RESEARCH PAPER

Flourishing, languishing and moderate mental health: Prevalence and change in mental health during recovery from drug and alcohol problems

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Abstract

The aim was to explore the utility of Keyes' concept of mental health in a substance addiction context. Mental health is considered the presence of emotional wellbeing in conjunction with high levels of social and psychological functioning. Using Keyes' measure, the frequency of languishing and flourishing is compared between clients who became abstinent and those continuing to use substances following treatment. It was hypothesised that there would be a significant interaction between substance use and levels of mental health over time. Participants were 794 individuals (79.5% male) attending residential substance abuse treatment provided by The Australian Salvation Army. The current sample was drawn from a larger longitudinal study evaluating routine client outcomes. At entry to treatment there were higher rates of languishing compared to population estimates, yet greater rates of flourishing at all time points compared to community normative data. There was a significant interaction between continuous mental health and substance use status. Mental health was rated significantly higher by individuals who were abstinent than those who had used substances at 3-month post-discharge follow-up. The comorbidity of mental illness and substance misuse has previously been investigated, but this is the first study to investigate the prevalence of mental health. While participants who remained abstinent achieved the highest levels of flourishing, at follow-up there were lower rates of languishing than found in a general community sample. Additionally, results suggested that improved mental health was a consequence of reduced severity of alcohol and other drug abuse, and followed reductions in cravings.

Introduction

''Recovery'' is the aim of substance use disorder (SUD) treatment services (Laudet & Humphreys, 2013). Historically, abstinence has been one of the primary outcomes of recovery from SUDs (Garbutt, West, Carey, Lohr, & Crews, 1999; Laudet & White, 2010; Rudolf & Watts, 2002). However, improvements in wider areas of functioning (such as wellbeing) can occur without abstaining (Laudet & White, 2010). The Substance Abuse and Mental Health Services Administration (SAMHSA) recently defined recovery as ''a process of change through which individuals improve their health and wellness, live a self-directed life and strive to reach their full potential'' (SAMHSA, 2011). SAMHSA also identified four dimensions of life that promote recovery: health (physical and emotional, including abstinence), home

(a safe residence), purpose (meaningful activity) and community (social network) (SAMHSA, 2011).

Consistent with this definition, research and treatment for many disorders are adopting wellness outcomes as indicators of recovery, predominantly with mental illness (e.g. schizophrenia, depression), and more recently substance misuse (Best et al., 2012; De Maeyer, Vanderplasschen, Lammertyn, van Nieuwenhuizen, & Broekaert, 2011; Donovan, Mattson, Cisler, Longabaugh, & Zweben, 2005). One such outcome is quality of life which captures elements of health and wellness (Donovan et al., 2005), but more comprehensive components of subjective wellbeing are needed to operationalise definitions of recovery. A concept that has burgeoned in recent mental illness research is that of Keyes' model of complete mental health, which encompasses social, emotional and psychological wellbeing (Keyes, 2007). Mental health is considered to be the presence of emotional wellbeing in conjunction with high levels of social and psychological functioning (Keyes & Westerhof, 2012).

Keyes' model of complete mental health has demonstrated that mental health and mental illness are independent yet correlated dimensions (Provencher & Keyes, 2011). In this

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context, mental illness refers to psychopathology such as depression. In contrast, the primary measure of mental health used to test the model of complete mental health has been the Mental Health Continuum (Keyes, 2002), which can categorise or ''diagnose'' individuals as flourishing, languishing or moderately mentally healthy. To be flourishing in life, individuals must exhibit high levels of emotional wellbeing and positive functioning; in contrast a person who is languishing will exhibit low levels (Keyes, 2002). Individuals who do not meet the criteria for flourishing or languishing are considered moderately mentally healthy (Keyes, 2002). Flourishing, languishing and moderate mental health can all occur in the presence or absence of a mental illness (Keyes, 2002).

In relation to substance use, comorbidity of mental illness and addiction in Australian residential SUD clients has been reported at 64–71% (Mortlock, Deane, & Crowe, 2011). However, the prevalence of mental health has not been investigated in the context of substance misuse. Given the high prevalence of comorbidity, it has been proposed that addiction research should adopt and integrate constructs and outcomes utilised in the mental health recovery domain (Bowersox, Saunders, & Wojcik, 2009; Coombs & Meehan, 2003; Rudolf & Watts, 2002). Given previous investigations of mental health and illness, we use substance use status as the measure of mental illness. If Keyes' (2002) conceptualisation of mental health is extended to the drug and alcohol addiction context, then it would be possible for individuals who were abstinent to potentially be flourishing, languishing or moderately well. In addition to facilitating recovery progress, identifying mental *health* diagnoses would aid the mobilisation of additional treatment support to enhance recovery.

The interactions of well-functioning in the presence or absence of substance use is not new in the addiction fields. For example, languishing despite being abstinent has historically been captured by the concept of the ''dry drunk''. The phrase is a lay term, coined early in Alcoholics Anonymous history (AA; Flaherty, McGuire, & Gatski, 1955) and is the notion that a person can be abstinent from substances yet still experience the emotional and functional problems that were encountered during their addiction (Gogek, 1994). It is theorised that there is a subset of individuals who, when discharged from treatment, are unable to attain satisfactory wellbeing, purpose in life, or flourish.

Keyes (2005) has reported American general population estimates of 16.9% of people who were languishing, 65.1% moderately mentally healthy and 18.0% considered to be flourishing from a mental health perspective. However, there appears to be variability across different populations. A survey study of 1045 American yoga practitioners found notably different estimates, with 1.0% identified as languishing, 55.2% as moderately mentally healthy and 43.8% as flourishing (Ross, Friedmann, Bevans, & Thomas, 2013). The authors implied that yoga practice and belief in the personal health benefits of yoga might explain the relatively high rates of flourishing. However, definitive conclusions about why there were relatively high rates of flourishing in this sample could not be made from the cross-sectional data (Ross et al., 2013).

Flourishing has been associated with a range of personal and societal health benefits (Keyes, 2005; Ross et al., 2013). It has been found that individuals identified as flourishing have reduced odds of premature mortality, potentially due to the association of tobacco use and physical inactivity among individuals who are not flourishing (Keyes & Simoes, 2012). When combined with the absence of a mental disorder, individuals who are flourishing have reported better health, such as the lowest risk of cardiovascular disease and fewest limitations of activities of daily living, and thus unsurprisingly have lower health care utilisation and fewest missed days of work (Keyes, 2007). It is theorised that flourishing and moderate mental health are a source of resilience, acting as a buffer against stressful life events (Keyes, 2002), which are known predictors of substance abuse relapse (Laudet, Cleland, Magura, Vogel, & Knight, 2004). A potential mechanism for this buffer effect was identified by a survey study of community members across America (Catalino & Fredrickson, 2011). They found that relative to individuals who did not flourish or were depressed, individuals who flourished tended to respond with larger spikes in positive emotion following everyday pleasant events. It was argued that this larger positive emotional reactivity ultimately fed back into promoting higher levels of flourishing. Therefore, the concept of flourishing may be a useful construct when considering outcomes following substance abuse treatment.

It is increasingly accepted that there is more to recovery than just abstinence from substances (Laudet & White, 2010; Schwarzlose et al., 2007; SAMHSA, 2011). There is a need to begin exploring the relationships between mental health as proposed by Keyes (2007) and substance use amongst individuals in treatment in order to identify those in need of greater support and more targeted interventions. Given the preliminary nature of this research on the mental health continuum, we have chosen to use both categorical and continuous ratings of mental health in order to provide comparisons with normative data and changes in mental health over time.

Therefore, the primary aim of the present study was to describe rates of mental health and to test the validity of the mental health continuum in the context of substance misuse. It was expected that mental health would have significant relationships with commonly utilised research and clinical measures, providing evidence of convergent and divergent validity. The second aim of the study was to identify variability in the proportions of categorical mental health ''diagnoses'' (Keyes, 2002). That is, to demonstrate whether individuals are, for example: abstinent and flourishing; misusing substances and languishing; misusing substances and flourishing; or abstinent and languishing. It is theorised that if recovery is broader than merely ''not drinking'' then we should identify some individuals who are languishing despite being abstinent. The third aim of the research was to explore the temporal link between mental health and indices of substance abuse severity and cravings (alcohol use, drug use and cravings). Three potential models are possible. The *consequence model* suggests that reduced addictive behaviour increases mental health. In short, given an episode of treatment it would be expected that substance abuse severity would decrease and this would lead to improvements in

mental health. In contrast, the *antecedent model* assumes that poor mental health is the cause of poor substance use outcomes. There are several possible reasons why an antecedent model might be present. People who have poorer mental health may turn to the substances as an unhelpful way of coping. Such a model is consistent with the self-medication hypothesis and findings that some individuals use drugs and alcohol as a way to regulate positive and negative emotions (Cooper, Frone, Russell, & Mudar, 1995; Khantzian, 1997). In a treatment context it is also possible that poorer mental health makes it more difficult for those receiving drug and alcohol services to obtain improvements for their addictions. Finally, the *reciprocal influence model* suggests that substance use is both an antecedent to and a consequence of mental health problems.

Method

All measures, forms and procedures were approved by the University Human Research Ethics Committee.

Participants

The data for the current study were collected as part of a wider research initiative that involved evaluating the effectiveness of The Salvation Army Recovery Service Centres. These centres provide residential alcohol and other substance abuse treatment in the form of a modified therapeutic community. Participants were recruited from nine different Recovery Service Centres that were located in the Australian states of New South Wales, Queensland and the Australian Capital Territory. Only participants who provided complete responses at entry to the programme on the Mental Health Continuum (Keyes, 2002) and items indicating their prior 30-day substance use status (used or abstained) were included in the current analysis ($N = 794$). Figure 1 provides a flow-chart of participant movement over the study period. The sample included 631 males (79.5%) and 163 females, who had an average age of 36.09 ($SD = 10.72$). Participants' demographic information is reported in Table 1.

A follow-up rate of 28.8% was obtained at the 3-month follow-up; three participants did not provide complete responses to the mental health or use status items, resulting in a sample of 226 individuals. Only those participants contacted at the 3-month follow-up were re-contacted at 12-month follow-up. This resulted in 113 (50.9%) participants providing complete responses to mental health and use status items.

Measures

Mental Health Continuum – Short Form

The Mental Health Continuum – Short Form (MHC-SF) is a 14 item self-report questionnaire that assesses positive mental health (Keyes, 2002). Participants rate the frequency of each feeling in the past month on a 6-point Likert scale (0 = never to 5 = every day). It was shown that three items form the Emotional Wellbeing subscale, which assesses positive emotions towards one's life (''Satisfied with life''), five items form the Social Wellbeing subscale (''That you had something important to contribute to society'') and six items form the Psychological Wellbeing subscale (''That you liked most

parts of your personality''), which assesses engagement and functioning in one's social and private life. Cronbach's alpha in the current sample was satisfactory ($\alpha = 0.94$).

The scale can be scored both continuously and categorically (Keyes, 2009). Continuous scoring is the sum of responses to the 14 items, with higher scores indicating better mental health. Categorical scoring results in what Keyes refers to as ''diagnoses'' of flourishing, languishing or moderate mental health (Keyes, 2002). To be flourishing, individuals must respond ''every day'' or ''almost every day'' to at least one of the three emotional wellbeing items, and at least six of the 11 social and psychological wellbeing items. To be languishing, individuals will respond ''never'' or ''once or twice'' to at least one emotional wellbeing item and six social and psychological wellbeing items. Individuals who are neither flourishing nor languishing are diagnosed with moderate mental health. Both scoring methods are utilised in the current research.

Addiction Severity Index

The Addiction Severity Index (ASI) is a semi-structured interview commonly used as a component of comprehensive assessment in substance abuse treatment programmes (McLellan et al., 1992). Several domains are assessed; drug, alcohol, medical, family, psychiatric, employment and legal. Cronbach's alphas are acceptable for the composites ($\alpha = 0.67$ to 0.85) (Zanis, McLellan, & Corse, 1997). For the purpose of the current research, only the questions pertaining to use of substances in the past 30 days were included in the analyses.

Life Engagement Test

The Life Engagement Test (LET) is a 6-item scale measuring a person's purpose in life in terms of engaging in activities that are personally valued (Scheier et al., 2006). Participants were asked to rate each statement on a scale from 1 (strongly disagree) to 5 (strongly agree). An example item is, ''To me, the things I do are worthwhile''. Cronbach's alpha for the scale in the current sample was satisfactory ($\alpha = 0.77$).

Depression Anxiety Stress Scale

The Depression Anxiety Stress Scale (DASS) is a 21-item self-report measure yielding three subscales (Lovibond & Lovibond, 1995). Seven items form each of the subscales; depression (''I felt that life was meaningless''), anxiety (''I was aware of dryness of my mouth'') and stress (''I find it hard to wind down''). Cronbach's alpha for the scale in the current sample is satisfactory ($\alpha = 0.96$).

Desires for alcohol questionnaire

The abbreviated 6-item Desires for Alcohol Questionnaire (DAQ) was used to assess the participants' current desire for alcohol (Mo, Deane, Lyons, & Kelly, 2013). Participants indicated their agreement to the statements on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree). Items were modified for the study to assess drug *and* alcohol desires. For example, the statement ''I want to drink so much I can taste it'' was adjusted to ''I want to drink/use drugs so much I can taste it''. Cronbach's alpha for the scale in the current sample was satisfactory ($\alpha = 0.93$).

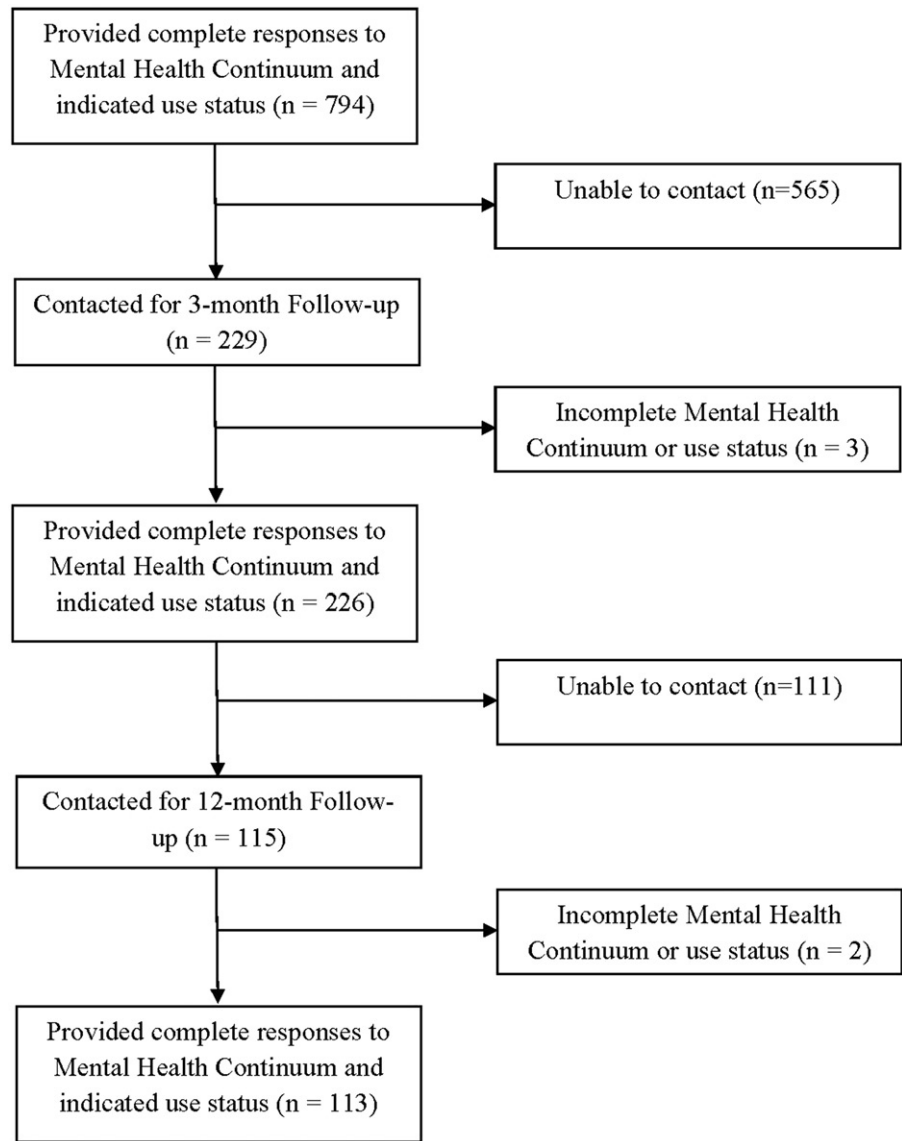Figure 1. Participant's flow over baseline and follow-up assessments.

Table 1. Demographic information.

Characteristics	n	Valid %	M	SD
Gender				
Male	631	79.5		
Female	163	20.5		
Age			36.09	10.72
Days in treatment			92.22	74.66
Years of substance use problem			18.28	10.77
Self-reported primary substance				
Alcohol	463	60.2		
Amphetamines	113	14.7		
Cannabis	101	13.1		
Heroin	63	8.2		
Other	29	3.8		
Marital status				
Single/Never married	529	68.0		
Divorced	108	13.9		
Separated	84	10.8		
Married/Remarried	54	6.9		
Widowed	3	0.4		
Education				
Primary	13	1.7		
Lower secondary (Years 7–9)	231	29.2		
Upper secondary (Years 10–12)	463	58.6		
Post-secondary	83	10.5		

Drug Taking Confidence Questionnaire

The Drug Taking Confidence Questionnaire (DTCQ) is an 8-item scale assessing a person's self-efficacy to resist the urge to drink alcohol or take drugs in specific high relapse risk situations (Sklar & Turner, 1999). Participants were asked to specify their primary drug of choice then rate their confidence of resisting that drug in each situation on a scale of 0 (not at all confident) to 100 (very confident). This measure was only administered at baseline. Cronbach's alpha for the scale in the current sample was satisfactory ($\alpha = 0.91$).

Procedures

The Salvation Army staff (centre managers and clinical employees) were trained in the administration of the ASI and all outcome measures used in the study by the research team. These measures were integrated into intake protocols and each client was provided a consent form and information relating to the aims, procedures and demands of the research. Those clients wishing to participate completed all measures during this intake session. Intake data were entered by The Salvation Army staff into the Salvation Army's online Service

and Mission Information System (SAMIS) and downloaded for analysis by the research team.

Three and 12-month post-discharge follow-ups were conducted. Participants were provided with an AUD$20 gift voucher for completing each follow-up interview (see Deane, Kelly, Crowe, Lyons, & Cridland, 2014, for more details).

Data analytic strategy

Visual inspections of the variables' distributions (Tabachnick & Fidell, 2013) showed normality violations, which transformations failed to correct, so non-parametric equivalents were adopted as required.

Spearman's Rho bivariate correlations were used to determine the associations between mental health and other routine clinical measures of SUDs. To determine proportional differences in categorical diagnoses (flourishing, languishing, moderate mental health) at each assessment, a Friedman two-way ANOVA was run. A Wilcoxon Signed Rank test was subsequently utilised to identify the assessment points that yielded significantly different diagnoses. To investigate the relationship between substance use status and mental health diagnosis, a Pearson's Chi-square Test of Contingencies was used.

A 2 (Group: abstinent or used) × 3 (Time: baseline, 3-month, 12-month follow-up) mixed-design ANOVA and Autoregressive Cross-lag (ACL) analysis were used to examine changes in mental health across time for substance use status. With respect to the ANOVA, mental health scores obtained at the three time points were entered as a within-subjects factor and substance use at 3-month follow-up (abstinent and use of substances) was entered as a between subjects factor.

Autoregressive Cross-lag models were utilised, as they are a common method to consider temporal ordering of constructs in order to distinguish between alternative causal hypotheses, or directionality of the associations between constructs (i.e. a predicts changes in b; b predicts changes in a; or a and b are reciprocally related) (Marshall, Parker, Ciarrochi, & Heaven, 2014). This model's focus is on the relations between one construct at a time point T on change in another construct observed to occur between time point T and $T + 1$.

We used AMOS 21 (Arbuckle, 2012) to estimate a series of structural equation models representing the relations between substance use and mental health across the three time points of the study. We estimated one- and two-year autocorrelations (Time 1 predicting the same variable at Time 2 and 3) and one-year cross-lags (Time 1 predicting the other Time 2 variable). Adding a two-year cross-lag did not improve fits of any model.

Given that this was a longitudinal study, missing data is a potential concern. It is now well recognised in the social sciences that traditional approaches to missing data (e.g. listwise or pairwise deletion) are inappropriate and can lead to biased parameter estimates. Modern methods like full-information-maximum-likelihood (FIML) provide a principled approach to missing data, which uses all the available information for parameter estimation (Enders & Bandalos, 2001; Howell, 2008). This procedure was employed for all models.

Results

Attrition bias

The low follow-up rates have meant that there is considerable missing data. A more extensive missing data analysis for the follow-up methods used as part of routine outcome assessment revealed no systematic differences between completers and non-completers (Deane et al., 2014). However, we also checked for potential attrition bias on 18 variables for the current subsample.

Differences between participants who had provided data at all three time points and those who had only completed the baseline assessment were investigated. An independent t-test of baseline variables (e.g. religiosity, addiction severity) identified no significant differences, with the exception of the ASI alcohol composite score (t (740) = –2.36, $p < 0.05$), and age (t (794) = –3.72, $p < 0.05$). Participants who had not completed all follow-up assessments had lower alcohol severity and were younger ($M = 35.53$, $SD = 10.43$) than participants who had completed assessments at all three time points ($M = 39.58$, $SD = 11.80$). The following results are therefore more applicable to those clients with more severe alcohol problems and near our obtained mean age.

The impact of length in residential care was also considered. The analyses were conducted excluding individuals who had been at the treatment facility for less than one month. However, the same pattern of results was obtained. Given the additional data loss this introduced, and no significant difference identified in the independent t-test, time in treatment was not used an exclusion criterion.

Correlations with clinical measures

Spearman's Rho correlations were run due to the normality violations to assess the bivariate associations between the mental health continuum and the four self-report measures at baseline, 3-month follow-up and 12-month follow-up (Table 2). The correlations demonstrate moderate significant relationships in the expected direction. Mental health was negatively correlated with psychological symptoms, distress and cravings; positively correlated with refusal self-confidence and life engagement.

Categorical mental health prevalence

Table 3 presents the frequencies of mental health as diagnosed categorically. All three diagnoses are present in the sample. Most participants were moderately mentally healthy at all three assessments (54.3%, 50.0% and 47.8%, respectively). At baseline, around as many participants were flourishing (21.9%) as were languishing (23.8%). However, at 3- and 12-month follow-ups flourishing increased, whereas languishing decreased, when compared to baseline.

Comparisons over time

A Friedman two-way ANOVA was used for participants who had completed the baseline, 3-month and 12-month assessments to investigate differences in diagnoses over time. The results indicated that there was a statistical difference in the categorical mental health continuum scores at each

Table 2. Spearman's Rho correlations among continuous mental health and clinical measures.

	Mean	Standard deviation	1	2	3	4
			Baseline ($n = 668$)			
1. Continuous mental health	34.13	16.08				
2. DASS-21	55.75	32.15	–0.54**			
3. DAQ	16.42	9.16	–0.40**	0.50**		
4. LET	20.59	4.39	0.58**	–0.48**	–0.42**	
5. DTCQ	55.07	26.95	0.36**	–0.31**	–0.35**	0.32**
			3-Month follow-up ($n = 217$)			
1. Continuous mental health	43.59	15.32				
2. DASS-21	33.89	26.90	–0.62**			
3. DAQ	15.75	10.36	–0.51**	0.55**		
4. LET	20.99	4.44	0.69**	–0.48**	–0.55**	
			12-Month follow-Up ($n = 66$)			
1. Continuous mental health	42.11	15.99				
2. DASS-21	32.93	28.73	–0.64**			
3. DAQ	15.21	10.59	–0.59**	0.52**		
4. LET	21.82	4.16	0.76**	–0.49**	–0.56**	

The DTCQ was not administered at the 3-month and 12-month follow-up assessments.
DASS-21, Depression Anxiety Stress Scale-21; DAQ, Desires for Alcohol Questionnaire; LET, Life Engagement Test; DTCQ, Drug Taking Confidence Questionnaire.
**$p < 0.01$.

Table 3. Proportion of mental health categories at baseline, 3- and 12-month follow-up.

	Baseline n	Baseline Valid %	3-Month n	3-Month Valid %	12-Month n	12-Month Valid %
Languishing	189	23.8	21	9.3	14	12.4
Moderately mentally healthy	431	54.3	113	50.0	54	47.8
Flourishing	174	21.9	92	40.7	45	39.8

Table 4. Mental health categories delineated by abstinence or use of substances at baseline, 3- and 12-month follow-up.

	Abstinent n	Abstinent %	Used n	Used %
Baseline ($n = 794$)				
Languishing	26	14.9	163	26.3
Moderately mentally healthy	93	53.1	338	54.6
Flourishing	56	32.0	118	19.1
3-Month follow-up ($n = 225$)				
Languishing	5	4.4	16	14.4
Moderately mentally healthy	50	43.8	63	56.8
Flourishing	59	51.8	32	28.8
12-Month follow-up ($n = 113$)				
Languishing	3	7.3	11	15.3
Moderately mentally healthy	11	26.8	43	59.7
Flourishing	27	65.9	18	25.0

''Used'' indicates the use of any substances in the previous 30 days.

assessment, χ^2 (2, $N = 111$) $= 24.33$, $p < 0.001$. Follow-up pairwise comparisons with the Wilcoxon Signed Rank test and a Bonferroni adjusted α of 0.017 indicated that there were significant differences between baseline (*Mean Rank* $= 1.71$) and 3-month follow-up (*Mean Rank* $= 2.18$), $p < 0.001$, and baseline and 12-month follow-up (*Mean Rank* $= 2.12$), $p < 0.001$. There was no significant difference between the 3- and 12-month follow-up mental health diagnoses ($p = 0.38$).

To investigate whether substance use is related to a diagnosis of mental health, Pearson's Chi-square tests were conducted (Table 4). The Chi-square tests comparing mental health category and substance use status were significant at baseline, χ^2 (2, $N = 794$) $= 18.02$, $p < 0.001$, 3-month follow-up, χ^2 (2, $N = 225$) $= 15.23$, $p < 0.001$ and 12-month follow-up, χ^2 (2, $N = 113$) $= 18.20$, $p < 0.001$. At all three time points, the proportion of participants who were languishing was significantly higher in the group who were still using substances (26.3%, 14.4%, 15.3%) compared to those who were abstinent (14.9%, 4.4%, 7.3%). Similarly, the proportion of those who were flourishing was significantly higher for those who were abstinent (32.0%, 51.8%, 65.9%) compared to those who were still using (19.1%, 28.8%, 25.0%).

Continuous mental health

To investigate continuous mental health, mixed-design ANOVA and ACL analyses were utilised.

For the mixed-design ANOVA, reported substance use status (abstinent or using) at 3-month follow-up was used as the grouping variable (Table 5). The results revealed a significant interaction between mental health and substance use status, $F(2, 218) = 4.92$, $p < 0.01$, partial $\eta^2 = 0.04$. Figure 2 shows that participants started with a similar level of mental health. However, while mental health increases over time for both groups, abstinent individuals experience larger increases in mental health than those who use substances. There was an overall within-subjects effect of mental health across time, $F(2, 218) = 24.09$, $p < 0.01$, with significant differences between baseline and 3-month follow-up ($p < 0.001$) and baseline and 12-month follow-up

($p<0.001$), but not between the 3- and 12-month follow-ups ($p>0.05$). This indicates that improvements in mental health occur early in the recovery phase, and, as shown in Figure 2, continue to improve for individuals who abstain and decrease slightly for individuals who use substances.

Additionally, a significant main effect of substance use status was found, F (1, 109) = 13.60, $p<0.001$. Congruent with Figure 2, simple effects indicated that mental health was not significantly different between abstainers and users at

Table 5. Continuous mental health means (M), standard deviations (SD) and between-group *t*-tests.

	Abstinent		Used substances			
	M	SD	M	SD	*t*-Value	*p*
Baseline	34.44[a]	15.29	32.02[a]	15.06	0.84	>0.05
3-Month follow-up	47.48[b]	14.72	37.81[c]	14.51	3.49	<0.001
12-Month follow-up	48.44[b]	12.92	36.72[c]	16.04	4.25	<0.001

$n = 111$.

Supscripts that differ between columns and rows indicate significant differences; *t*-value statistics reflect between group analyses; Substance use status is based on responses provided at 3-month follow-up; ''Used'' indicates the use of any substances in the previous 30 days.
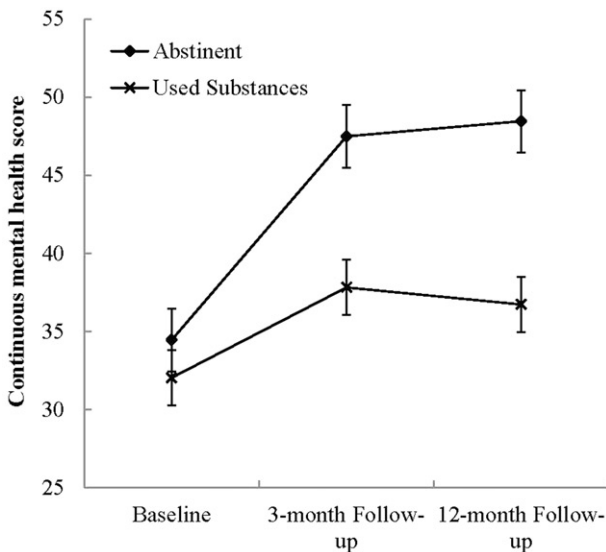

Figure 2. Changes in continuous mental health scores between assessment periods as a function of substance use status ($n = 111$).

baseline ($p = 0.404$). However, mental health was rated significantly higher by abstinent individuals than those who had used substances at 3-month ($p<0.01$) and 12-month follow-up ($p<0.001$).

Next, ACL models were applied; specifically, the antecedent, consequence and reciprocal influence models. The ASI-Alcohol Severity, ASI-Drug use Severity and DAQ (cravings) measures were used as indicators of addiction problems. These three addiction measures were each used with the Mental Health Continuum (continuous variable) in three ACL analyses.

All models showed excellent fit, with Chi-square (2) < 5.5, $p>0.05$, Comparative fit index > 0.97, and Root Mean Square Error of Approximation < 0.05. Figure 3 presents the results. The variables tended to be moderately stable across time. There were no significant cross-lags from mental health to substance use, providing no support for the mental-health as an antecedent model. However, there were significant cross-lags between Time 2 measurement of substance use and cravings, and Time 3 mental health. These results support the mental health as a consequence model. Time 2 and Time 3 measures represent residual change in this ACL model. Thus, if participants improved on the substance use variables from Time 1 to Time 2, they were more likely than those who did not improve to experience an increase in mental health from Time 2 to Time 3.

Discussion

This study examined whether Keyes' model of mental health had utility in the context of drug and alcohol misuse. Proportions of mental health diagnoses identified that flourishing, languishing and moderate mental health diagnoses were present in the current sample. Compared to American population estimates (16.9%; Keyes, 2005), the current sample had higher levels of languishing at baseline (23.8%) as might be expected. It was notable that following treatment at 3-month follow-up in the community, the frequency of those considered to be languishing was lower than in general population samples (Keyes, 2005). The rates of flourishing at baseline were similar between population and recovery samples (18% and 21.9%, respectively); however, by the 12-month follow-up, the rates of flourishing were higher (39.8%) and more comparable to those found among yoga practitioners (43.8%; Ross et al., 2013). There was a significant difference in mental health proportions between baseline and

Figure 3. Longitudinal relationships of mental health with alcohol and substance use, and cravings. *Note:* The three standardised coefficients represent the relationships for substances, alcohol use and cravings, respectively. Two-year auto correlations were estimated but are not presented in the figure. Bolded coefficients are significant at $p<0.05$; *$p = 0.055$.
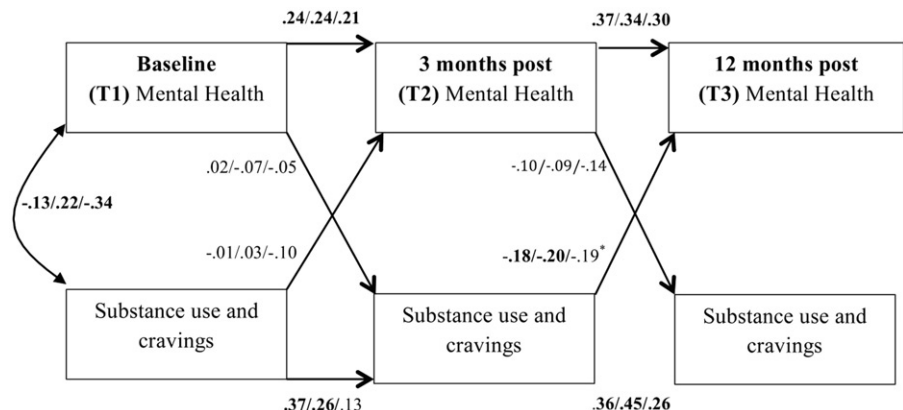
follow-up assessments, but not between the two follow-up assessment points.

There were associations between categorical mental health status and the use of substances. It was found that at post-treatment follow-ups, abstinence from substances was more commonly associated with flourishing mental health. Conversely, given that we cannot assume causality it may be that individuals with flourishing mental health may be more likely to maintain abstinence. The directional aspects of these relationships are discussed further when we review the results of the Autoregressive Cross-lag (ACL) analyses using continuous variables.

There was a significant interaction between substance use status (abstinent/used) and mental health over time. Those who were abstinent (based on the 3-month follow-up period) experienced significantly better mental health during the follow-up periods compared to those who continued to use. Participants who used substances achieved mean continuous mental health scores that were only either equal to, or marginally above, the mean baseline score of abstinent individuals. As a result of attrition and missing data, these findings are particularly relevant for those with more severe levels of alcohol misuse at treatment entry and may not generalise to those with less severe alcohol problems.

Finally, the model testing indicated that the data were most consistent with the mental health as a consequence model. That is, improved mental health appears to be a consequence of reduced severity of alcohol and other drug abuse. Similarly, better mental health follows reductions in cravings. The measures were administered at three time points; at entry to residential treatment; at 3-month follow-up after discharge and then 12 months post-discharge follow-up. Reductions in drug and alcohol severity and cravings appeared to precede improvements in mental health over these time periods. This result is consistent with the supposition that the receipt of treatment and the consolidation of treatment effects in the community lead to improved drug and alcohol outcomes, although without a control group we cannot conclude causation. However, the results do suggest that it is not just drug- and alcohol-specific outcomes, but also more general mental health that improve.

Study implications

Finding relatively low rates of languishing at follow-up compared to population rates, was somewhat surprising but may be partially explained by a contrast effect. That is, individuals who have experienced the challenges and hardships associated with substance abuse, which then have positive personal and emotional experiences through treatment, could respond disproportionately to such positive experiences. The contrast between their baseline levels of well-being and subsequent perceptions may lead more individuals to move out of the languishing range. This contrasting effect would likely be further enhanced by the positive emotional reactivity found among individuals who are flourishing (Catalino & Fredrickson, 2011). In addition, the relatively lower rates of languishing were found after participants had prioritised their well-being by receiving treatment. Similarly, the low rate of languishing amongst

yoga practitioners was also attributed to the high priority they gave to health and wellbeing (Ross et al., 2013). However, the current frequencies and comparison may also be influenced by differences in rates of mental health between the US and Australian samples. This highlights the need to assess Australian community population rates of mental health as conceptualised by Keyes. Finally, some caution is needed in making comparisons between studies using either the short or long form of the Mental Health Continuum. The estimates of the mental health categories in the American population were generated from the long form of the Mental Health Continuum, while the current and other studies, including the yoga practitioner study, have utilised the short form. Although both forms of the Mental Health Continuum have demonstrated adequate validity and reliability (Keyes, 1998, 2002; Ryff & Keyes, 1995), it is unclear whether they might result in variations of estimates.

The pre- and post-treatment differences in mental health diagnoses indicate that individuals may experience significant changes from treatment entry to post-discharge follow-up, but these changes stabilise over the 12-month post-discharge. This pattern has been identified in previous research with stabilisation being a common goal in the early stages (less than 12 months) of recovery (Dennis, Scott, Funk, & Foss, 2005; El-Guebaly, 2012; McLellan, Lewis, O'Brien, & Kleber, 2000).

The majority of the sample experienced moderate mental health. While not mentally unhealthy, these individuals are not experiencing the benefits of flourishing (Keyes, 2005). The mental health of these individuals might be further increased through enhancing or maintaining support resources. Such resources are broadly known as recovery capital (Cloud & Granfield, 2008). Recovery capital includes variables, such as spirituality, religion, life meaning and 12-step affiliation (Laudet, Morgen, & White, 2006), which are thought to reflect an individual's embeddedness in their social and cultural life (Granfield & Cloud, 2001; Laudet et al., 2006). Enhancing components of recovery capital may buffer the effects of stress (Laudet & White, 2008; Laudet et al., 2006) and lead to improved mental health. Future research is needed to confirm such relationships.

Languishing was found to be most common amongst individuals who had used substances. However, there were individual's at all three assessments, who had remained abstinent and yet were languishing. This is the group that historically may have been referred to as "dry drunks" (Gogek, 1994). While abstinence has previously been utilised as a defintion of recovery (Garbutt et al., 1999; Laudet & White, 2010; Rudolf & Watts, 2002), the current and previous research highlight the limitations of using abstinence as an isolated outcome (Schwarzlose et al., 2007). The inclusion of mental health indices is likely to more comprehensively capture the experience of individuals in recovery (Laudet, 2007).

Finally, evidence for the consequential model suggests that by improving drug and alcohol outcomes other mental health indicators also improve. The study is not able to clarify the mechanisms by which this occurs, but the provision of treatment over the study period suggests this as a potential if not likely mechanism. The Salvation Army residential

treatment programme is faith-based and subscribes to a 12-step treatment model in what is described as a modified therapeutic community. However, there are other multiple components, such as individual counselling, family support and work opportunities provided (e.g. gardening, food services). There is a need for future research to try to provide evidence for the most helpful ingredients in treatment that maximise both substance abuse and mental health outcomes.

Limitations and future directions

Limitations of the study include reduced sample sizes for follow-up periods, use of only faith-based treatment programmes, and primarily male samples (79.9%). Despite attrition, analyses suggesting only alcohol addiction severity may be different for those who completed all follow-ups and those who did not; it is still possible there were other unexplored variables that could potentially bias the findings. Although the ASI is a widely used measure of substance use (McLellan et al., 1992), it is a self-report measure. Future research may benefit from including objective measures of substance use.

There are many reasons for failing to retain participants at follow-up with the more common being: re-entry into recovery services; not providing consent to be contacted at follow-up; incorrect contact details and withdrawing consent at follow-up contact. Future research would benefit from utilising balanced gender and a combination of secular and non-secular treatment comparison groups. In addition, the majority of previous literature has arisen from North American culture (Dennis et al., 2005), whereas the current study utilises an Australian sample. While this broadens research on mental health in addiction contexts, it would be useful to obtain Australian community normative data on the mental health continuum to provide an additional point of reference to quantify rates of mental health recovery.

Despite these limitations, this study offers a unique insight into how mental health relates to recovery from substance misuse. While the comorbidity of mental illness and substance misuse has previously been investigated, this is one of the first studies to document the prevalence of mental health diagnoses.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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