Examining Temptation to Drink from an Existential Perspective: Associations among Temptation, Purpose in Life, and Drinking Outcomes

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Abstract

Temptation to drink, defined as the degree to which one feels compelled to drink in the presence of internal or external alcohol-related cues, has been shown to predict alcohol treatment outcomes among individuals with alcohol use disorders (AUDs). Research examining temptation to drink from an existential perspective is lacking and little is known about how existential issues such as purpose in life (PIL) relate to temptation to drink, which is surprising given the role of existential issues in many treatments and mutual help approaches for AUDs. The current study examined the longitudinal associations among temptation to drink, PIL, and drinking outcomes using data from Project MATCH (N = 1726). Parallel process latent growth curve analyses indicated that PIL and temptation to drink were significantly associated across time, such that higher initial levels of PIL and increases in PIL over time were associated with lower initial levels of temptation to drink and decreases in temptation to drink over time. Higher initial levels of temptation to drink, lower initial levels of PIL, increases in temptation to drink, and decreases in PIL were significantly associated with greater intensity and frequency of drinking and greater drinking-related consequences at the 15-month follow-up. Accordingly, temptation to drink and PIL may be important constructs for clinicians to consider throughout the course of treatment. Future studies should examine if and how various kinds of treatments for AUDs are associated with increases in PIL, and whether these increases are related to decreased temptation to drink and reduced drinking.

Keywords

Temptation to Drink; Purpose in Life; Alcohol Use Disorder; Alcohol Treatment; Drinking Outcomes

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Introduction

Temptation to drink, defined as the degree to which one feels compelled to drink in the presence of internal or external alcohol-related cues, has been shown to predict alcohol treatment outcomes among individuals with alcohol use disorders (AUDs). For example, temptation to drink, as measured by the Temptation scale of the Alcohol Abstinence Self-Efficacy Scale (DiClemente, Carbonari, Montgomery, & Hughes, 1994) was found to be a strong predictor of poorer drinking outcomes during and following treatment in Project MATCH (DiClemente et al., 2001). One type of internal cue for drinking, craving for alcohol, defined as the subjective experience of having a desire to drink, may particularly increase an individual's temptation to drink and has also associated with poorer alcohol treatment outcomes (Bottlender & Soyka, 2004; Connolly et al., 2013; Moore et al., 2013; Oslin, Cary, Slaymaker, Colleran, & Blow, 2009; Schmidt, Helten, & Soyka, 2011; Witkiewitz, 2013). Moreover, craving is now one of the diagnostic criteria for Substance Use Disorders in the Substance-Related and Addictive Disorders section of the fifth edition of the Diagnostic and Statistical Manual for Mental Disorders (DSM-5; American Psychiatric Association, 2013).

Few studies that have tried to disentangle the subjective experience of craving from reported temptation to drink (Ooteman, Koeter, Vserhuel, Schippers, & van den Brink, 2006); however, one recent study found the Temptation scale of the Alcohol Abstinence Self-Efficacy Scale (DiClemente et al., 1994) could be conceptualized as measuring two types of craving experiences: reward craving and relief craving (Glöckner-Rist, Lémenager, Mann & PREDICT Study Research Group, 2013). Further, in a recently detoxified sample of individuals with AUD the authors found that both types of craving experiences, as measured by the Temptation scale, were significantly associated with perceived stress. Thus, temptation to drink may reflect a strong desire to seek reward or provide relief from craving, which is highly stressful. In the context of seeking alcohol treatment, particularly among clients with an abstinence goal, such temptation may introduce a stressful existential crisis whereby an individual's desire to drink conflicts with the individual's decision to remain abstinent.

Despite the importance of temptation to drink in predicting alcohol treatment outcomes, there is limited research that has temptation to drink from multiple theoretical perspectives. Skinner and Aubin (2010) reviewed 18 models of addiction that prominently address the role of craving and temptation to drink including conditioning-based (i.e., learning), cognitive, psychobiological, and motivational models, yet their review did not include potential existential issues that may be related to temptation to drink in the presence of craving. In particular, we believe that it may be important to examine temptation to drink and drinking outcomes from an existential perspective (Frankl, 1997) that considers purpose in life (PIL), or the extent to which individuals view their lives as purposeful and meaningful (Crumbaugh & Maholick, 1964). First, existential issues, such as PIL, are central to twelve-step facilitation treatment and Alcoholics Anonymous, two highly utilized approaches among individuals with AUD. Besides 12-step facilitation, several other empirically-supported treatments for AUD include components that address personal values and engagement in meaningful activity, which are related to PIL. For example, Motivational

Interviewing (MI) involves values clarification (Miller & Rollnick, 2002); Mindfulness-Based Relapse Prevention involves making conscious decisions consistent with one's values and goals (Bowen, Chawla, and Marlatt, 2010); and the Community Reinforcement approach (CRA; Miller, Meyers, Hiller-Sturmhöful, 1999) aims to enhance positive reinforcement for sobriety by assisting the client in engaging valued and enjoyable non-drinking activities. Although research on Acceptance and Commitment Therapy (ACT) for AUD is preliminary, ACT also focuses on commitment to valued action (Hayes, Strosahl & Wilson, 1999; Hayes, Luoma, Bond, Masuda, & Lillis, 2006). Second, existential constructs have been widely investigated in relation to alcohol use (Cook, 2004), including meaning-seeking as a primary matching criterion for Project MATCH (Project MATCH Research Group, 1998; Tonigan, Miller, & Connors, 2001). Moreover, in regards to PIL specifically, low PIL has been found to be associated with heavy drinking (Marsh, Smith, Piek, & Saunders, 2003), and alcohol relapse (Miller, Westerberg, Harris, & Tonigan, 1996; Waisenberg & Porter, 1994), whereas increases in PIL during treatment predict improved drinking outcomes (Robinson, Krentzman, Webb, & Brower, 2011; Krentzman, Farkas, & Townsend, 2010).

To our knowledge, no published studies have examined the relationship between PIL and temptation to drink, but PIL has been investigated among individuals with alcohol use disorders. Marsh and colleagues (2003) found that lower PIL was significantly associated with impaired control over alcohol use. Also, the construct of spirituality has been shown to be strongly correlated to PIL in alcohol dependent samples (Carroll, 1993). Studies investigating the association between spirituality and alcohol use have found an inverse relationship between spirituality and alcohol craving, which could be related to subsequent temptations to drink (Gordon et al., 2006; Sterling et al., 2006).

The present study used data from Project Matching Alcohol Treatment to Client Heterogeneity (MATCH; Project MATCH Research Group, 1997) to examine the longitudinal associations among PIL, temptation to drink, and drinking outcomes. We hypothesized that PIL and temptation to drink would be significantly associated over time and that lower initial levels of PIL and higher initial levels of temptation to drink would prospectively predict worse drinking outcomes among individuals with AUD.

Method

Participants and Procedure

This secondary analysis uses data from Project Matching Alcohol Treatment to Client Heterogeneity (Project MATCH Research Group, 1997), a multisite randomized clinical trial of three treatments for AUDs: Cognitive Behavioral Therapy, Motivational Enhancement Therapy, or Twelve-Step Facilitation. Participants (N = 1726 (952 outpatients, 774 aftercare clients); 24.3% female, 20% non-white; average age (SD) = 40.2 (10.9)) were eligible for the study if they had a current DSM-III-R diagnosis of Alcohol Abuse or Dependence, were drinking 3 months before study entry (or had been drinking for the 3 months preceding the inpatient or hospital admission), were at least 18 years of age, and had at least a 6th grade reading level. Participants were assessed at baseline, the 3-month post-baseline (end-of-treatment), and 6-, 9-, 12-, and 15-months post-baseline. PIL and

temptation to drink were assessed at baseline, 3-months post-baseline (end-of-treatment), and 9- and 15-months post-baseline.

Measures

Temptation to Drink—Five items that represent the Urge subscale of the Temptation scale of the Alcohol Abstinence Self-Efficacy Scale (AASE; DiClemente, et al., 1994) were used as the measure of temptation to drink. The Temptation Urge subscale of the AASE asks participants to indicate the degree in which they are tempted to drink while experiencing urges, craving, and withdrawal symptoms. The items included "When I am in agony because of stopping or withdrawing from alcohol use;" "When I have an urge to try just one drink to see what happens;" "When I am feeling a physical need or craving for alcohol;" "When I want to test my willpower over drinking;" and "When I experience an urge or impulse to take a drink that catches me unprepared" and were scored from 1 ("Not at all tempted") to 5 ("Extremely tempted"). The internal consistency reliability of the five temptation to drink items exceeded a Cronbach's $\alpha = 0.84$ at all time points. It is important to note that previous psychometric analyses of the AASE indicate that temptation is a distinct construct from efficacy (DiClemente, Carbonari, Montgomery & Hughes, 1994). Moreover, the Temptation subscale of the AASE has been used as a measure of temptation to drink in secondary analyses of Project MATCH (DiClemente et al., 2001) and in other studies (Bischof, Rumpf, Hapke, Meyer & John, 2000; Bischof, Rumpf, Hapke & John, 2003).

Purpose in life—The Purpose in Life test (PIL test; Crumbaugh & Maholick, 1964) was used to measure PIL, the degree to which an individual has a sense of meaning or purpose in life. The PIL test is a self-report measure of 20 items, each rated on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). Items include content regarding life meaning, life satisfaction, freedom, fear of death, suicidal ideation, and one's perception of how worthwhile one's life is. The PIL test has good reliability (Crumbaugh & Maholick, 1964; Crumbaugh, 1968) and good convergent validity (Crumbaugh, 1968; Harlow et al., 1987). The internal consistency reliability of the PIL exceeded Cronbach's $\alpha = 0.91$ at all time points.

Drinking outcomes—Alcohol consumption, including percent drinking days (PDD) and drinks per drinking day (DDD), was assessed using a calendar method via the Form-90 (Miller, 1996) and alcohol related consequences were assessed using the Drinker Inventory of Consequences (DrInC; Miller, Tonigan, & Longabaugh, 1995). The DrInC assesses the occurrence of 50 consequences on a scale of 1 ("Never") to 4 ("Daily or almost daily"). The internal consistency reliability of the DrInC was $\alpha = 0.96$ at the 15-month follow-up.

Statistical Analyses

A series of latent variable models of the association between PIL and temptation to drink were estimated using Mplus version 7.1 (Muthén & Muthén, 2012). Considering the complex sampling designs in the MATCH study (i.e., data collected from nine sites), all parameters were estimated using either a weighted maximum likelihood function with standard errors computed using a sandwich estimator (MLR estimator in Mplus; for models with continuous indicators) or a robust weighted least squares estimator with delta

parameterization (WLSMV estimator in Mplus; for models with categorical indicators). Both of these estimators are robust to violations of non-normality and violations of independence caused by clustering (i.e., account for site effects); however, the former uses numerical integration which becomes very computationally demanding, making the robust weighted least squares estimator preferable for more complex models. The fit of all models was evaluated by χ^2 values, the Root Mean Square Error of Approximation [RMSEA; (Browne & Cudeck, 1993)], and the Comparative Fit Index [CFI; (Bentler, 1990)]. Models with RMSEA < 0.05 and CFI > 0.95 were considered a good fit to the observed data (Hu & Bentler, 1999) and models with RMSEA < 0.08 and CFI > 0.90 were considered a reasonable fit.

We estimated longitudinal measurement models of the PIL and the temptation urge subscale of the AASE-Temptation scale across four time-points (baseline, and the 3-, 9-, and 15-month follow-ups). The PIL items, which were ordered categorical with responses across seven categories that approximated a normal distribution, were treated as continuous in the context of a longitudinal confirmatory factor analysis (Little, Preacher, Selig, & Card, 2007) using the MLR estimator with item loadings and intercepts constrained to equality over time. The AASE items, which were ordered categorical with five categories and a non-normal distribution of responses across the five categories, were treated as ordered categorical in the context of a longitudinal graded response model (Samejima, 1969, 1997) using the WLSMV estimator with item loadings and thresholds constrained to equality across time.

The longitudinal associations between PIL and the AASE urge subscale models were examined using parallel process latent growth curve analyses (Cheong, Mackinnon, & Khoo, 2003). The latent growth curve models were first tested separately to determine the optimal functional form of time (e.g., linear, quadratic) for each construct. The models that provided the best fit were combined and both processes were estimated simultaneously, with growth factors allowed to covary. After estimating the parameters of the parallel process latent growth curve models, we examined the correlations between the intercept and slope factors and drinking outcomes at 15-month follow-up.

We also examined whether Project MATCH treatment condition was associated with mean differences in PIL confirmatory scores, temptation to drink graded responses scores, or the growth parameters derived from the parallel process latent growth curve models using one-way analysis of variance. We also examined whether treatment condition moderated the associations between PIL and temptation to drink scores using moderated regression analyses (Aiken & West, 1991).

Results

Table 1 provides the correlation matrix of the PIL, temptation to drink items, and drinking outcomes at baseline (below diagonal) and 15-month follow-up (above diagonal).

Measurement Models of PIL and Temptation to Drink

The confirmatory factor model of the 20 PIL items across time provided a reasonable fit to the data (CFI = 0.92; RMSEA = 0.033, 90% CI: 0.032, 0.034) with all item loadings and item intercepts constrained to equality across time (Byrne, Shavelson, & Muthén, 1989). As shown in Table 2, most of the standardized factor loadings exceeded 0.5 and item intercepts (e.g., mean level on each item at the average level of the factor) were in the 4 to 5 range, indicating moderate agreement with PIL items [range 1 (strongly disagree) to 7 (strongly agree)]. The longitudinal graded response model of the five temptation to drink items also provided a reasonable fit to the data (CFI = 0.91; RMSEA = 0.053, 90% CI: 0.050, 0.056) with all item discriminations and item thresholds constrained to equality across time. All standardized item discriminations (analogous to factor loadings) exceeded 0.76.

Parallel Process Latent Growth Curve Model

First we estimated latent growth curve models of the PIL and temptation to drink separately and found a model with a linear slope provided a reasonable fit to the PIL longitudinal confirmatory factor model (CFI = 0.92; RMSEA = 0.032, 90% CI: 0.31, 0.033), whereas a model with linear and quadratic slopes provided a reasonable fit to the temptation to drink graded response model (CFI = 0.94; RMSEA = 0.042, 90% CI: 0.039, 0.044). The PIL latent growth model indicated significant linear increases in PIL over time (average linear slope (SE) = 0.27 (0.03), $p < 0.001$). The temptation to drink latent growth model demonstrated both a significant linear decrease in temptation to drink (average linear slope (SE) = −2.88 (0.26), $p < 0.001$) indicating an overall decrease over time as well as a significant quadratic trend, indicating a leveling off and slight increase at later time points (average quadratic slope (SE) = 1.71 (0.15), $p < 0.001$). To illustrate the shape of change over time, Figure 1 shows the mean latent growth curve models for PIL and temptation to drink. The parallel process latent growth curve model provided an adequate fit to the observed data (CFI = 0.94; RMSEA = 0.011, 90% CI: 0.010, 0.012). As shown in Figure 2, the association between the growth parameters of each process were significant, with the intercept of PIL significantly inversely associated with the intercept of temptation to drink (r = −0.39; B (SE) = −0.32 (0.04), $p < 0.001$) and the linear slope of PIL was significantly inversely associated with the linear slope of temptation to drink (r = −0.45; B (SE) = −0.39 (0.0.09), $p < 0.001$).

Associations with Drinking Outcomes and Effect of Project MATCH Treatment Conditions

Table 3 provides correlations between the parameters of the growth models and 15-month drinking outcomes. The intercepts and slopes of PIL and temptation to drink were significantly correlated with all three drinking outcomes at 15-month follow-up. Higher initial PIL and increases in PIL over time were associated with lower PDD and DDD and fewer alcohol-related consequences. Higher initial temptation to drink and increases in temptation to drink were associated with higher PDD and DDD and greater alcohol-related consequences.

One-way analysis of variance indicated no significant effects of treatment on the PIL or temptation to drink scores at any time point or the intercept and slopes of PIL and temptation to drink scores. Likewise, moderated regression analyses indicated that treatment

condition did not significantly moderate the association between PIL and temptation to drink scores.

Discussion

This study examined the longitudinal association between purpose in life (PIL) and temptation to drink, defined as self-reported temptation to drink in the presence of physical withdrawal, craving or urges. Parallel process latent growth curve analyses revealed that PIL and temptation to drink were significantly inversely associated across time, such that higher initial levels of PIL and increases in PIL over time were associated with lower initial temptation to drink and decreases in temptation to drink over time. Higher initial PIL and increases in PIL over time, as well as lower initial temptation to drink and decreases in temptation to drink over time, were significantly associated with lower drinking frequency and intensity, and reduced alcohol-related consequences at the 15-month follow-up. Treatment condition did not predict PIL or temptation to drink, nor did treatment moderate the association between PIL and temptation to drink. These findings are consistent with numerous Project MATCH analyses that have found no differences between treatment groups (Project MATCH Research Group, 1998) and suggest PIL may be an important construct related to drinking behavior change across treatment modalities. However, Tonigan et al. (2001) found a treatment moderation effect on the association between meaning seeking and outcomes in the Project MATCH dataset, such that meaning seeking positively predicted AA attendance among clients receiving Twelve-step Facilitation, but not clients receiving Motivational Enhancement Therapy or Cognitive-Behavioral Therapy. Our findings regarding treatment moderation effects may differ from Tonigan et al. (2001) because we examined PIL (measured as PIL test scores only) whereas Tonigan et al. (2001) examined meaning seeking, a similar but distinct construct which was conceptualized as scores from the Seeking of Noetic Goals test (Crumbaugh, 1977) minus scores for the PIL test.

Limitations

There were a few limitations of the current study that may limit the generalizability of the findings. Most notably, we were limited by self-reported measures of temptation, PIL and drinking outcomes. The measure of temptation to drink was derived from items of the Temptation Urge scale of the AASE. The Temptation Urge subscale of the AASE-Temptation scale measures one's belief regarding the degree of temptation when experiencing physical withdrawal, urges or craving, as well as degree of temptation when "testing willpower." Thus, in this study, we were not able to directly examine the role of temptation on drinking in drinking contexts, but rather we examined one's appraisal of their likely temptation to drink while experiencing an urge. Importantly, we found that the end of treatment AASE-Temptation Urge subscale graded response score was significantly correlated with the average ratings of temptation to drink during treatment ("Overall, how tempted to drink have you been during this past week?") ($r = 0.46$, $p < 0.001$), which provides some evidence that the measure of temptation to drink used in the current study is associated with experiences of temptation. The PIL and TLFB are widely used and

previously validated measures of purpose in life and drinking behavior; nonetheless, self-report biases may be present.

Clinical Implications

Our results also provide further support for the notion that PIL should be an important target in treatment for alcohol and other substance use disorders (Martin, MacKinnon, Johnson, & Rohsenow, 2011). Consistent with the other therapies in which behaving in accord with one's values have demonstrated efficacy (Miller et al., 1999; Miller & Rollnick, 2002; Bowen, Chawla, and Marlatt, 2010; Hayes, Strosahl & Wilson, 1999), our findings suggest that it may be valuable for treatment providers to explore clients' current PIL in relation to clients' temptation to drink. Specifically, assisting clients in identifying important personal values and encouraging engagement in meaningful activities that are concordant with those values, may be poignant reminders of the importance of remaining abstinent when faced with the temptation to drink. It is important to note, however, that it is currently not clear whether values-based treatments enhance PIL. Further research is needed to investigate whether values-based treatments can enhance PIL.

Conclusions and Future Directions

We believe that the association between PIL and temptation to drink fits well within the context of existing models of addiction. For example, to the extent that low PIL is associated with negative affective states (e.g., feelings of emptiness), affect regulation models would predict that low PIL would be associated with temptation to drink and subsequent alcohol use (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Tiffany, 1999). From a behavioral perspective (Higgins, Heil, & Lussier, 2004), low PIL may be viewed as a relative deprivation of reinforcers (e.g., meaningful experiences in one's life) that may contribute to the increased salience of alcohol cues and alcohol craving, and in turn increased temptation to drink. Also consistent with the dynamic model of relapse which posits that numerous interacting risk factors may be important predictors of relapse in a high-risk situation (Witkiewitz & Marlatt, 2004), feelings of low purpose in life could modulate the influence of proximal risk factors (including temptation and negative affect) in a high-risk situation.

Finally, our findings suggest that the construct of temptation to drink is worthwhile to examine in future research. DiClemente and colleagues (1994) note that temptation, as measured by the AASE, "can be seen as evaluating the cue strength of each situation in terms of its ability to precipitate alcohol consumption" (p. 147). Thus, the Urge subscale of the AASE Temptation scale may be seen as assessing the cue strength or incentive salience of internal cravings (Robinson & Berridge, 1993). Further research is warranted to examine whether the manner in which individuals perceive craving experiences may be more important in predicting relapse than the reported intensity or frequency of craving *per se*. More research is also needed to examine whether and how values-based treatments may influence temptation to drink, and how temptation to drink and PIL may change together over time during and following treatment.

Acknowledgements

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Mean Parallel Latent Growth Curves
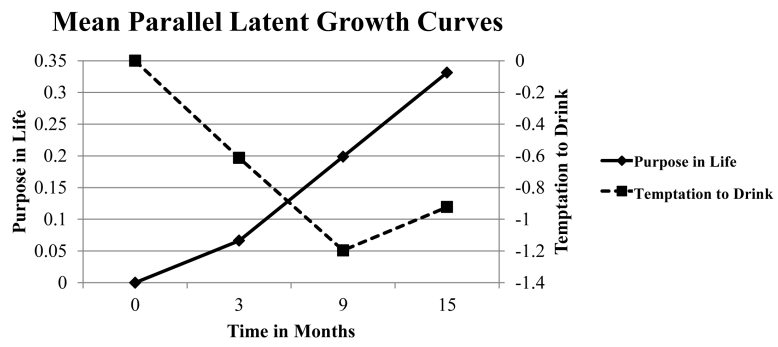
Figure 1.
Mean parallel process latent growth curve models of Purpose in Life and (PIL) and Temptation to Drink (TTD).
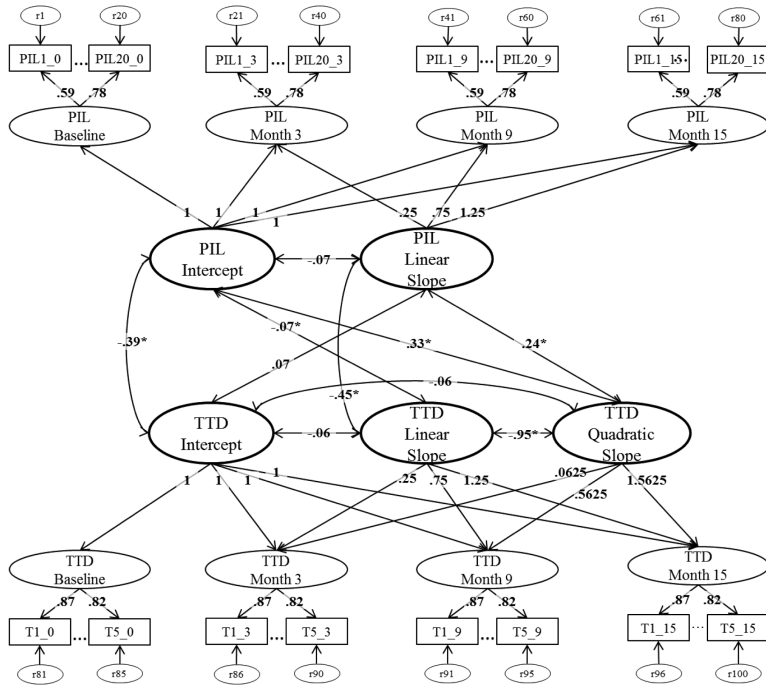
Figure 2.
Parallel process latent growth curve model of Purpose in Life (PIL) and Temptation to Drink (TTD) items from baseline through 15-month follow-up. • • • = items not shown, including items 2 – 19 of the PIL test and items 2 – 4 of the AASE Temptation Urge subscale. Coefficients represent standardized factor loadings and standardized regression coefficients with * $p < 0.05$.

Note. Although not shown in the figure, error variances of each of the 20 PIL items were allowed to freely correlate across all time points such that item 1 at baseline was correlated with item 1 at all other time points, item 2 was correlated with item 2 at all time points, etc.

Table 1

Correlations for PIL, AASE, and Drinking at Baseline (Below Diagonal) and 15-Month Follow-Up (Above Diagonal)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. AASE 1		.5*	.4*	.7*	.5*	-.3*	-.3*	-.3*	-.3*	-.3*	-.2*	-.2*	-.2*	-.3*	-.3*	-.3*	-.2*	-.2*	-.3*	-.2*	-.2*	-.2*	-.3*	-.3*	-.3*	.4*	.4*	.5*
2. AASE 2	.5*		.7*	.6*	.6*	-.2*	-.3*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.1*	-.2*	-.1*	-.2*	-.3*	-.2*	-.2*	.3*	.3*	.4*
3. AASE 3	.4*	.7*		.6*	.6*	-.3*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.2*	-.1*	-.2*	-.2*	-.2*	-.1*	-.2*	-.1	-.2*	-.2*	-.2*	.3*	.3*	.3*
4. AASE 4	.6*	.6*	.7*		.7*	-.3*	-.3*	-.3*	-.3*	-.3*	-.2*	-.2*	-.3*	-.3*	-.3*	-.2*	-.3*	-.3*	-.2*	-.2*	-.2*	-.2*	-.3*	-.4*	-.3*	.4*	.4*	.5*
5. AASE 5	.5*	.5*	.5*	.6*		-.3*	-.3*	-.3*	-.3*	-.3*	-.2*	-.1*	-.2*	-.3*	-.3*	-.2*	-.2*	-.3*	-.2*	-.2*	-.2*	-.2*	-.2*	-.3*	-.3*	.4*	.4*	.5*
6. PIL 1	-.2*	-.1*	-.1*	-.1*	-.1*		.7*	.5*	.5*	.6*	.4*	.4*	.5*	.6*	.5*	.4*	.5*	.4*	.3*	.2*	.3*	.4*	.4*	.6*	.5*	-.2*	-.3*	-.4*
7. PIL 2	-.1*	-.1*	-.1*	-.1*	-.1*	.7*		.5*	.6*	.7*	.5*	.4*	.5*	.6*	.5*	.5*	.5*	.4*	.4*	.2*	.3*	.5*	.5*	.6*	.6*	-.2*	-.3*	-.4*
8. PIL 3	-.1*	-.1*	-.1*	-.1*	-.1*	.5*	.4*		.7*	.5*	.5*	.4*	.6*	.6*	.5*	.5*	.5*	.4*	.4*	.2*	.3*	.6*	.5*	.5*	.7*	-.2*	-.3*	-.4*
9. PIL 4	-.2*	-.1*	-.1*	-.2*	-.1*	.4*	.4*	.5*		.6*	.6*	.5*	.6*	.7*	.6*	.6*	.6*	.5*	.5*	.3*	.4*	.6*	.6*	.6*	.7*	-.2*	-.2*	-.3*
10. PIL 5	-.1*	-.1*	-.1*	-.1*	-.1*	.5*	.6*	.4*	.6*		.5*	.4*	.5*	.6*	.5*	.5*	.5*	.4*	.4*	.3*	.3*	.5*	.5*	.6*	.6*	-.2*	-.3*	-.3*
11. PIL 6	-.1*	-.1*	-.1*	-.1*	-.1*	.3*	.4*	.3*	.5*	.4*		.3*	.5*	.6*	.6*	.6*	.5*	.4*	.4*	.2*	.5*	.5*	.5*	.6*	.6*	-.2*	-.3*	-.4*
12. PIL 7	-.1*	-.04	-.1*	-.1*	-.1*	.2*	.2*	.3*	.3*	.3*	.2*		.4*	.4*	.3*	.3*	.3*	.3*	.3*	.2*	.2*	.4*	.3*	.4*	.4*	-.1*	-.2*	-.3*
13. PIL 8	-.1*	-.1*	-.1*	-.1*	-.1*	.4*	.3*	.4*	.4*	.4*	.4*	.2*		.6*	.6*	.6*	.6*	.5*	.4*	.3*	.3*	.5*	.5*	.6*	.6*	-.2*	-.3*	-.4*
14. PIL 9	-.1*	-.1*	-.1*	-.1*	-.1*	.4*	.5*	.4*	.5*	.5*	.5*	.2*	.6*		.6*	.6*	.6*	.5*	.4*	.3*	.4*	.6*	.6*	.7*	.7*	-.2*	-.3*	-.5*
15. PIL 10	-.2*	-.1*	-.1*	-.2*	-.2*	.4*	.4*	.3*	.5*	.4*	.5*	.2*	.5*	.6*		.7*	.6*	.5*	.4*	.3*	.4*	.6*	.5*	.6*	.6*	-.1*	-.2*	-.4*
16. PIL 11	-.1*	-.1*	-.1*	-.1*	-.1*	.3*	.4*	.4*	.5*	.4*	.5*	.3*	.4*	.5*	.6*		.7*	.4*	.5*	.3*	.5*	.6*	.5*	.6*	.7*	-.1*	-.2*	-.4*
17. PIL 12	-.1*	-.1*	-.1*	-.1*	-.1*	.3*	.4*	.3*	.4*	.4*	.5*	.2*	.4*	.5*	.5*	.6*		.4*	.5*	.3*	.4*	.6*	.5*	.6*	.6*	-.1*	-.2*	-.3*
18. PIL 13	-.1*	-.1*	-.1*	-.1*	-.1*	.3*	.2*	.3*	.3*	.2*	.3*	.1*	.4*	.4*	.4*	.3*	.3*		.4*	.3*	.3*	.4*	.5*	.5*	.5*	-.1*	-.3*	-.5*
19. PIL 14	-.1*	-.01	-.0	-.1*	-.1*	.2*	.2*	.1	.2*	.2*	.3*	.2*	.2*	.3*	.2*	.3*	.3*	.2*		.2*	.3*	.4*	.3*	.5*	.5*	-.1*	-.1*	-.2*
20. PIL 15	-.1*	-.1*	-.1*	-.1*	-.1*	.1*	.2*	.1	.2*	.2*	.1	.0	.2*	.2*	.2*	.1	.2*	.2*	.1*		.2*	.3*	.3*	.3*	.3*	-.1*	-.2*	-.2*
21. PIL 16	-.1*	-.1*	-.1*	-.1*	-.1*	.2*	.2*	.2*	.3*	.2*	.4*	.1	.3*	.3*	.3*	.4*	.3*	.2*	.1	.0		.5*	.4*	.4*	.4*	-.0	-.1*	-.3*
22. PIL 17	-.1*	-.1*	-.1*	-.1*	-.1*	.4*	.3*	.5*	.5*	.4*	.4*	.3*	.4*	.4*	.4*	.5*	.4*	.3*	.3*	.1*	.3*		.6*	.6*	.7*	-.1*	-.2*	-.3*
23. PIL 18	-.1*	-.1*	-.1*	-.1*	-.1*	.3*	.3*	.3*	.4*	.3*	.3*	.2*	.3*	.4*	.4*	.4*	.4*	.3*	.3*	.2*	.2*	.4*		.6*	.6*	-.2*	-.2*	-.4*
24. PIL 19	-.2*	-.1*	-.1*	-.2*	-.2*	.5*	.5*	.4*	.5*	.6*	.4*	.2*	.5*	.6*	.5*	.5*	.5*	.4*	.2*	.2*	.3*	.5*	.5*		.7*	-.2*	-.3*	-.4*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
25. PIL 20	-.2*	-.2*	-.1*	-.2*	-.2*	.4*	.4*	.5*	.6*	.5*	.5*	.3*	.5*	.5*	.5*	.5*	.5*	.4*	.2*	.1*	.3*	.6*	.4*	.6*		-.2*	-.2*	-.4*
26. PDD	.1*	.1*	.1*	.1*	-.0	-.1*	-.1*	-.1*	-.0	-.1*	.0	-.1*	-.0	-.0	-.0	-.0	-.0	.0	-.1*	-.0	.1*	-.0	-.1*	-.1*	-.1*		.5*	.2*
27. DDD	.2*	.1*	.1*	.1*	.1*	-.1*	-.1*	-.1*	-.1*	-.1*	-.1*	-.1*	-.2*	-.1*	-.2*	-.1*	-.1*	-.2*	-.0	-.1*	-.1*	-.0	-.1*	-.1*	-.1*	.1*		.4*
28. DrInC	.2*	.2*	.1*	.2*	.2*	-.2*	-.2*	-.2*	-.2*	-.1*	-.2*	-.0	-.3*	-.3*	-.2*	-.2*	-.2*	-.3*	-.1*	-.2*	-.2*	-.2*	-.2*	-.2	-.2*	.1*	.4*	

Note.

* $p < 0.05$; AASE = Alcohol Abstinence Self-Efficacy Scale Temptation Urge subscale; PIL = Purpose in Life; PDD = percent drinking days; DDD = drinks per drinking day; DrInC = Drinker Inventory of Consequences

Table 2

Item Factor Loadings and Intercepts from PIL Longitudinal Confirmatory Factor Model and Item Discriminations from AASE-T Urge Graded Response Model

Purpose in Life Test	Loading	Intercept
I am usually exuberant, enthusiastic	0.59	4.50
Life seems to me always exciting	0.63	4.23
In life I have very clear goals and aims	0.62	5.19
My personal existence is very purposeful/meaningful	0.74	5.56
Every day is constantly new	0.68	4.67
If I could choose I would like nine more lives just like this one	0.64	4.93
After retiring I would do some exciting things I have always wanted to do	0.42	5.94
In achieving life goals I have progressed to complete fulfillment	0.65	4.50
My life is running over with exciting good things	0.76	4.62
If I should die today, I would feel that my life has been very worthwhile	0.70	4.84
In thinking of my life, I always see a reason for my being here	0.69	5.00
…The world fits meaningfully with my life	0.67	4.52
I am a very responsible person	0.51	5.34
…I believe man is absolutely free to make all life choices	0.44	5.44
With regard to death I am prepared and unafraid	0.31	4.82
With regard to suicide I have never given it a second thought	0.39	5.40
…My ability to find meaning, purpose, or mission in my life is very great	0.67	5.20
My life is in my hands and I am in control of it	0.60	5.24
Facing daily tasks is a source of pleasure and satisfaction	0.76	4.82
I have discovered clear-cut goals and a satisfying life purpose	0.78	4.99

Alcohol Abstinence Self-Efficacy – Temptation Urge Subscale	Item Discrimination
When I am in agony because of stopping or withdrawing from alcohol use	0.87
When I have the urge to try just one drink to see what happens	0.80
When I want to test my willpower over drinking	0.80
When I am feeling a physical need or craving for alcohol	0.77
When I experience an urge to take a drink that catches me unprepared	0.82

Table 3

Correlations between Parallel Process Growth Model Parameters and Drinking Outcomes at 15-month follow-up

	PDD	95% CI	DDD	95% CI	DrInC	95% CI
PIL intercept	−0.04	−0.11, 0.02	−0.15*	−0.20, −0.09	−0.27*	−0.34, −0.20
PIL linear slope	−0.31*	−0.39, −0.23	−0.36*	−0.43, −0.28	−0.44*	−0.57, −0.32
Temptation intercept	0.13*	0.08, 0.17	0.19*	0.13, 0.25	0.30*	0.21, 0.39
Temptation linear slope	0.38*	0.20, 0.55	0.26*	0.15, 0.38	0.31*	0.09, 0.53
Temptation quadratic slope	−0.21	−0.44, 0.02	−0.12	−0.29, 0.05	−0.1*	−0.39, 0.11

Note.

*$p < 0.05$; PIL = Purpose in Life; PDD = percent drinking days; DDD = drinks per drinking day; DrInC = Drinker Inventory of Consequences; CI = Confidence Interval.