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RESEARCH PAPER

All Positive Constructs are Not Equal: Positive Affect, Happiness, and Life Satisfaction in Relation to Alcohol and Mental Health Outcomes

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Abstract

Previous theoretical work suggests that happiness, life satisfaction, and positive affect are distinct. However, many recent research studies refer to these constructs interchangeably and mixed findings exist regarding their associations with alcohol and mental health outcomes. Thus, the purpose of this study was to explore the factor structure of positive affect, happiness, and life satisfaction and examine their associations with alcohol and mental health outcomes (i.e., alcohol consumption, drinking motives, depression, anxiety, and stress). Undergraduate students (N=348; M_{age}=19.7 years; 74.6% women; 85.4% White) at a northeastern United States public university recruited via classroom announcements completed an online battery of self-report measures. A confirmatory factor analysis showed that modelling happiness, life satisfaction, and positive affect as three distinct factors provided optimal fit, $\chi^2(149)=409.31$, $p<.001$, CFI=0.98, RMSEA=0.07, 90%CI [0.06, 0.08]. Happiness and life satisfaction were negatively associated with coping motives, while only life satisfaction was negatively associated with conformity motives. Happiness, life satisfaction, and positive affect were negatively associated with depressive symptoms and stress. Happiness and life satisfaction were negatively associated with anxiety symptoms. Findings of the current study highlight the distinct nature of positive psychological constructs: life satisfaction, subjective happiness and positive affect, and their differential link to alcohol use and mental health outcomes. Researchers should consider the differential nature of these positive constructs when selecting constructs to increase precision and promote clarity.

Keywords Positive psychology · Alcohol use · Mental health · College students

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1 Introduction

The prevalence of alcohol use disorder and mood and anxiety disorders are heightened in college students compared to non-college-attending peers of the same age (Blanco et al., 2008). College-aged young adults exhibit higher rates of risky alcohol use, binge drinking, and high-intensity drinking compared to other age groups (Schulenberg et al., 2021). Risky alcohol use among college students is associated with alcohol-related problems and engagement in other hazardous behaviors such as alcohol-induced memory impairment, drinking and driving, aggressive behavior, and sexual assault (Ashenhurst & Fromme, 2018). Additionally, numerous stressors may negatively impact the mental health of college students (Mahmoud et al., 2012). Stress, depression, and anxiety may be especially prominent due to frequent concerns about academic performance, pressure to succeed, and post-graduation plans (Beiter et al., 2015). Thus, it is important to identify relevant factors that may protect against risky alcohol use and negative mental health outcomes in college students.

Positive psychology is the study of "conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (Gable & Haidt, 2005, p. 104). One aspect of positive psychological research focuses on positive emotional constructs such as positive affect, happiness, and life satisfaction. Positive affect refers to one's dynamic moods and emotions, which vary depending on context and as reactions to events (Diener et al., 1999), and reflects how much a person feels enthusiastic, alert, and active ((Watson et al., 1988a). Life satisfaction is defined as the stable, cognitive evaluation of satisfaction with one's life. In contrast to the specific constructs of life satisfaction and positive affect, happiness is a more general construct which refers to how subjectively happy or unhappy one generally feels (Diener & Ryan, 2009; (Diener et al., 2009b; Lyubomirsky & Lepper, 1999). Happiness differs from life satisfaction and reflects overall quality of life, and affect, which is focused on emotions over a given period of time (Lyubomirsky & Lepper, 1999). These positive constructs are disparate from each other in the way that they can be experienced by individuals. For instance, people can feel dissatisfied with their life conditions (i.e., low life satisfaction) but still experience happiness or momentary positive affect. Thus, existing theoretical literature has established life satisfaction, positive affect, and happiness as distinct constructs. However, a critical limitation of the existing literature is inconsistency in how they are defined and conceptualized in empirical research. Many studies refer to these constructs interchangeably rather than separately assessing them (Donaldson et al., 2015). While moderate to strong correlations exist among happiness, life satisfaction, and positive and negative emotionality (Lyubomirsky & Lepper, 1999), this lack of precision may contribute to mixed findings regarding the association between these positive constructs and important health outcomes, such as alcohol and mental health outcomes.

Existing studies focusing on the association between positive constructs and alcohol use outcomes reveal conflicting findings. Positive affect and life satisfaction have been found to be negatively associated with alcohol use (Murphy et al., 2005; Saether et al., 2019; Wills et al., 1999), and prior-day alcohol use has been found to be negatively associated with next-day happiness (Harder et al., 2014; Lee et al., 2022). However, other studies have found a positive relationship between life satisfaction

and alcohol use (Molnar et al., 2009) and some longitudinal studies have identified positive associations between positive affect and alcohol use (Hussong et al., 2001; Rankin & Maggs, 2006). Other studies have shown a non-linear association between life satisfaction and alcohol use. For instance, Koivumaa-Honkanen et al. (2012) reported a J-shaped association, wherein life satisfaction was higher for people who consumed low amounts of alcohol compared to those who either consumed high amounts of alcohol or were abstinent from alcohol. Massin and Kopp (2014) described an inverse J-shaped relationship between life satisfaction and alcohol use among men (i.e., men who reported the most alcohol consumption exhibited lower life satisfaction than men who abstained from alcohol) and an inverse U-shaped relationship among women (i.e., women who reported the most alcohol use exhibited lower satisfaction compared to women who drank less alcohol yet higher satisfaction compared to women who abstained from alcohol). Conversely, alcohol use has been found to have no relationship with happiness (Zhou et al., 2015) and life satisfaction (Clifford et al., 1991; Murphy et al., 2006). These inconsistent findings may be a result of imprecision in the definitions and measurement of these positive constructs and point to a need for research focusing on their distinction in relation to alcohol outcomes.

Findings on the associations between these positive constructs and mental health outcomes have been more uniform, with research generally finding that they are important for good mental health (Rosenfeld, 2019), though some of these findings have also been inconsistent. Happiness and life satisfaction have been found to be negatively associated with depression, anxiety, and stress in college students (Mahmoud et al., 2012; Wong, 2010). Indeed, life satisfaction is positively associated with good mental health outcomes even after controlling for factors such as income, general health, and gender (Lombardo et al., 2018). Life satisfaction has been found to be negatively associated with anxiety in college students (Mahmoud et al., 2015), though another study found that life satisfaction was not associated with worry and anxious arousal (Carver et al., 2021). An inverse relationship between positive emotions and stress has been found in college students (Çivitci, 2015), perhaps because positive affect helps people cope with stress over time (Folkman & Moskowitz, 2007). Decreased positive affect is a common effect of anxiety (Eisner et al., 2009) and depression (Brown et al., 1998; Clark & Watson, 1991), and college students with more intense and frequent experiences of positive affect tend to report lower depressive symptoms (Schick & Spillane, under review). While these findings between positive constructs and mental health outcomes are more consistent compared to alcohol outcomes, it is important to further refine our understanding of these positive constructs to more accurately identify mechanisms through which these outcomes can be targeted.

Previous theoretical work suggests that happiness, life satisfaction, and positive affect are distinct constructs. However, many recent research studies refer to them interchangeably (Donaldson et al., 2015) and mixed findings exist regarding their associations with alcohol and mental health outcomes. To promote precision in research, we aim to (1) statistically validate if happiness, life satisfaction, and positive affect are distinct factors and (2) determine if they are differentially related to alcohol and mental health outcomes. Increased clarity regarding the relations among

these positive constructs and college student alcohol and mental health has the potential to inform treatment development, ultimately improving college student health.

2 Materials and Methods

2.1 Participants and Procedures

This study represents a secondary analysis of data collected from undergraduate students at a public university in the northeastern United States for a larger study examining the associations among stress, positive emotions, and alcohol use (Schick et al., 2023). Participants were recruited through online advertisements and announcements in classes in Spring 2018. Those interested in participating utilized a link within the advertisement to access a Qualtrics survey, at which point they were asked to read a consent form and confirm their willingness to participate by selecting "yes" at the bottom of the form. Participants who provided consent to participate were asked to complete the online Qualtrics survey, which took approximately 30 min to complete, and participants did not receive any compensation for completing the survey. No identifying information was collected during this study and all study procedures were approved by the University of Rhode Island Institutional Review Board. A total of 350 students provided informed consent and completed study questionnaires. The average age of the sample was 19.7 years ($SD = 2.13$; range: 18–40 years). Most participants identified as women (74.6%), non-Hispanic (93.4%), and White (85.4%), and were in their freshman (42.0%) or sophomore (26.0%) years of college. Sample demographic characteristics are summarized in Table 1. All data and code related to this manuscript can be found via Open Science Framework at https://doi.org/10.17605/OSF.IO/5ZWFU.

2.2 Measures

2.2.1 Positive Construct Measures

Positive affect was measured using the positive affect subscale of the Positive and Negative Affect Schedule (PANAS-PA; Watson et al., 1988a). The PANAS-PA includes 10 items measuring the intensity with which individuals have experienced a range of positive emotions over the preceding week. Participants rate each item based on the extent to which they have felt each of the emotions with five possible response options (1 = *very slightly or not at all*, 5 = *extremely*) for a possible total score between 10 and 50, with higher scores indicating higher intensity of positive affective experiences over the preceding week. The PANAS is considered the "gold standard" for the measurement of positive affect and has been shown to have good psychometric properties (Crispim et al., 2014); internal consistency in the present sample was excellent, Cronbach's $\alpha = 0.90$.

Subjective happiness was measured using the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), a 4-item measure of overall subjective happiness, happiness relative to peers, and participants' characterization of themselves as a generally

Table 1 Sample Demographic Characteristics

Construct	*M* (*SD*)	Range	*n* (%)
Age	19.65 (2.13)	18–40	
Gender Identity			
Woman			261 (74.6%)
Man			84 (24.0%)
Transgender or Non-binary			5 (1.5%)
Hispanic Ethnicity			23 (6.6%)
Racial Background			
American Indian/Alaska Native			3 (0.9%)
Asian			12 (3.5%)
Native Hawaiian or other Pacific Islander			1 (0.3%)
Black or African American			12 (3.5%)
White			299 (86.4%)
Multiracial			19 (5.5%)
Year in College			
1st Year/Freshman			147 (42.0%)
2nd Year/Sophomore			91 (26.0%)
3rd Year/Junior			51 (15.4%)
4th Year/Senior			49 (14.0%)
5th Year or Higher			9 (2.6%)

happy or unhappy person. Participants rate each item based on whether they perceive themselves to fall on a seven-point scale (i.e., one item has anchor points of 1 = *much less happy* and 7 = *much more happy*). Items are summed to produce a total score with possible scores ranging from 7 to 28, with higher scores indicating greater subjective happiness. Internal consistency in this sample was good, Cronbach's α = 0.87.

Life satisfaction was measured using the Satisfaction with Life Scale (SWLS; Diener et al., 1985a), Diener et al., 1985a> 5-item measure assessing the degree to which participants perceive their life conditions as positive. Participants rate each item based on the extent to which they agree with each statement according to seven possible response options (1 = *strongly disagree*, 7 = *strongly agree*). Item scores are summed to create a total score ranging from 5 to 35, with higher scores indicating greater life satisfaction. Internal consistency in the present sample was excellent, Cronbach's α = 0.91.

2.2.2 Alcohol Outcome Measures

Alcohol consumption was measured using open-ended questions regarding past-month frequency and quantity of alcohol use. For the present analyses, items regarding drinking frequency (i.e. "in the past month, on average how many days did you drink alcohol?") were multiplied by drinking quantity (i.e. "in the past month, on average how many drinks did you have each time you drank?") to create a total consumption score reflecting approximate number of alcoholic drinks consumed per

month. This derived score has been used previously in extant research (Beard et al., 2019; Lima et al., 2005; Schick et al., 2022), with higher total scores reflecting greater alcohol consumption.

Drinking motives were measured using the Drinking Motives Questionnaire – Revised (DMQ-R; Cooper 1994). The DMQ-R includes 20 items across four subscales reflecting reasons for alcohol use (i.e., social, coping, enhancement, and conformity). Participants rate each item based on how frequently they drink for each reason with five possible response options (1 = *almost never/never*, 5 = *almost always/always*). Subscale scores are created by summing appropriate items, with higher scores indicating more frequent endorsement of drinking due to each motive. Cronbach's alphas in the present study were good, α = 0.90, 0.88, 0.86, and 0.86 for the social, coping, enhancement, and conformity motive subscales, respectively.

2.2.3 Mental Health Outcome Measures

Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9; Kroenke & Spitzer 2002), a self-report measure assessing depressive symptoms over the preceding two weeks. Participants rate each item based on the extent to which they have been bothered by each symptom in the past two weeks with four possible response options (0 = *not at all*, 3 = *nearly every day*). Item scores are summed to create a total scale score ranging from 0 to 27, with higher scores indicating greater depressive symptom severity. Internal consistency in this sample was good, Cronbach's α = 0.89.

Anxiety symptoms were measured using the Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006), a self-report measure assessing anxiety symptoms over the preceding two weeks. Participants rate each item based on the extent to which they have been bothered by each symptom in the past two weeks with four possible response options (0 = *not at all*, 3 = *nearly every day*). Item scores are summed to create a total scale score ranging from 0 to 21, with higher scores indicating greater anxiety symptom severity. Internal consistency in this sample was excellent, Cronbach's α = 0.90.

Perceived stress was measured using the Perceived Stress Scale (PSS; Cohen et al., 1983), a 10-item self-report measure assessing the degree to which situations in one's life are appraised as stressful. Participants rate each item based on the extent to which each statement has been true for them in the preceding month with five possible response options (0 = *never*, 4 = *very often*). Appropriate items are reverse scored, then all items are summed to create a total scale score ranging from 0 to 40, with higher scores indicating higher levels of perceived stress in the past month. Internal consistency in this sample was good, Cronbach's α = 0.88.

2.3 Data Analytic Strategy

First, two confirmatory factor analysis (CFA) models were examined in M*plus* version 7.1 (Muthén & Muthén, 1998) using weighted least squares estimation method (WLSMV). WLSMV was utilized due to the ordinal nature of item responses (i.e., Likert-type scales) and has been shown to be less biased and more accurate than

robust maximum likelihood in estimating factor loadings for ordinal data (Li, 2016). The first model estimated a three-factor structure, with each scales' respective items loading onto separate factors. The second model estimated a bifactor model in which an overall positive construct variable as a general factor under which the three scales were subsumed. Overall model fit was assessed using the likelihood ratio test based on the chi-square value. A nonsignificant likelihood ratio test indicated good model fit. However, because the chi-square test rejects even adequately fitting models (Hu & Bentler, 1999), fit indices based on the chi-square distribution were also used to assess model fit. Specifically, the comparative fit index greater than 0.95 (CFI; Bentler 1990) and root mean square error of approximation value below 0.10 (RMSEA; Steiger 1990) with accompanying 90% confidence intervals (CIs) were also used to indicate good model fit. Agreement among fit indices provides evidence that at least adequate model fit was achieved (Kline, 2016).

Next, using SPSS v. 27.0, we examined scores on study variables of interest to assess adherence to assumptions of normality. We examined bivariate correlations between variables representing positive constructs (i.e., positive affect, subjective happiness, life satisfaction), alcohol use outcomes (i.e., alcohol consumption, drinking motives), and mental health outcomes (i.e., depressive symptoms, anxiety symptoms, stress) to examine their interrelations. Magnitude of correlations was interpreted based on the following guidelines by Mukaka (2012): below 0.30 is very small, 0.30 to 0.50 is small, 0.50 to 0.70 is moderate, and above 0.70 is large. In any cases where multiple positive constructs emerged as significantly correlated with an outcome, we entered all positive constructs into a multiple linear regression model to examine their relative contributions to each respective outcome.

Finally, we conducted sensitivity analyses to examine the effects of age and gender on the associations between positive constructs and alcohol and mental health outcomes. We examined bivariate correlations among age, gender, and alcohol and mental health outcomes. Then, for any cases where multiple positive constructs and either age or gender were significantly correlated with an outcome, we entered all positive constructs, age, and gender into a multiple linear regression model to examine their relative contributions to each respective outcome.

3 Results

3.1 Confirmatory Factor Analysis Results

The three-factor model comprising factors representing positive affect, subjective happiness, and life satisfaction provided good fit to the data, $\chi^2(149) = 409.31, p < .001$, CFI = 0.98, RMSEA = 0.07, 90% CI [0.06, 0.08]. The model comprising of a bifactor solution provided worse fit to the data, $\chi^2(137) = 1292.66$, $p < .001$, CFI = 0.89, RMSEA = 0.16, 90% CI [0.15, 0.16]. Thus, the solution modeling three distinct factors was retained. See Table 2 for factor loadings derived from the confirmatory factor analysis conducted assuming a three-factor solution. The positive affect, subjective happiness, and life satisfaction scales were found to have acceptable reliability in the present sample, Cronbach's α's = 0.90, 0.87 and 0.91, respectively. Pearson product-

Table 2 Standardized Factor Loadings from Confirmatory Factor Analysis

	Positive Affect	Subjective Happiness	Life Satisfaction
PANAS-Positive Affect Subscale			
Interested	0.71		
Excited	0.78		
Strong	0.76		
Enthusiastic	0.85		
Proud	0.81		
Alert	0.53		
Inspired	0.71		
Determined	0.74		
Attentive	0.74		
Active	0.60		
Subjective Happiness Scale			
In general, I consider myself a very happy person.		0.96	
Compared with most of my peers, I consider myself more happy.		0.87	
Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?		0.84	
Some people are generally very unhappy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?		0.60	
Satisfaction with Life Scale			
In most ways my life is close to my ideal.			0.90
The conditions of my life are excellent.			0.83
I am satisfied with my life.			0.91
So far I have gotten the important things I want in my life.			0.82
If I could live my life over, I would change almost nothing.			0.76
Reliability (Cronbach's α)	0.90	0.87	0.91

Note. PANAS = Positive and Negative Affect Scale

moment correlations revealed significant positive correlations of moderate magnitude between the three scales (see Table 3).

3.2 Relation to Alcohol Use Outcomes

Pearson product-moment correlations (see Table 3) revealed that only life satisfaction was significantly correlated, with a very small magnitude, with past-month alcohol consumption. All positive constructs were significantly negatively related to coping drinking motives with a small magnitude, both subjective happiness and life satisfaction were significantly negatively related to conformity motives with a very small magnitude, and only subjective happiness was negatively related to social drinking motives with a very small magnitude. No positive constructs were significantly correlated with enhancement drinking motives.

Table 3 Bivariate correlations and descriptive statistics

	Positive Affect	Subjective Happiness	Life Satisfaction	*M* (SD)	Range	Skewness	Kurtosis
Positive Constructs							
Positive Affect	-			31.50 (7.98)	10–50	-0.07	-0.30
Subjective Happiness	0.63***	-		17.74 (5.36)	4–28	-0.30	-0.39
Life Satisfaction	0.54***	0.67***	-	21.67 (7.33)	5–35	-0.28	-0.75
Alcohol Use Outcomes							
Past-Month Alcohol Consumption	−0.04	−0.08	−0.15*	21.79 (22.43)	0–120	1.70	2.76
Social Drinking Motives	0.00	−0.13*	−0.06	15.96 (5.42)	5–25	-0.33	-0.93
Coping Drinking Motives	−0.22***	−0.34***	−0.33***	10.41 (5.05)	5–25	0.84	-0.29
Enhancement Drinking Motives	0.05	−0.10	−0.08	13.61 (5.40)	5–25	0.16	-0.79
Conformity Drinking Motives	−0.10	−0.15*	−0.19**	7.47 (3.74)	5–25	1.82	2.76
Mental Health Outcomes							
Depressive Symptoms	−0.55***	−0.62***	−0.59***	9.06 (6.38)	0–27	0.53	-0.58
Anxiety Symptoms	−0.34***	−0.51***	−0.45***	8.31 (5.61)	0–21	0.37	-0.74
Perceived Stress	−0.52***	−0.58***	−0.58***	19.23 (6.89)	0–40	-0.01	-0.44

Note. *$p<.05$, **$p<.01$, ***$p<.001$

Multiple linear regression analyses (see Table 4) predicting coping drinking motives revealed that, when all three positive constructs are entered into a model together, only subjective happiness ($\beta = -0.22$, $p=.01$) and life satisfaction ($\beta = -0.20$, $p=.01$) emerged as significant predictors (model $R^2=0.14$, $f^2=0.16$). In a model predicting conformity drinking motives, only life satisfaction ($\beta = -0.17$, $p=.046$) emerged as a significant predictor (model $R^2=0.04$, $f^2=0.04$).

3.3 Relation to Mental Health Outcomes

Pearson product-moment correlations (see Table 3) revealed that all positive constructs were significantly negatively correlated with depressive symptoms with a moderate magnitude, anxiety symptoms with a small to moderate magnitude, and perceived stress with a moderate magnitude. Multiple linear regression analyses (see Table 4) predicting depressive symptoms revealed that, when all three positive constructs are entered into a model together, positive affect ($\beta = -0.20$, $p<.001$), subjec-

Table 4 Multiple linear regression analyses

	Unstandardized Coefficients	Standardized Coefficients				Overall Model				
Predictor	*b* (*SE*)	β	*t*	*p*	95%*CI*	F	df	*p*	R^2	f^2
Outcome: Coping Drinking Motives						13.56	[3, 258]	<0.001	0.14	0.16
Intercept	16.71 (1.28)		13.08	<0.001	[14.19, 19.23]					
Positive Affect	0.02 (0.05)	0.02	0.31	0.76	[-0.08, 0.11]					
Subjective Happiness	−0.21 (0.08)	−0.22	-2.63	0.009	[-0.37, −0.05]					
Life Satisfaction	−0.14 (0.05)	−0.20	-2.49	0.01	[-0.24, −0.03]					
Outcome: Conformity Drinking Motives						3.27	[3, 258]	0.02	0.04	0.04
Intercept	9.60 (1.00)		9.61	<0.001	[7.63, 11.57]					
Positive Affect	0.01 (0.04)	0.02	0.30	0.76	[-0.06, 0.09]					
Subjective Happiness	−0.04 (0.06)	−0.05	-0.56	0.58	[-0.16, 0.09]					
Life Satisfaction	−0.09 (0.04)	−0.17	-2.01	0.046	[-0.17, −0.002]					
Outcome: Depressive Symptoms						98.00	[3, 342]	<0.001	0.46	0.85
Intercept	25.81 (1.07)		24.06	<0.001	[23.70, 27.92]					
Positive Affect	−0.16 (0.04)	−0.20	-3.84	<0.001	[-0.24, −0.08]					
Subjective Happiness	−0.36 (0.07)	−0.30	-5.06	<0.001	[-0.49, −0.22]					
Life Satisfaction	−0.25 (0.05)	−0.28	-5.19	<0.001	[-0.34, −0.15]					
Outcome: Anxiety Symptoms						44.39	[3, 342]	<0.001	0.28	0.39
Intercept	18.45 (1.09)		16.93	<0.001	[16.30, 20.59]					
Positive Affect	0.01 (0.04)	0.01	0.19	0.85	[-0.08, 0.09]					
Subjective Happiness	−0.40 (0.07)	−0.38	-5.63	<0.001	[-0.54, −0.26]					

Table 4 (continued)

	Unstandardized Coefficients	Standardized Coefficients				Overall Model				
Predictor	*b* (*SE*)	β	*t*	*p*	95%*CI*	F	df	*p*	R^2	f^2
Life Satisfaction	−0.15 (0.05)	−0.20	-3.12	0.002	[-0.25, −0.06]					
Outcome: Perceived Stress						83.30	[3, 343]	<0.001	0.42	0.72
Intercept	36.41 (1.19)		30.50	<0.001	[34.07, 38.76]					
Positive Affect	−0.17 (0.05)	−0.20	-3.69	<0.001	[-0.26, −0.08]					
Subjective Happiness	−0.32 (0.08)	−0.25	-4.08	<0.001	[-0.47, −0.17]					
Life Satisfaction	−0.28 (0.05)	−0.30	-5.33	<0.001	[-0.39, −0.18]					

tive happiness ($\beta = -0.30, p < .001$), and life satisfaction ($\beta = -0.28, p < .001$) emerged as significant predictors (model $R^2 = 0.46$, $f^2 = 0.85$). In a model predicting anxiety symptoms, only subjective happiness ($\beta = -0.38$, $p < .001$) and life satisfaction ($\beta = -0.20$, $p = .002$) emerged as significant predictors (model $R^2 = 0.28$, $f^2 = 0.39$). Finally, in a model predicting perceived stress, positive affect ($\beta = -0.20$, $p < .001$), subjective happiness ($\beta = -0.25$, $p < .001$), and life satisfaction ($\beta = -0.30$, $p < .001$) emerged as significant predictors (model $R^2 = 0.42$, $f^2 = 0.72$).

3.4 Sensitivity Analyses

Bivariate correlations among age, gender, and alcohol and mental health outcomes (see Supplemental Table 1) revealed that age was significantly negatively correlated with social drinking motives, and being a woman was significantly negatively correlated with past-month alcohol consumption and significantly positively correlated with anxiety symptoms and perceived stress (all with very small magnitudes). Age and gender were not significantly correlated with any of the three positive constructs. Follow-up multiple linear regression analyses (see Supplemental Table 2) revealed that, controlling for age and gender, subjective happiness ($\beta = -0.42$, $p < .001$) and life satisfaction ($\beta = -0.17$, $p < .001$) remained significantly associated with anxiety symptoms (model $R^2 = 0.31$, $f^2 = 0.45$), while positive affect ($\beta = -0.15$, $p = .001$), subjective happiness ($\beta = -0.35$, $p < .001$), and life satisfaction ($\beta = -0.31$, $p < .001$) remained significantly associated with perceived stress (model $R^2 = 0.48$, $f^2 = 0.92$).

4 Discussion

The purpose of this study was to examine the factor structure underlying subjective happiness, life satisfaction and positive affect, and their differential relationships with alcohol and mental health outcomes. First, we found evidence that these constructs may be best conceptualized as three distinct factors, rather than reflecting some underlying overall positive construct. This finding is in response to previous calls for clarity regarding the distinction between various positive psychological constructs and may help to explain the reasons for the mixed findings observed with respect to the associations between these constructs and clinically relevant outcomes. The growing field of positive psychology has received critiques regarding its conceptual and scientific rigor (Aspinwall & Tedeschi, 2010; Lazarus, 2003). As the field continues to expand (Donaldson et al., 2015), clarity and accuracy in construct measurement will be vital to promote rigor, increase the reach of research findings, and move towards the stated goal of the field to increase understanding of factors that promote individuals' flourishing (Seligman & Csikszentmihalyi, 2014). Indeed, scientific rigor is the key separation of positive psychology from folk wisdom and popular ideas about positive thinking (Diener, 2003; Peterson & Park, 2003).

Next, we found that positive affect, subjective happiness, and life satisfaction emerged as differential predictors of alcohol-related outcomes. Specifically, at zero-order, only life satisfaction was significantly and negatively related to past-month alcohol consumption, only subjective happiness was significantly and negatively related to social motives for drinking, and only subjective happiness and life satisfaction were significantly and negatively related to conformity motives for drinking. All three positive constructs were significantly and negatively related to coping drinking motives at zero-order. In multivariate models including all positive constructs, life satisfaction emerged as the strongest predictor of both conformity drinking motives, while subjective happiness was the strongest predictor of coping drinking motives. It is interesting to note that coping and conformity motives represent avoidance-type motives for drinking under Cooper's (1994) motivational model of alcohol use. It may be that those individuals who are more satisfied with their lives and happier are less likely to engage in avoidance-type behaviors overall. However, additional research is needed to explore the reason for this finding. While previous work has focused on well-being overall in relation to drinking motives (Appleton et al., 2018), this finding suggests that future work may benefit from more thoroughly examining the link between life satisfaction, happiness and drinking motives. Interestingly, a larger proportion of variance was accounted for by the positive constructs in the model predicting coping drinking motives compared to the model predicting conformity drinking motives; this may be related to the emotion-focused nature of coping motives (Cooper et al., 2000). Further, with the exception of a significant correlation with coping drinking motives, positive affect was not significantly related to any alcohol use outcomes. This finding may reflect the state-based and momentary nature of positive affect, whereas subjective happiness and life satisfaction are conceptualized as being more stable traits (Diener et al., 2009a, b). It may be that momentary states, such as positive affect, are more likely to predict momentary alcohol use and

motives for that specific episode of alcohol use rather than average levels of alcohol use reported retrospectively.

Findings regarding the association between positive psychological constructs and mental health outcomes were more consistent, and the positive constructs accounted for a much larger proportion of the variance in outcomes compared to the models focused on alcohol-related outcomes. Positive affect, subjective happiness and life satisfaction were significantly and negatively related to depressive symptoms and stress in both bivariate and multivariate models, consistent with previous literature (Koivumaa-Honkanen et al., 2004; Pompili et al., 2016; Werner-Seidler et al., 2013). Each positive psychological construct was significantly related to anxiety symptoms at zero-order, but in multivariate models including all three positive psychological construct, only subjective happiness and life satisfaction remained significant predictors. Further, findings regarding anxiety and perceived stress remained consistent in sensitivity analyses after controlling for age and gender. Similar to our findings regarding links with alcohol use, it may be that the momentary nature of positive affect would be more likely to be associated with momentary, or even within-day, measures of mental health symptomatology. Indeed, previous work has found that frequency of positive emotions, not intensity (as is measured by the PANAS; Watson et al., 1988b), is related to overall well-being and good mental health (Diener et al., 1985b, 2009a). If this is the case, it would support the need for investigations using intensive longitudinal (e.g., experience sampling) methodologies to examine these temporal associations as they unfold in individuals' daily lives, rather than relying on retrospective, cross-sectional examinations of correlates of positive emotions.

Findings of the present study have important implications for both research and clinical practice. First, they speak to the need for increased precision when considering positive psychological constructs in research given their theoretical and, now, empirically-supported distinction. Our finding that these constructs are differentially related to outcomes suggest that failure to thoroughly consider which positive construct researchers mean to measure may contribute to the previously observed mixed findings regarding their associations with important clinically relevant outcomes (Donaldson et al., 2015; Krentzman, 2013). Our finding that positive psychological constructs were negatively associated with various alcohol and mental health outcomes also suggests that positive psychological interventions (PPIs) may be a useful avenue for improving college students' alcohol and mental health outcomes. Meta-analytic reviews examining the efficacy of PPIs have found strong support for their use to reduce depressive symptoms and that these effects last over time (Bolier et al., 2013; Sin & Lyubomirsky, 2009). More preliminary work has found evidence to suggest that PPIs may also be useful to target alcohol consumption (Akhtar & Boniwell, 2010), anxiety symptoms (Brown et al., 2019), and stress (Matvienko-Sikar & Dockray, 2017). Further work is needed to explore the efficacy of these interventions for a wider range of outcomes other than depression, and to better understand what specific positive construct is impacted by PPIs and is associated with changes in outcomes.

While results of the present study are novel and contribute to our understanding of the role of positive psychological constructs in relation to alcohol and mental health outcomes, findings should be considered within the context of the study's limitations.

First, the cross-sectional and correlational study design precludes the ability to draw causal inferences or predictive conclusions from the data (Solem, 2015). Additional data from longitudinal studies would be useful to further examine the interrelation between positive psychological constructs and to clarify the role of positive psychological constructs in alcohol and mental health outcomes, including examining how variations in these variables over time and in different contexts relate to outcomes. Second, the majority of participants were non-Hispanic women in their first two years of college. This limits the generalizability of the study, especially given work suggesting age, race, and gender differences in alcohol use and mental health symptomatology (Chen & Dagher, 2016; Maguen et al., 2010; White, 2020). However, it is also important to note that recent literature has called for interventions focused on reducing alcohol use among women in particular (White, 2020), necessitating the examination of factors that influence risk for alcohol use in samples largely comprised of women. Nevertheless, future studies should focus on obtaining a more generalizable sample to understand the extent to which these results are applicable to a wider population.

Findings of the current study highlight the distinct nature of positive psychological constructs: life satisfaction, subjective happiness and positive affect, and their differential link to alcohol use and mental health outcomes. Additional work is needed to further explore the association between these constructs and clinically relevant outcomes. Such work will increase precision in research and better inform how positive psychological interventions can be leveraged to help individuals flourish and reduce alcohol use and mental health concerns.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s41042-023-00103-8.

Declarations

Ethical Approval This study was reviewed and approved by the University of Rhode Island Institutional Review Board prior to beginning data collection procedures.

Informed Consent All participants provided informed consent via online questionnaire prior to providing responses to study questionnaires.

Conflicts of interest The authors report no conflicts of interest.

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