as workplaces (Watanabe et al., 2018), among student veterans (Umucu et al., 2020), and classical musicians (Ascenso et al., 2018), to name a few. Several studies have also demonstrated psychometric strength when translating the PERMA Profiler into languages other than English (Choi et al., 2019; de Carvalho et al., 2021; Giangrasso, 2021; Payoun et al., 2020; Pezirkianidis et al., 2021; Wammerl et al., 2019). More recently, the PERMA Profiler has been applied to measure well-being and flourishing during the COVID-19 pandemic among diverse samples, such as large, multi-nation online survey samples (Carreno et al., 2021), adults placed under enhanced community quarantine in the Philippines (Camitan IV & Bajin, 2021), graduate and medical students (Moog, 2021; Mustika et al., 2021), and individuals with disabilities and chronic conditions (Umucu & Lee, 2020). Only one known study has administered the PERMA Profiler to an alcohol recovery sample and found that participants in recovery scored significantly higher than a

sample of mental health service users, but significantly worse than healthy controls in the community who regularly exercised at a gym (Makin et al., 2022). However, this study did not report on psychometric properties of the PERMA Profiler among those in AUD recovery. Examining whether the PERMA Profiler exhibits psychometric strength among individuals in recovery is necessary for measuring flourishing in recovery as it exists currently.

Research to Date: Positive Psychology Interventions

Testing the psychometric validity and reliability of the PERMA Profiler will inform researchers whether this tool accurately and reliably captures human flourishing for individuals in AUD recovery. Through identifying a psychometrically sound measure of human flourishing, researchers can better identify treatment targets for applying PPIs in AUD populations. To date, only three known studies have applied a PPI to alcohol treatment samples (Akhtar & Boniwell, 2010; Cai et al., 2020 [however, this study is published in a Chinese journal, and therefore only the abstract is available in English]; Krentzman et al., 2015). One study has also applied PPIs to a self-identifying recovery sample (alcohol and other drugs; AOD) (Hoeppner, Schick, et al., 2019). Akhtar and Boniwell (2010) pilot-tested an eight-week positive psychology workshop with 10 alcohol-misusing adolescents in outpatient treatment and compared to a treatment-as-usual control (n = 10), finding significant increases in happiness, optimism, and positive emotions, as well as significant declines in alcohol dependence. Krentzman and colleagues (2015) pilot-tested a web-based gratitude exercise to 23 adults in AUD outpatient treatment and demonstrated decreased negative affect and implementation feasibility. Cai et al (2020) randomly assigned 60 alcohol treatment inpatients to receive

either treatment-as-usual, or treatment-as-usual plus a PPI, finding that those who received the PPI showed enhanced social support, reduced automatic thinking, reduced craving, and altered attention bias relative to the treatment-as-usual group. Hoeppner and colleagues (2019) randomly assigned five brief, self-administered web-based happiness exercises to 531 adults in recovery from AOD problems and yielded significantly increased momentary happiness among those who received the happiness exercises as compared to those who received a control exercise. While promising, these studies either tended to focus on a single facet of positive psychology ideology, like gratitude (Krentzman et al., 2015) or happiness (Hoeppner, Schick, et al., 2019), or the actual components of the PPI are not available in English (Cai et al., 2020). In the one study that included multiple positive psychology constructs in the intervention design, the intervention was eight weeks long and only tested among an adolescent sample, limiting generalizability (Akhtar & Boniwell, 2010). None of the aforementioned studies, to our knowledge, evaluated these facets in relation to human flourishing or recovery or used a theoretical framework such as PERMA.

The Present Study

Given the lack of research evaluating the psychometric strength of the PERMA Profiler among those in AUD recovery, the aims of this study were twofold: (1) evaluate the reliability and validity of the PERMA Profiler via a two-wave, online panel survey among a sample of individuals in recovery, and (2) identify themes related to flourishing *not* captured by the PERMA Profiler that individuals in recovery hold important through thematic analysis of open-ended, qualitative data.

Method

We administered the PERMA Profiler as part of a two-wave, online panel study with a battery of related measures, to individuals who self-identified as being in recovery from an AUD (n=250). Recruitment relied on flyers posted to relevant listservs and online platforms (i.e., recovery-focused Reddit forums, Moderation Management Facebook page and email listserv, SMART Recovery email listserv, and a listserv of nationwide recovery community centers). Interested individuals followed a scannable code or hyperlink provided on the flyer and were directed to an electronic consent form before proceeding to an eligibility screener. The eligibility screener determined eligibility based on the following criteria: (1) adults ages 18 and older, (2) fluent in English and comfortable completing surveys in English, and (3) identifying as being "in recovery from an alcohol problem." If participants were deemed eligible, they were emailed a link to a secure platform (i.e., REDCap; Harris et al., 2009) to complete the baseline survey (survey 1). The follow-up survey (survey 2) was automatically emailed to participants one week later. Participants were remunerated a $20 Amazon gift card for survey 1 and a $10 Amazon gift card for survey 2, as survey 1 contained additional demographic questions. Both surveys included three validity check items interspersed among survey measures (e.g., "Please select "most of the time" for this item"); survey responses that did not answer all three validity checks were not used in final analyses. Partway through data collection, additional validity checks were added into the eligibility screen due to a large proportion of scam and "bot" responses, as suggested by nonsensical responses to open-ended questions (e.g., random letters), and by individuals completing multiple responses to survey 1 with alias email addresses (e.g., one-after-the-other response, evidenced by an

individual completes survey 1 at 12:30 pm, and an individual with a similar email address and demographic information begins survey 1 at 12:31 pm). Based on prior research (Brühlmann et al., 2020; Griffin et al., 2021) and peer advice for resolving scam/bot responses, we added the following validity checks to the eligibility screen: a CAPTCHA (challenge-response test to determine whether the responder is human), a math equation, a fake drug name (i.e., "Have you ever been prescribed Ozypropazole?"), and an open-ended question inquiring about recruitment source.

Measures

PERMA

The PERMA Profiler (Butler & Kern, 2016) is a 23-item measure of human flourishing across the five PERMA domains (i.e., Positive Emotions, Engagement, Relationships, Meaning and Accomplishments) with additional subscales for negative emotions, health, and single-items for loneliness and happiness. Fifteen of the 23 items make up the PERMA subscales (i.e., three items per PERMA domain). The measure uses an 11-point Likert scale (0-10), and response anchors differ based on the different "blocks" of questions (e.g., Blocks 2 and 6, which include items to assess the health subscale, use the anchors "0 = *terrible*, 10 = *excellent*," while all other blocks either use "0 = *not at all*, 10 = *completely*," or "0 = *never*, 10 = *always*"). All PERMA Profiler items, as well as their domain or subscale, can be found in Table 1. We added 5 additional open-ended questions to the end of the PERMA Profiler in survey 1: "*What else has helped you ____, particularly during alcohol recovery?*" *(experience positive emotions, engage in pleasurable activities, develop and maintain important relationships, experience meaning in life, feel accomplished)*. These open-ended questions were added

to capture what, if anything, is missing from the PERMA Profiler when measuring flourishing in the context of AUD recovery. The measure can be scored to generate a total flourishing mean score (mean of items across the five PERMA domains and the happiness single-item), as well as to generate mean scores across each domain/subscale. Higher scores are indicative of greater human flourishing (both for the total score and domain/subscale scores). The PERMA Profiler has demonstrated acceptable psychometric properties across a variety of samples, including university students, online company employees, Amazon MTurk participants, and various positive psychology-centered research study participants (Butler & Kern, 2016).

Demographics

A brief demographics measure was administered to obtain information pertaining to race, ethnicity, age, socioeconomic status, level of education, stage of recovery, and past treatment, among others.

Alcohol Use

The Alcohol Use Disorder Identification Test (AUDIT; Saunders et al., 1993), a 10-item measure, was used to assess frequency and quantity of current alcohol use and severity of AUD symptoms. The AUDIT first presents participants with an image depicting standard drinks across different types of alcoholic beverage (e.g., 12 fluid ounces of beer, 5 fluid ounces of wine). Sample items include "*How often do you have a beverage containing alcohol?*" rated on a 7-point Likert scale (0 = *never*, 6 = *daily*); "*How often during the last year have you found that you were not able to stop drinking once you had started?*" rated on a 5-point Likert scale (0 = *never*, 4 = *daily or almost daily*); and "*Have you or someone else been injured because of your drinking?*" rated on

a 3-point Likert scale (0 = *no*, 1 = *yes, but not in the last year*, 2 = *yes, during the last year*). The AUDIT can be scored to generate a total score (0-40, where higher scores indicate greater severity of AUD). The AUDIT has previously demonstrated strong psychometric properties among drinking samples (e.g., Saunders et al., 1993) and in particular strong predictive validity of future alcohol-related consequences (Conigrave et al., 1995).

Patient-Reported Recovery Outcomes

The Substance Use Recovery Evaluator (SURE; Neale et al., 2016) is a 21-item patient-reported outcome measure (PROM) assessing drug and alcohol recovery outcomes during the past week from a self-assessed health-related quality of life perspective, across three "sections" (i.e., drinking and drug use, quality of and outlook on life, importance of different values). Part 1 of Section A is rated on a 5-Point Likert scale (1 = *never*, 5 = *every day*) and includes questions such as "*Thinking about the last week, I have experienced cravings.*" Part 2 of Section A is also rated on a 5-point Likert scale (1 = *all of the time*, 5 = *none of the time*), and includes questions such as "*Still thinking about the last week, I have managed pains and ill-health without misusing drugs or alcohol*." Section B measures functioning across self-care, relationships, material resources, and outlook on life using a 5-point Likert scale (1 = *all of the time*, 5 = *none of the time*) with questions such as "*Still thinking about the last week, I have been taking care of my physical health*" and "*Still thinking about the last week, I have been treated with respect and consideration by people around me*." Section C includes the stem prompt "*Still thinking about the last week, please record how important each of the following have been to you*" with statements such as "*Having resources and belongings*

(stable housing, regular income, managing money)" measured on a 4-point Likert scale (1 = *not important*, 4 = *very important*). The SURE can be scored to generate a total score, as well as scores for the following five subscales: drinking and drug use, self-care, relationships, material resources, and outlook on life. The SURE was developed with input from those in recovery, has demonstrated strong psychometric properties, and can be used in both therapeutic and non-therapeutic contexts (Neale et al., 2016). Among the current sample, the SURE demonstrated acceptable internal consistency for the total scale, with Cronbach's αs of .80 and .79 at baseline and follow-up, respectively. However, reliability estimates for the subscales were weaker, with Cronbach's αs ranging from .42 (baseline material resources subscale) to .71 (baseline outlook on life subscale).

Recovery Progression

The Recovery Progression Measure (RPM; Elison et al., 2016) is a 36-item measurement of the progression of biopsychosocial functioning during substance use recovery across six domains (i.e., situations, thoughts, physical sensations, behaviors, lifestyle, emotions). Each domain includes five yes/no items inquiring about dysfunction over the past two weeks (e.g., "*Being in risky places or situations?*" and "*That you can't trust someone or something?*"). The sixth item in each domain is an 11-point Likert scale (0 = *no impact*, 10 = *overwhelming impact*) question regarding impact of the dysfunctional areas (e.g., "*Overall, what impact do these difficult situations have on you?*"), such that a higher score on this measure would indicate more dysfunction. The RPM has demonstrated reliability, validity, sensitivity and specificity in previous research among treatment service users (Elison et al., 2017). The RPM's total scale demonstrated strong internal consistency among the current sample, with Cronbach's αs

of .91 and .92 for baseline and follow-up, respectively. Subscales showed weaker internal consistency, with Cronbach's αs ranging between .47 (baseline behaviors subscale) to .57 (follow-up situations subscale).

Recovery Capital

The Assessment of Recovery Capital (ARC; Groshkova et al., 2013) is a 50-item measure of the variety of resources available to an individual to facilitate recovery across ten domains (i.e., substance use and sobriety, global health [psychological], global health [physical], citizenship/community involvement, social support, meaningful activities, housing and safety, risk taking, coping and life functioning, and recovery experience). Individuals are instructed to check any statements that they agree with and that fit their situation on the day they are completing the assessment. Sample statements include "*What happens to me in the future mostly depends on me*;" "*I cope well with everyday tasks*;" "*My personal identity does not revolve around drug use or drinking*;" "*My living space has helped to drive my recovery journey.*" The ARC has demonstrated acceptable psychometric properties in both a treatment and recovery sample (Groshkova et al., 2013). The total ARC scale demonstrated strong reliability in the present sample (Cronbach's αs .92/.91 for baseline/follow-up), but weaker consistency for subscales (Cronbach's αs ranging .29 [baseline risk-taking subscale] to .55 [baseline recovery experiences subscale]).

Subjective Well-being

The Well-Being Scale (WeBS; Lui & Fernando, 2018) is a multidimensional assessment of subjective well-being consisting of 29 items rated on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). Scoring the WeBS provides an overall

subjective well-being score, as well as sub-scale scores for financial well-being (e.g., "*I feel in control of my finances*"), physical well-being (e.g., "*I am physically healthy*"), social well-being (e.g., "*There is at least one person I know who loves me and/or needs me*"), hedonic well-being (i.e., pleasure-related, e.g., "*I feel happy often*"), and eudaimonic well-being (i.e., self-actualization and meaning-related, e.g., "*Life has meaning for me*"). The WeBS has previously demonstrated adequate psychometric properties (Lui & Fernando, 2018). Among the current sample, the WeBS demonstrated strong internal consistency for the total scale (Cronbach's αs of.92/.93 for baseline/follow-up), and adequate internal consistency across the subscales (Cronbach's αs ranging from .69 for baseline social well-being to .88 for follow-up physical well-being).

Important Recovery Factors

The Important Recovery Factors Measure (IRF; Goldfarb et al., 1996) is an 11-item measure that assesses the self-rated importance of religious and spiritual factors (e.g.. "*A strong spiritual orientation*") and socioeconomic and health services-related factors (e.g., "*Good stable housing*," "*Availability of regular outpatient services*") to one's recovery. Importance is rated on a 5-item Likert scale (1 = *not at all*, 5 = *very much*). The IRF has demonstrated psychometric strength previously (Goldfarb et al., 1996). Among the present sample, the IRF exhibited strong internal consistency for the total score (Cronbach's αs of .81/.82 for baseline/follow-up) and adequate-to-strong reliability among the subscales (Cronbach's αs ranging from .65 for baseline socioeconomic and health-related factors to .86 for baseline religious and spiritual factors).

Quality of Life

The World Health Organization Quality of Life Brief Version (WHOQOL-BREF; WHOQOL Group, 1998) is a self-report measure that includes 25 items which measure quality of life (QoL) across four domains: physical health (e.g., "*To what extent do you feel that physical pain prevents you from doing what you need to do?*"), psychological health (e.g., "*How often do you have negative feelings such as blue mood, despair, anxiety, depression?*"), social relationships (e.g., "*How satisfied are you with the support you get from your friends?*"), and environmental (e.g., "*How satisfied are you with the conditions of your living place?*") quality of life. Responses are rated on a 5-item Likert scale (1 = *not at all,* 5 = *an extreme amount*), where higher scales indicate better QoL. The WHOQOL-BREF has demonstrated good to excellent reliability and validity (Skevington et al., 2004), and demonstrated adequate reliability among the current sample, with Cronbach's αs ranging from .69 (baseline physical health subscale) to .77. (baseline environmental subscale).

Positive and Negative Affect

The Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) lists 20 adjectives and asks participants to indicate the extent they felt each in the past week on a 5-point Likert scale (1 = *very slightly or not at all*, 5 = *extremely*). The items can be sum-scored to provide separate 10-item subscale scores for positive affect (e.g., "*proud*") and negative affect (e.g., "*ashamed*"). The PANAS has demonstrated strong psychometric properties previously (e.g., Crawford & Henry, 2004), and strong internal consistency among the present sample for both positive (Cronbach's αs .84/.84 for baseline/follow-up) and negative affect (.88/.90 for baseline/follow-up).

Flow

The Flow State Questionnaire of the Positive Psychology Lab (PPL-FSQ; Magyaródi et al., 2013) is a 20-item measure of the meta-dimensions of flow, or the capacity of one to become effortlessly and spontaneously engaged in what one is doing. Items are rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*) and item examples include: "*Time passed faster than I thought it did*" and "*The activity totally engrossed my attention*." The PPL-FSQ has demonstrated acceptable psychometric properties in university student samples (Magyaródi et al., 2013), and exhibited strong internal consistency among the present sample (Cronbach's αs .87 and .88 for baseline and follow-up, respectively).

Perceived Social Support

The Medical Outcome Study Social Support Survey (MOS-SS; Sherbourne & Stewart, 1991) is a 19-item measure of social support, with questions specifically appropriate for those with chronic illnesses. Statements are rated on a 5-point Likert scale (1 = *none of the time*, 5 = *all of the time*). The stem question reads "*How often is each of the following kinds of support available to you if you need it?*" and sample statements include "*someone to confide in or talk to about yourself or your problems*" and "*someone to prepare your meals if you were unable to do it yourself*." Reliability and validity of this measure has been demonstrated in a large chronic illness sample (Sherbourne & Stewart, 1991). The MOS-SS demonstrated strong internal consistency among the present sample with Cronbach's αs of .94 and .96 for baseline and follow-up, respectively.

Self-Efficacy

The Drinking Refusal Self-Efficacy Questionnaire (DRSEQ; Oei et al., 2005) is a 19-item measure that captures one's ability to resist drinking in certain situations across three subscales: emotional relief (e.g., "*when I am upset*"), opportunistic (e.g., "*when I first get home from work*"), and social pressure (e.g., "*when my friends are drinking*"). The measure is rated on a 6-point Likert scale (1 = *I am very sure I would drink*, 6 = *I am sure I would not drink*). The DRSEQ has previously demonstrated adequate psychometric properties in student, community, and clinical samples (Oei et al., 2005), and exhibited strong internal consistency among the current sample (Cronbach's αs .97/.98 for baseline/follow-up). Generalized self-efficacy was also captured using the New General Self-Efficacy Scale (New GSES; Chen et al., 2001), which consists of 8 statements (e.g., "*I will be able to successfully overcame many challenges*") rated on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The New GSES has previously shown strong psychometric properties (Gilad Chen et al., 2001), and demonstrated strong reliability among the present sample (Cronbach's αs .84/.83 for baseline/follow-up).

Data Analysis

Quantitative Analyses

Several quantitative analyses were performed to examine the psychometric properties of the PERMA Profiler in the present alcohol recovery sample. Specifically, we evaluated internal reliability, test-retest reliability, construct validity, and criterion-related validity.

Internal Consistency and Reliability. We evaluated internal consistency across items by calculating Cronbach's alpha (Tavakol & Dennick, 2011) for each subscale and total score. Cronbach's alpha scores range from 0 to 1; generally, a value above 0.70 has

been regarded as acceptable (Bland & Altman, 1997) but some warn that a value higher than 0.90 would indicate redundancy (Streiner, 2003). We also evaluated reliability across time by calculating test-retest score correlations (i.e., Intraclass Correlation Coefficient [ICC]; McGraw & Wong, 1996) from time point 1 (T1) to time point 2 (T2), based on the recommendations put forth by Qin and colleagues (2019). The ICC has been shown to be sensitive to detecting systematic error, particularly among smaller sample sizes (Yen & Lo, 2002). Recommended interpretation cutoffs are that ICC values between 0.5 and 0.75 indicate moderate reliability, 0.75 to 0.9 indicated good reliability, and scores above 0.9 indicate excellent reliability (Portney & Watkins, 2009).

Construct Validity. To examine construct validity of the five PERMA domains among the present sample, we conducted a confirmatory factor analysis (CFA) of the 15 PERMA items at T1 to replicate the five-factor PERMA Profiler structure. The five-factor structure was compared to an alternative single-factor structure (e.g., Ryan et al., 2019). Participants' recruitment source was included in the model as a cluster variable, under the assumption that recruitment source might contribute to non-independence in responses (e.g., recruited via mutual help organization vs. social media). Several fit indices were used to evaluate model fit, including the chi-square statistic, comparative fit index (CFI), Tucker Lewis Index (TLI), and root mean square error of approximation (RMSEA). Typically, a good (adequate) fit is indicated through scores of .95 (.90-.94) or higher for the CFI/TLI and .06 (.07-.08) or lower for the RMSEA (F. Chen et al., 2008; Hu & Bentler, 1999). However, recent work has criticized the use of these fixed fit cutoffs, as they were derived from Hu & Bentler's (1999) specific CFA model, and therefore are not generalizable (McNeish & Wolf, 2021). Therefore, we identified

additional dynamic fit index cutoffs tailored to the present model and sample size through use of the dynamic model fit Shiny software application (McNeish & Wolf, 2021). The application identified the following fit cutoff indices, based on our sample size and model specifications: .989 or higher for the CFI and .046 or lower for the RMSEA. Given the previous research support for this five-factor PERMA structure within various samples (e.g., Butler & Kern, 2016), we hypothesized that this model will show adequate fit with the data.

Criterion Validity. We evaluated convergent validity by examining the PERMA Profiler in relation to other similar positive psychology and recovery-oriented measures at T1, by means of bivariate correlations. Convergent validity of the total PERMA Profiler was evaluated in relation to the SURE, the RPM, the ARC, and the WeBS. In addition, convergent validity of each PERMA Profiler subscale was evaluated in relation to corresponding measures. Specifically, the Positive Emotions subscale was evaluated in relation to the PANAS positive affect subscale and the WeBS hedonic subscale, the Engagement subscale to the FSS and ARC citizenship/community involvement subscale, the Relationships subscale to the MOS-SS and SURE relationships subscale, the Meaning subscale to the ARC meaning subscale and IRF spirituality subscale, and the Accomplishments subscale to the DRSEQ and GSES. We additionally examined convergent validity of the PERMA Profiler's negative emotion and health subscales: negative emotion was evaluated in relation to the PANAS negative affect subscale and the RPM emotions subscale, and health was evaluated in relation to the WHOQOL-Bref physical health QoL scale and the ARC physical health subscale. Predictive validity of the PERMA Profiler and subscales were examined through correlations between PERMA

Profiler scores at T1 and PERMA Profiler scores/scores of corresponding relevant measures at T2.

IBM SPSS version 28.0 was used to prepare data and conduct descriptive, reliability, and correlational analyses, and all other analyses were conducted in M*plus* version 8 (B. Muthén & Muthén, 2017). Maximum likelihood estimation with robust standard errors (MLR) was used to account for missing data in the indicator variables (i.e., PERMA items) in the CFA. Being from the same measure, the 15 PERMA items are non-independent, and MLR estimates standard errors while being robust to non-normality and non-independence of observations.

Qualitative Analysis

We adopted a reflexive thematic analysis (RTA) approach to identify themes in responses to the additional open-ended PERMA Profiler questions (Clarke & Braun, 2018). Braun and Clarke (2018) specify six steps to analyzing qualitative data through RTA: familiarization, coding, generating initial themes, theme development and review, defining themes, and writing. Importantly, the nature of RTA is that it is recursive, such that any of these steps can be repeated. Additionally, Braun and Clarke (2018) emphasize the researcher's active role in knowledge creation, urging against the assumption that themes pre-exist in the data and simply emerge through analysis. As such, the researcher's subjectivity is used as a "resource (rather than a problem to be managed)," thus capitalizing on the "contextual nature of meaning" in the analytic process (Clarke & Braun, 2018, p. 107). In RTA, themes are not discrete boxes that house data points; rather, they are "key characters" in the story of the data (p. 108). One author (HC) first reviewed qualitative responses to become familiar with the data, then used an inductive

approach to generate codes in a spreadsheet alongside responses (either fitting within one of the five PERMA categories or an additional generated code). These additionally-generated codes were refined several times, and then grouped into themes across each of the five PERMA domains. These themes were then named and defined. Finally, writing of results is intertwined with the analytic phase in RTA, and thus a description of the themes and their definitions were written into the following results section.

Results

Participants and Descriptive Statistics

The final analytic sample included n=250 individuals who completed survey 1, and n=187 individuals who completed both surveys 1 and 2 (74.8% retention). Sample demographic information, as well as descriptive statistics of study variables, is summarized in Table 2. Participants were mostly white (67.6%), non-Hispanic (81.2%) and male (52.0%), who were mostly college-educated (44.0%), employed for wages (74.0%), married (45.2%), living in an urban area (64.8%), with a mean age of 36.57 years (SD=14.07). The majority of participants were recruited via Reddit (42.4%). Most participants reported having utilized alcohol treatment services at some point during their lives (70.4%), and most reported being in recovery for more than three years (29.6%). Interestingly, 42.0% of participants reported *not* currently being abstinent from alcohol.

Quantitative Results

Internal Consistency and Reliability

Among the current sample, the PERMA Profiler exhibited acceptable-to-strong internal consistency at both T1 and T2, with Cronbach's α values ranging from .72 to .95 for each of the five PERMA subscales (Table 3). Intraclass correlation coefficient (ICC)

values indicated good-to-excellent test-retest reliability between T1 and T2, with values ranging from .83 to .97 (Table 3).

Construct Validity

CFA was conducted on the 15 PERMA items at T1 to test both the five- and single- factor PERMA structures (Table 4). The five-factor structure indicated poor fit with the data, as indicated by the CFI/TLI values being below the identified dynamic cutoffs (.93/.91), the significant $\chi 2$ statistic (262.48, $p<.001$), and the RMSEA value being above the dynamic cutoff (.10). While the five-factor PERMA structure did not adequately fit the current sample, a CFA of the single-factor structure revealed even worse fit, evidence by the CFI/TLI values (.90/.88), a significant $\chi 2$ statistic (450.37, $p<.001$), and the RMSEA value (.12). Figure 1 displays the observed model, including standardized item loadings and intercorrelations of the five-factor PERMA structure. All items loaded significantly onto their hypothesized factors, with standardized loadings ranging from .55 to .89. Each of the five factors (i.e., Positive Emotions, Engagement, Relationships, Meaning, Accomplishments) exhibited moderate to high correlation with one another (ranging from .71 to .94; Figure 1). Examination of item-level residual correlations (Table 5) revealed possible sources of misfit in the model; residual correlations greater than .10 are thought to indicate such sources of misfit (Kline, 2015). In particular, items A2 and A3 appeared to have high residual correlations with other items in the measure (i.e., A2. How often do you achieve the important goals you have set for yourself?; A3. How often are you able to handle your responsibilities?). Modification indices (MIs) are the amount the $\chi 2$ statistic would decrease (i.e., model fit would be improved) if an additional parameter was estimated as part of the model,

assuming that items can cross-load onto multiple factors (L. K. Muthén & Muthén, 2017). The MIs for the five-factor CFA model are displayed in Table 6. These estimates can also be used to identify possible sources of model misfit. Based on the MIs for the five-factor CFA model, the largest decrease (improvement) in the five-factor model's $\chi 2$ statistic would occur if item R2 (R2. To what extent do you feel loved?) was allowed to cross-load on the Accomplishments factor.

Criterion Validity

Convergent validity, or bivariate correlations between PERMA subscales and total scale at T1 and related measures at T1, is depicted in Table 7. The five PERMA subscales and total scale were expectedly intercorrelated. As hypothesized, convergent validity of most PERMA scales with relevant measures appeared moderately strong (see Table 7). Specifically, the total PERMA scale showed moderate correlations with the SURE total scale ($r=.60$, $p<.001$), the the RPM total scale ($r=-.60$, $p<.001$), the WeBS total scale ($r=.59$, $p<.001$), and the ARC total scale ($r=.55$, $p<.001$). Similarly, the Positive Emotions subscale was moderatetly positively associated with the PANAS positive affect subscale ($r=.64$, $p<.001$) and the WeBS hedonic subscale ($r=.67$, $p<.001$), the Relationships subscale was moderately positively associated with the MOS-SS total scale ($r=.67$, $p<.001$) and the SURE relationships subscale ($r=.50$, $p<.001$), and the Accomplishments subscale was moderately positively associated with the GSES total scale ($r=.57$, $p<.001$) and the DRSEQ total scale ($r=.45$, $p<.001$). However, the Engagement and Meaning subscales showed somewhat weaker convergent validity with their hypothesized corresponding measures. Engagement was weakly positively associated with the FSS total scale ($r=.25$, $p<.001$) and moderately positively associated

with the ARC community subscale (r=.32, p<.001). Meaning was moderately positively associated with the ARC meaning subscale (r=.39, p<.001), but showed no association with the IRF spirutality subscale (r=-.01, p=.93).

Predictive validity, or bivariate correlations between the subscales and total scale at T1 and T2, is summarized in Table 8. In line with past research and the present study's hypotheses, the PERMA subscales and total score were moderately positively predictive of themselves between T1 and T2 (.68<rs<.79, all ps<.001). Additionally, predictive validity of most PERMA scales at T1 with corresponding related measures at T2 appeared moderate. The total PERMA scale at T1 was moderately associated with the SURE total scale at T2 (r=.64, p<.001), the RPM total scale at T2 (r=-.53, p<.001), the WeBS total scale at T2 (r=.51, p<.001), and the ARC total scale at T2 (r=.47, p<.001). Positive Emotions at T1 was moderately positively associated with the PANAS Positive Affect subscale at T2 (r=.51, p<.001) and the WeBS hedonic subscale at T2 (r=.63, p<.001). Relationships at T1 was moderately positively associated with the MOS-SS total scale at T2 (r=.64, p<.001) and the SURE relationships subscale at T2 (r=.35, p<.001). Accomplishments at T1 was moderately positively associated with the GSES total scale at T2 (r=.56, p<.001) and the DRSEQ at T2 (r=.48, p<.001). Still, a weaker pattern of predictive validity emerged for the Engagement and Meaning subscales at T1 with relevant measures at T2, such that Engagement at T1 was weakly positively associated with the FSS total scale at T2 (r=.19, p<.05) and the ARC community subscale at T2 (r=.24, p<.001), and Meaning at T1 was moderately positively associated with the ARC meaning subscale at T2 (r=.33, p<.001) and not associated with the IRF spirituality subscale at T2 (r=.10, p=.18).

Qualitative Results

Themes from the RTA of open-ended items, as well as their definitions and sample responses, are displayed in Table 9. Importantly, the themes identified through the RTA were from open-ended responses that were deemed to *not* align with the existing questions asked by the PERMA Profiler; these themes are meant to characterize what is "missing" from the PERMA Profiler when measuring flourishing in AUD recovery. From 1034 open-ended responses, a total of 31 themes were identified across the five PERMA domains (i.e., 5 themes for Positive Emotions, 4 themes for Engagement, 8 themes for Relationships, 8 themes for Meaning, and 6 themes for Accomplishments). Some themes were identified across multiple PERMA domains (i.e., "mutual help," "helping others," and "mindfulness") and they appear to align with some sources of model misfit observed in the five-factor CFA. Detailed below are examples of some prominent themes that were identified across multiple PERMA domains.

Notably, though not reflected in Table 9, many open-ended responses that were deemed to fit within the pre-existing Relationships PERMA Profiler category emerged across all five domains. In fact, many participants wrote relationship-oriented responses for all five open-ended questions. This suggests that relationship development and maintenance is an important element of flourishing in recovery, regardless of PERMA domain. This is also reflected in the residual correlations and MIs of the five-factor CFA; the majority of the model misfit appears to be due to the Relationships factor and/or items in the Relationships domain. Correspondingly, we identified 8 themes across the Relationships domain, which was the largest number of themes for a domain (tied only by the Meaning domain).

The theme titled “mutual help” was identified across three domains: Positive Emotions, Relationships, and Accomplishments. “Mutual help” was most prevalent in the Relationships domain; many participants reported developing and maintaining relationships through involvement in mutual help organizations (e.g., *reaching out to people I meet at meetings or recovery groups*). The “mutual help” theme in the Positive Emotions domain was related to experiencing positive emotions from involvement in mutual help organizations (e.g., *going to meetings*). In the Accomplishments domain, “mutual help” involved accomplishments related to involvement in mutual help organizations. For example, one participant expressed feeling accomplished through their respected position in Alcoholics Anonymous, and feeling part of a larger community as a result (*being a ‘trusted servant’ in A.A. and feeling part of a global movement*).

“Helping others” was another theme identified within three of the five domians: Relationships, Meaning, and Accomplishments. Across the “helping others” theme in the Relationships domain, recurrent open-ended responses were related to the development and maintenance of relationships due to helping others and compassion toward others (e.g., *supporting others when they need it*). In the Meaning domain, the “helping others” theme involved finding meaning in life through helping others or volunteering. Many participants described finding meaning specifically through helping other people in recovery (e.g., *using my experience in recovery to help other people in recovery*; *offering my personal experiences in online communities*). “Helping others” in the Accomplishments domain encompassed a feeling of accomplishment related to helping other people. For example, one participant noted feeling accomplished when other people

appreciate a kind gesture (*when folks say thank you for the notes and items I have made for them*).

Mindfulness-related themes were identified across the Positive Emotions, Relationships, and Meaning domains. For Relationships, the "mindfulness" theme concerned development and maintenance of relationships due to being present and mindful when spending time with social supports (e.g., *ability to be present and engaged and remember things*). The Positive Emotions theme of "gratitude/savoring/mindfulness" involved the experience of positive emotions related to being grateful, savoring (i.e., conscious and deliberate appreciation of a positive experience; Lyubomirsky et al., 2005), and mindful awareness. One participant described the conscious and mindful attentiveness to experiencing positive emotions (*[being] able to experience and notice when I am having positive emotions*). Finally, in the Meaning domain, the "mindfulness/acceptance" theme included participant responses related to finding meaning in life though mindfulness practice, increased nonjudgmental awareness and/or acceptance (e.g., *mindfulness practice*; *cultivating acceptance*).

Discussion

In recent years, the field of alcohol use disorder (AUD) treatment has shifted toward a more recovery-oriented approach, one that emphasizes strength, resilience, and long-term (chronic) care. Meanwhile, the field of positive psychology, or the study of what allows individuals and communities to flourish, has grown rapidly recently, resulting from it the development of theoretical models and positive psychology interventions (PPIs). Still, these two fields remain relatively siloed, despite the parallels in philosophy and clinical implications. As such, the aim of this study was to examine the

psychometric properties of the PERMA Profiler, a previously-established measure of human flourishing, among a sample of individuals in recovery from AUD, as well as to identify elements of flourishing during recovery that may be missing from the measure.

Current quantitative findings were mixed with regard to the psychometric strength of the PERMA Profiler in an AUD recovery sample. Similar to previous studies that have tested the psychometric properties of the PERMA Profiler (Butler & Kern, 2016), we found evidence of the measure's strong reliability. Further, most PERMA Profiler subscales and the total scale indicated moderate-to-strong criterion validity (i.e., convergent and predictive) with their hypothesized related measures, suggesting that these broader domains *do* appear related to both positive psychological and recovery-specific measures central to well-being. However, the Engagement and Meaning subscales exhibited weaker criterion validity. A broader concern in the present study's results was our inability to replicate the five-factor PERMA CFA structure; therefore, we did not find evidence of the PERMA Profiler's construct validity in the present sample. This is contrary to prior psychometrics studies that found the PERMA Profiler to be valid across diverse samples (e.g., Butler & Kern, 2016; Ryan et al., 2019; Umucu et al., 2020). These results imply that the PERMA Profiler is inaccurate in capturing flourishing for those in AUD recovery.

Fortunately, qualitative results perhaps aid in explaining the PERMA Profiler's poor validity observed among the current recovery sample, as well as offer insight into how the measure can be adapted to accurately capture flourishing in recovery. Importantly, there were three cross-cutting themes identified across multiple domains: "mutual help," "helping others," and "mindfulness." Responses related to mutual help

involvement were observed across Positive Emotions, Relationships, and Accomplishments. This undoubtably fits within the picture of existing research on mutual help group (MHG) involvement in recovery. One qualitative study reported that members of an online MHG reported increased happiness due to an ability to be more authentic and truer to themselves (Chambers et al., 2017). Some have even argued that Alcoholics Anonymous (AA), a popular MHG, actually led the way in using positive emotions as therapeutic tools, long before the emergence of positive psychology (Vaillant, 2014). Regarding relationship development and maintenance, the association between MHG involvement and strength of social support networks is well-documented (e.g., Groh et al., 2007; Kelly et al., 2014). Extant research has also found that personal, civic, and economic achievements during addiction recovery is associated with self-esteem, happiness, QoL, and recovery capital (Eddie et al., 2021). The "mutual help" theme in the Accomplishments domain might fit within these categories of personal or civic achievements, such that achievements in MHG involvement confers benefits related to flourishing. Relatedly, "helping others" was a theme observed throughout the domains of Relationships, Meaning, and Accomplishments. In MHGs such as AA, the principle of "helper therapy" suggests that helping others can be used as a way of helping oneself (Zemore et al., 2004). Empirical evidence even shows that the helper therapy principle has merit: helping has been associated with positive recovery outcomes, such as decreased binge drinking and greater MHG involvement (Zemore et al., 2004; Zemore & Pagano, 2008). Specifically helping peers who are also in AUD recovery is associated with more desirable recovery outcomes than just helping others in a more general sense (Pagano et al., 2009). The idea that helping people can bestow a sense of meaning is in

line with past research as well: one qualitative study concluded that helping those with alcohol concerns can encourage spiritual growth and meaning in life for the helper (Umeda, 2008). Themes related to mindful awareness were also cross-cutting, and were identified in the Positive Emotions, Relationships, and Meaning domains. The identified theme titled "gratitude/savoring/mindfulnesss" in the Positive Emotions domain aligns with existing knowledge. Gratitude has previously been associated with greater quality of life (QoL) for individuals with AUD (Charzyńska et al., 2020) and some researchers have argued that gratitude is, in fact, a form of recovery capital, such that being grateful can further one through the recovery process (Gila Chen, 2017). The positive effects of savoring and mindfulness strategies for individuals in addiction recovery is well-supported (e.g., Bryan et al., 2022); one study found that participants in recovery were more likely to complete a savoring-centered web-based exercise compared to several other exercises (Hoeppner, Schick, et al., 2019). Additionally, mindfulness has been associated with greater social support and resilience and less negative emotionality among substance-using individuals (Gu et al., 2022), evidencing the ability of mindfulness to cut across multiple domains of flourishing (i.e., Relationships and Positive Emotions). In clinical practice, mindfulness- and acceptance-based treatments for AUD are efficacious (Byrne et al., 2019), though no studies to our knowledge have examined meaning in life in relation to these concepts.

Aside from these cross-cutting themes, the themes unique to each domain are also worthy of discussion, as they imply domain-specific adaptations for the PERMA Profiler in recovery populations. For example, "optimism" was a theme identified among the Positive Emotions domain, and existing research supports that optimism and hope for the

future is important to recovery. Prior research has found that individuals in recovery have comparable levels of trait optimism with healthy controls and cardiac patients (Millstein et al., 2019). Hope for the future is also a theme commonly seen in Twelve Step-oriented models, such as AA (Alcoholics Anonymous World Services, 1981). Moreover, the Engagement domain included a theme titled "non-drinking activities."

Recovery-oriented models of care emphasize the importance of living a life according to one's values, strengths, and goals; often, on a clinical care level, this involves encouraging individuals to increase their activities that do not involve drinking (Witkiewitz et al., 2020). And, naturally, engaging in alternative activities that do not involve alcohol or drug use is associated with positive recovery outcomes (e.g., Cloud & Granfield, 2001; Richter, 2003). Similarly, we observed a theme titled "non-drinking/new supports" in the Relationships domain. The benefits of having non-drinking social supports is a common theme in formal treatments for AUD, such as cognitive-behavioral therapy (Epstein et al., 2018), and research has supported that a social network with less drinkers is associated with better recovery outcomes (e.g., McCutcheon et al., 2016). "Spirituality/religion" was identified as a major theme in the Meaning domain, which is perhaps expected due to the popularity AA and other spiritually-aligned MHGs. There is also evidence to suggest that a link exists between spirituality and religiosity and positive recovery outcomes (Walton-Moss et al., 2013). Within the Accomplishments domain, the theme titled "small goals/daily tasks" falls in line with research surrounding the idea that recovery is a lifelong process; one qualitative study found that those in addiction recovery often described productive change as the achievement of small goals, in an effort to reach larger milestones along the way (Costello et al., 2020).

Though replication of this research with a larger, more diverse recovery sample is needed, current findings provide preliminary guidance on how to adapt the PERMA Profiler for an AUD recovery sample. First, it is possible that flourishing may not fit a five-factor model in an AUD recovery sample, and therefore all five PERMA domains might not be warranted in an adapted measure. Several of the five factors were highly-correlated in the factor analysis, which might indicate redundancy (Kline, 2015). In other words, highly-correlated factors are likely one in the same. For instance, the strong correlation between Positive Emotions and Relationships fits within the picture of our results, such that relationship-oriented qualitative responses were observed across all domains, and that modification indices mostly centered around the Relationships items cross-loading onto other factors. Given the high intercorrelation of factors, it is possible that there is a higher-order domain driving flourishing in recovery. Also, the current measure's questions are quite broad in assessing the five domains of flourishing, but our participants highlighted more specific ways that they achieve flourishing across the domains. This perhaps suggests that some specificity in items, or additional items that capture said specificity, are needed in an adapted PERMA Profiler for recovery. Adapted or additional items that capture the cross-cutting themes of mutual help, helping others, and mindfulness and their abilities to influence flourishing, as well as the more domain-specific themes (e.g., optimism and hope for the future, non-drinking activities and social supports) would likely improve the accuracy of the measure in a recovery sample. For example, item E1 in the Engagement domain (*E1. How often do you become absorbed in what you are doing?*) might be adapted to the following: "How often do you engage in pleasurable non-drinking activities?". More recovery-specific items could be added to the

measure as well; for instance, an item capturing the cross-cutting benefits of helping others should be integrated (e.g., “How often do you feel that helping other people improves your relationships, brings you a sense of meaning in life, and/or makes you feel accomplished?”). More in-depth qualitative research, such as focus groups or interviews, might provide more insight into a more accurate factor structure of flourishing in recovery.

Of course, the current study is not without its limitations. Importantly, our sample was somewhat small, and participants were predominantly young, white, non-Hispanic, college-educated males living in an urban area, which limits the generalizability of these findings. Also, this study was advertised mostly on recovery support social media (e.g., Reddit) and on websites of mutual help organizations (e.g., SMART Recovery, Moderation Management), which likely attracted a sample with specific recovery values and demographics. The present study also did not examine factors that might hinder recovery and flourishing (e.g., other substance use, emotional distress, stigma, discrimination). Future research might consider such variables in an effort to examine discriminant validity of the PERMA Profiler. We also found poor internal consistency estimates for several of the previously-established recovery measures administered in the survey (i.e., the SURE, the RPM, and the ARC). Prior studies have found these recovery-oriented measures to be both reliable and valid, and thus the present study’s lack of reliability support is puzzling. Although we implemented a number of validity-check measures to the eligibility screen and surveys and excluded a large proportion of survey responses, we received a large proportion of scam responses during the early data collection period. It is possible that despite our efforts to identify and remove them, some

illegitimate or invalid responses were included in final analyses, which might have muddied the results. Therefore, replication of this study with a larger, more diverse recovery sample is warranted.

From the unanticipated results of this study come future research implications to better measure human flourishing and to apply positive psychology theoretical models and interventions to AUD recovery populations. Unlike previous research which has supported the psychometric strength of the PERMA Profiler to measure flourishing in a variety of samples, we did not find evidence for construct validity of the measure among those in AUD recovery. The findings of this study imply that there are additional elements that make up flourishing in AUD recovery, elements that are not currently assessed by the PERMA Profiler. Future research in this area would benefit from adapting the PERMA Profiler to match how flourishing is experienced for those in AUD recovery, based on the areas of model misfit and qualitative themes identified in the present study. The development of a valid, reliable, theory-based measure of human flourishing tailored to the recovery experience would aid researchers in overlapping the philosophically-aligned fields of AUD recovery and positive psychology.

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Table 1. PERMA Profiler items

Domain/Subscale	Item	Response Anchors
Positive Emotions	P1. In general, how often do you feel joyful?	0 = never, 10 = always
	P2. In general, how often do you feel positive?	0 = never, 10 = always
	P3. In general, to what extent do you feel contented?	0 = not at all, 10 = completely
Engagement	E1. How often do you become absorbed in what you are doing?	0 = never, 10 = always
	E2. In general, to what extent do you feel excited and interested in things?	0 = not at all, 10 = completely
	E3. How often do you lose track of time while doing something you enjoy?	0 = never, 10 = always
Relationships	R1. To what extent do you receive help and support from others when you need it?	0 = not at all, 10 = completely
	R2. To what extent do you feel loved?	0 = not at all, 10 = completely
	R3. How satisfied are you with your personal relationships?	0 = not at all, 10 = completely
Meaning	M1. In general, to what extent do you lead a purposeful and meaningful life?	0 = not at all, 10 = completely
	M2. In general, to what extent do you feel that what you do in your life is valuable and worthwhile?	0 = not at all, 10 = completely
	M3. To what extent do you generally feel you have a sense of direction in your life?	0 = not at all, 10 = completely
Accomplishments	A1. How much of the time do you feel you are making progress towards accomplishing your goals?	0 = never, 10 = always
	A2. How often do you achieve the important goals you have set for yourself?	0 = never, 10 = always
	A3. How often are you able to handle your responsibilities?	0 = never, 10 = always
Negative Emotions	N1. In general, how often do you feel anxious?	0 = never, 10 = always
	N2. In general, how often do you feel angry?	0 = never, 10 = always
	N3. In general, how often do you feel sad?	0 = never, 10 = always
Health	H1. In general, how would you say your health is?	0 = terrible, 10 = excellent
	H2. How satisfied are you with your current physical health?	0 = not at all, 10 = completely
	H3. Compared to others of your same age and sex, how is your health?	0 = terrible, 10 = excellent
Loneliness	L. How lonely do you feel in your daily life?	0 = not at all, 10 = completely
Happiness	Hap. Taking all things together, how happy would you say you are?	0 = not at all, 10 = completely

Table 2. Sample demographic information and study variables (N=250).

	Time 1 N (%)/M (SD)	Time 2 N(%)/M(SD)
Gender		
Female	117 (46.80%)	
Male	130 (52.00%)	
Transgender/other/unspecified	3 (1.20%)	
Age	36.57 (14.07)	
Ethnicity		
Hispanic	47 (18.80%)	
Race		
African American/Black	68 (27.20%)	
Asian/Asian American	2 (.80%)	
American Indian/Alaska Native	2 (.80%)	
Native Hawaiian/Pacific Islander	1 (.40%)	
White	169 (67.60%)	
Other	1 (.40%)	
Recruitment source		
Reddit	106 (42.40%)	
Recovery Community Center	60 (24.00%)	
SMART Recovery	35 (14.00%)	
Moderation Management	31 (12.40%)	
Twitter	14 (5.60%)	
Word of mouth	4 (1.60%)	
Employment		
Employed for wages	185 (74.00%)	
Self-employed	25 (10.00%)	
Retired	16 (6.40%)	
Out of work and looking for work	8 (3.20%)	
Student	8 (3.20%)	
Homemaker	3 (1.20%)	
Out of work and not looking for work	3 (1.20%)	
Unable to work	2 (.80%)	
Education level		
Bachelor’s degree	110 (44.00%)	
Some college, no degree	43 (17.20%)	
Master’s degree	36 (14.40%)	
Associate degree	27 (10.80%)	
Doctorate degree	13 (5.20%)	
High school diploma or equivalent	12 (4.80%)	
Professional/trade training	9 (6.80%)	
Marital status		
Married	113 (45.20%)	
In a committed relationship	86 (34.40%)	
Single, never married	32 (12.80%)	
Divorced	14 (5.60%)	
Separated	4 (1.60%)	

Widowed	1 (.40%)	
Area of residence		
Urban	162 (64.80%)	
Suburban	73 (29.20%)	
Rural	12 (4.80%)	
Ever used alcohol treatment services	176 (70.40%)	
Recovery stage		
Under 6 months	50 (20.00%)	
6 – under 18 months	57 (22.80%)	
18 – 36 months	68 (27.20%)	
Over 3 years	74 (29.60%)	
Not abstinent from alcohol	105 (42.00%)	
AUDIT score	19.02 (8.59)	
PERMA		
Positive Emotions	6.90 (1.55)	6.98 (1.58)
Engagement	6.55 (1.49)	6.53 (1.51)
Relationships	7.20 (1.58)	7.21 (1.58)
Meaning	7.21 (1.53)	7.26 (1.52)
Accomplishments	7.20 (1.27)	7.17 (1.30)
Total	7.03 (1.30)	7.05 (1.32)
Negative Emotions	4.86 (1.88)	4.80 (1.84)
Health	7.20 (1.34)	7.22 (1.35)
PANAS Positive Affect	36.49 (5.91)	37.59 (5.83)
WeBS Hedonic	4.87 (.79)	4.86 (.75)
FSS	4.23 (.87)	4.43 (.87)
ARC Community	3.64 (1.24)	3.62 (1.24)
MOS-SS	3.88 (.62)	3.99 (.61)
SURE Relationships	10.85 (1.36)	10.80 (1.20)
ARC Meaning	3.52 (1.22)	3.56 (1.23)
IRF Spirituality	3.87 (1.05)	4.09 (.96)
GSES	29.53 (4.17)	29.41 (3.99)
DRSEQ	3.89 (1.35)	3.69 (1.40)
SURE Total	55.50 (5.64)	55.85 (4.95)
RPM Total	41.04 (24.38)	42.62 (26.14)
WeBS Total	4.78 (.58)	4.83 (.59)
ARC Total	34.90 (10.12)	34.97 (10.27)
PANAS Negative Affect	24.30 (7.72)	23.85 (7.13)
RPM Emotions	7.9 (4.36)	7.63 (4.57)
WHOQOL-Bref Physical Health	15.41 (2.24)	15.40 (2.39)
ARC Physical Health	3.46 (1.25)	3.46 (1.23)

Note. PERMA = Positive Emotions, Engagement, Relationships, Meaning, Accomplishments; PANAS = Positive and Negative Affect Schedule; WeBS = Well-Being Scale; FSS = Flow Short Scale; ARC = Assessment of Recovery Capital; MOS-SS = Medical Outcome Study Survey Social Support Survey; SURE = Substance Use Recovery Evaluator; IRF = Important Recovery Factors Measure; GSES = New General Self-Efficacy Scale; DRSEQ = Drinking-Refusal Self-Efficacy Questionnaire; RPM = Recovery Progression Measure; WHOQOL-Bref = World Health Organization Quality of Life Brief Version.

Table 3. Internal consistency and test-retest reliability.

PERMA Subscale	Cronbach's α (Baseline/Follow-up)	ICC
Positive Emotions	.87/.88	.92
Engagement	.74/.80	.86
Relationships	.84/.88	.91
Meaning	.88/.87	.92
Accomplishments	.72/.69	.83
Total	.95/.95	.97

Table 4. CFA results (n=250).

Model	$\chi 2$	df	CFI	TLI	RMSEA (90% CI)
5-factor	262.48*	55	.93	.91	.10 (.07, .10)
1-factor	450.37*	48	.90	.88	.12 (.11, .13)

Note. * = significant $\chi 2$ test at $p<0.001$

Table 5. Item-level residual correlations.

	P1	P2	P3	E1	E2	E3	R1	R2	R3	M1	M2	M3	A1	A2	A3
P1	.00														
P2	.02	.00													
P3	-.01	-.00	.00												
E1	-.06	.02	-.03	.00											
E2	.04	.05	-.04	-.03	.00										
E3	.03	.02	-.02	.08	.02	.00									
R1	-.03	-.05	.02	.10	.06	-.02	.00								
R2	-.01	-.06	.01	-.05	-.04	.03	.03	.00							
R3	.03	-.08	.06	-.06	.02	-.02	-.02	.01	.00						
M1	.05	.08	.01	-.03	.00	-.06	-.03	-.02	-.03	.00					
M2	-.04	.01	-.03	.02	.00	-.03	.05	-.05	.03	.04	.00				
M3	-.08	-.03	.02	.07	.01	-.04	.08	-.08	.03	-.04	.01	.00			
A1	.08	.05	.03	.07	-.04	.02	.03	-.05	.07	.02	-.06	.00	.00		
A2	.00	.01	-.06	.09	-.04	-.12	.05	-.16	.00	-.03	-.03	.03	.03	.00	
A3	-.15	.03	-.02	.07	.11	-.05	.11	-.08	.02	-.04	.04	.15	-.11	.02	.00

Note. Correlation residuals > +/-.1 are shaded in gray.

Table 6. CFA modification indices.

Factor Loadings	M.I.
Accomplishments BY R2	18.93
Relationships BY P2	15.58
Meaning BY R2	13.17
Accomplishments BY E1	10.65
Relationships BY P3	10.00

Item-Level Correlations	
A3 WITH P1	18.29
M3 WITH A3	14.43
R3 WITH P2	10.28
R2 WITH A2	10.06

Table 7. Evidence of convergent validity: correlations at T1 (n=250).

	P	E	R	M	A	Total	NE	Health
P	1							
E	.71**	1						
R	.75**	.64**	1					
M	.81**	.71**	.72**	1				
A	.68**	.62**	.57**	.75**	1			
PERMA Total	.92**	.84**	.85**	.92**	.81**	1		
Negative Emotion	-.38**	-.31**	-.39**	-.40**	-.44**	-.44**	1	
Health	.54**	.38**	.37**	.38**	.37**	.48**	-.24**	1
PANAS Positive Affect	.64**	.51**	.42**	.52**	.46**	.60**	-.19**	.47**
WeBS Hedonic	.67**	.49**	.51**	.60**	.43**	.64**	-.37**	.46**
FSS	.34**	.25**	.25**	.25**	.26**	.32**	-.00	.33**
ARC Community	.31**	.32**	.28**	.33**	.29**	.35**	-.20**	.16**
MOS-SS	.49**	.33**	.67**	.47**	.26**	.53**	-.23**	.30**
SURE Relationships	.34**	.37**	.50**	.40**	.39**	.45**	-.23**	.03
ARC Meaning	.40**	.37**	.36**	.39**	.40**	.44**	-.23**	.30**
IRF Spirituality	.09	-.06	-.01	-.01	-.08	-.00	.28**	.11
GSES	.35**	.40**	.35**	.47**	.57**	.48**	-.49**	.19**
DRSEQ	.31**	.40**	.37**	.40**	.45**	.43**	-.47**	.15**
SURE Total	.51**	.47**	.50**	.57**	.58**	.60**	-.35**	.35**
RPM Total	-.51**	-.52**	-.50**	-.53**	.57**	-.60**	.56**	-.30**
WeBS Total	.57**	.35**	.58**	.56**	.47**	.59**	-.48**	.51**
ARC Total	.51**	.46**	.46**	.48**	.51**	.55**	-.35**	.34**
PANAS Negative Affect	-.46**	-.39**	-.44**	-.49**	-.52**	-.52**	.79**	.47**
RPM Emotions	-.57**	-.52**	-.53**	-.60**	-.60**	-.64**	.63**	-.30**
WHOQOL-Bref Physical Health	.28**	.19**	.24**	.28**	.36**	.31**	-.60**	.42**
ARC Physical Health	.34**	.35**	.30**	.37**	.45**	.41**	-.47**	.31**

Note. PERMA = Positive Emotions, Engagement, Relationships, Meaning, Accomplishments; PANAS = Positive and Negative Affect Schedule; WeBS = Well-Being Scale; FSS = Flow Short Scale; ARC = Assessment of Recovery Capital; MOS-SS = Medical Outcome Study Survey Social Support Survey; SURE = Substance Use Recovery Evaluator; IRF = Important Recovery Factors Measure; GSES = New General Self-Efficacy Scale; DRSEQ = Drinking-Refusal Self-Efficacy Questionnaire; RPM = Recovery Progression Measure; WHOQOL-Bref = World Health Organization Quality of Life Brief Version.
Intercorrelations of PERMA scales at T1, and correlations of PERMA scales with hypothesized corresponding measures at T1, are shaded in gray.
** p<.001

Table 8. Evidence of predictive validity: correlations between T1 and T2 (n=187).

	P (T1)	E (T1)	R (T1)	M (T1)	A (T1)	Total (T1)	NE (T1)	Health (T1)
P (T2)	.79**							
E (T2)	.60**	.73**						
R (T2)	.67**	.53**	.79**					
M (T2)	.71**	.63**	.66**	.79**				
A (T2)	.46**	.47**	.46**	.58**	.68**			
PERMA Total (T2)	.75**	.67**	.72**	.76**	.64**	.82**		
Negative Emotion (T2)	-.38**	-.36**	-.42**	-.46**	-.47**	-.48**	.74**	
Health (T2)	.44**	.29**	.33**	.31**	.25**	.39**	-.19**	.79**
PANAS Positive Affect (T2)	.51**	.35**	.32**	.43**	.26**	.45**	-.17**	.53**
WeBS Hedonic (T2)	.63**	.47**	.48**	.59**	.37**	.60**	-.32**	.42**
FSS (T2)	.29**	.19*	.27**	.22**	.04	.25**	.04	.26**
ARC Community (T2)	.27**	.24**	.20**	.23**	.30**	.29**	-.18**	.18*
MOS-SS (T2)	.51**	.32**	.64**	.48**	.26**	.53**	-.26**	.40**
SURE Relationships (T2)	.31**	.30**	.35**	.39**	.34**	.38**	-.21**	-.05
ARC Meaning (T2)	.35**	.32**	.30**	.33**	.32**	.38**	-.18**	.30**
IRF Spirituality (T2)	.25**	.01	.11	.1	-.13	.10	.24**	.20**
GSES (T2)	.30**	.39**	.33**	.49**	.56**	.46**	-.51**	.18**
DRSEQ (T2)	.31**	.45**	.39**	.39**	.48**	.45**	-.48**	.13
SURE Total (T2)	.56**	.55**	.51**	.59**	.56**	.64**	-.30**	.38**
RPM Total (T2)	-.43**	-.50**	-.44**	-.45**	-.52**	-.53**	.47**	-.27**
WeBS Total (T2)	.51**	.29**	.46**	.52**	.37**	.51**	-.37**	.54**
ARC Total (T2)	.43**	.38**	.38**	.39**	.42**	.47**	-.31**	.33**
PANAS Negative Affect (T2)	-.34**	-.35**	-.38**	-.39**	-.41**	-.43**	.66**	-.19**
RPM Emotions (T2)	-.45**	-.47**	-.43**	-.46**	-.50**	-.53**	.52**	-.27**
WHOQOL-Bref Physical Health (T2)	.31**	.26**	.25**	.37**	.38**	.36**	-.44**	.47**
ARC Physical Health (T2)	.23**	.26**	.21**	.24**	.35**	.29**	-.48**	.25**

Note. PERMA = Positive Emotions, Engagement, Relationships, Meaning, Accomplishments; PANAS = Positive and Negative Affect Schedule; WeBS = Well-Being Scale; FSS = Flow Short Scale; ARC = Assessment of Recovery Capital; MOS-SS = Medical Outcome Study Survey Social Support Survey; SURE =

Substance Use Recovery Evaluator; IRF = Important Recovery Factors Measure; GSES = New General Self-Efficacy Scale; DRSEQ = Drinking-Refusal Self-Efficacy Questionnaire; RPM = Recovery Progression Measure; WHOQOL-Bref = World Health Organization Quality of Life Brief Version.
Correlations between PERMA scales at T1 and T2, and correlations of scales at T1 with hypothesized corresponding measures at T2, are shaded in gray.
*p<.05, ** p<.001

Table 9. RTA results.

Domain/Subscale	Theme	Definition	Example responses
Positive Emotions	Positive attitude	Positive emotions related to having an attitude of positivity toward oneself and others	"Having a positive attitude toward myself," "having a positive mentality," "thinking positively in every situation," "purposely seeking pleasure and reminding myself of the positives"
	Optimism	Positive emotions related to hope and confidence for the future	"Looking at my future self," "feeling hopeful," "making future plans"
	Gratitude/savoring/mindfulness	Positive emotions related to being grateful, savoring experiences, and mindful awareness	Cultivating an attitude of gratitude," "daily grateful journaling," "taking a moment to enjoy something beautiful outside," "able to experience and notice when I am having positive emotions," "trying to stay in the moment"
	Reframing thoughts	Positive emotions related to cognitive reframing and/or other cognitive behavioral skills	"Reducing my anxiety through cognitive reframing," "personal counseling," "tools from REBT that question irrational beliefs and help change outlook from negative to positive"
	Mutual help	Positive emotions related to involvement in mutual help organizations	"Going to meetings," "A.A. meeting[s]"
Engagement	Non-drinking activities	Engagement in activities that do not involve drinking alcohol	"Getting to know the importance of having fun in recovery," "experience [pleasurable activities] sober"
	Returning to/finding new activities	Once again engaging in pleasurable activites that one enjoyed prior to	"Giving myself permission to do activities I enjoy," "many long-term interests," "taking up piano as I

		entering recovery and/or engaging in new activities	studied a few years as a child," "learning new games"
	Getting out of comfort zone	Engagement related to trying activities out of one's comfort zone	"Willingness to get out of my comfort zone," "just forcing myself to get out there and do other things!"
	Increased energy/resources	Engagement due to increased energy or resources in recovery	"I have more time and energy for pleasurable activities," "getting my health back," "having money, having supports"
Relationships	Online	Relationships via online recovery support services	"Online support groups/forums/live streams," "Zoom meetings," "my online group which is very important to me"
	Non-drinking/new supports	Relationships with non-drinking individuals and/or new social supports during recovery	"Connecting with others in recovery," "sobriety group networking," "forming new friends every day," "meeting new people"
	Improved communication/therapy skills	Relationship development and maintenance due to improved communication and other psychotherapy skills	"Communicate better with people I like and love," "respecting others," "good communication," "thinking before I speak and taking responsibility for my words and actions," "my therapist," "couples' therapy," "attending group therapy with a drug addictions counselor"
	Honesty/vulnerability	Relationship development and maintenance due to increased honesty and/or vulnerability	"Being honest with my partner and family and friends about my recovery," "honesty in the relationship up front," "learning to be more vulnerable"

	Mindfulness	Relationship development and maintenance related to being present and mindful when spending time with social supports	"Ability to be present and engaged and remember things," "the ability to be still, be present"
	Helping others	Relationship development and maintenance due to helping others and compassion toward others	"My propensity for helping others," "I find joy in helping others," "supporting others when they need it," "showing compassion"
	Learning from/listening to others	Relationship development and maintenance due to an increased ability to learn from and/or listen to others	"Having genuine interest in the experience of others," "being a good listener," "getting help from people who are better off and were also addicts"
	Mutual help	Relationship development and maintenance related to involvement in mututal help organizations	"Routine meetings," "reaching out to people I meet at meetings or recovery groups," "telling my family about Moderation Management," "12-Step fellowship"
Meaning	Spirituality/religion	Meaning in life related to spirituality and/or religion	"Morning devotionals," "spiritual practice," "faith"
	Helping others	Meaning in life related to helping others and/or volunteering	"Being able to help others," "using my experience in recovery to help other people in recovery," "volunteering at the local food shelf," "offering my personal experiences in online communities"
	Work/school	Meaning in life related to employment or schooling	"My job as a medical professional is quite fulfilling," "successes at work," "changing my job to a more mission-aligned sector," "I found my purpose and career"

	Independence	Meaning in life related to finding independence in recovery	"I'm stable on my own," "the fact that I'm now independent and don't depend on my parents"
	Improved health	Meaning in life related to improved health in recovery	"Seeing the importance of having good health," "wanting to experience the rest of my life as healthy as I can be"
	Self-confidence	Meaning in life related to increased self-reflection, self-worth, and/or self-confidence in recovery	"Ongoing re-assessment of my hierarchy of values," "soul-searching," "realizing my worth in life," "my attitude toward myself"
	Mindfulness/acceptance	Meaning in life related to mindfulness practice, increased nonjudgemental awareness and/or acceptance	"Mindfulness practice," "daily meditation," "being present," "cultivating acceptance"
	Still searching for meaning	Acknolwedgment that finding meaning in life is a never-ending process	"Searching for that meaning right now," "moments of meaning are fleeting…but I have yet to find one overall meaning in life'
Accomplishments	Drinking goals	Accomplishments in meeting a moderation or abstinence drinking goal	"The 5 months I've been sober," "tracking my dry days," "moderation is the only thing that has helped me be more successful," "most of the time meeting my daily alcohol consumption goals"
	Small goals/daily tasks	Accomplishments of small, digestable goals and/or of everyday tasks	"Completing small tasks and goals I set for myself," "getting done many of the simple tasks that I want to do in a day," "consistently putting one day together at a time for almost 8 years now," "setting VERY SMALL goals that I know I can accomplish (e.g.,

		emptying the dishwasher, brushing my teeth, sending an email) so I don't get overwhelmed or paralyzed by inaction”
Helping others	Accomplishments related to helping other people	“When folks say thank you for the notes and items I have made for them,” “helping others,” “helping take care of my wife”
Financial/work/school	Accomplishments in the area of finances, work, and/or education	“Saving money,” “not getting laid off jobs because of drinking,” “I’ve been working for two years now,” “staying gainfully employed,” “getting my degree and certification”
Health	Accomplishments related to improved health and quality of life	“Losing weight,” “getting my health back,” “my living situation has improved during my recovery”
Mutual help	Accomplishments through involvement in mutual help organizations	“I facilitate a SMART Recovery meeting weekly,” “being a ‘trusted servant’ in A.A. and feeling part of a global movement,” “faciliating recovery meetings”

Figure 1. Observed CFA Model