"Ready, Willing, and (not) Able" to Change: Young Adults' Response to Residential Treatment

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Abstract

Background—Young adulthood represents a key developmental period for the onset of substance use disorder (SUD). While the number of young adults entering treatment has increased, little is known about the mechanisms of change and early recovery processes in this important clinical population. This study investigated during-treatment change in key therapeutic processes (psychological distress, motivation, self-efficacy, coping skills, and commitment to AA/NA), and tested their relation to outcome at 3 months post-treatment.

Methods—Young adults undergoing residential treatment (N=303; age 18–24; 26% female; 95% Caucasian) were enrolled in a naturalistic prospective study and assessed at intake, mid-treatment, discharge, and 3 months following discharge. Repeated-measures and regression analyses modeled during-treatment change in process variables and impact on outcome.

Results—Statistically significant medium to large effect sizes were observed for changes in most processes during treatment, with the exception of motivation, which was high at treatment intake and underwent smaller, but still significant, change. In turn, these during-treatment changes all individually predicted 3-month abstinence to varying degrees, with self-efficacy emerging as the sole predictor in a simultaneous regression.

Conclusions—Findings help to clarify the mechanisms through which treatment confers recovery-related benefit among young adults. At treatment intake, high levels of abstinence motivation but lower coping, self-efficacy, and commitment to AA/NA, suggests many entering treatment may be "ready and willing" to change, but "unable" to do so without help. Treatment appears to work, in part, by helping to maintain motivation while conferring greater ability and confidence to enact such change.

Keywords

mechanisms of change; treatment process; repeated measures; young adults; Minnesota Model; Alcoholics Anonymous; 12 step

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1. Introduction

1.1 Emerging Adulthood and Substance-Related Risks

The developmental stage of emerging adulthood (18–24 years) (Arnett, 2000) brings with it novel social rights and freedoms. Newly bestowed authority often conveys an exhilarating feeling of autonomy and self-determination as young people become free to make important decisions independent of parents or guardians. Compared to other life-stages, this period also confers the highest risk for the onset of a variety of serious mental health problems, including psychological distress and psychiatric disorders, harmful alcohol and other drug use, and substance use disorders (SUD) (Substance Abuse and Mental Health Services Administration, 2010).

In the United States (US), rates of SUD are 20.0% among young adults, compared to 7.0% among adolescents and 7.3% among adults aged 26 and older (Substance Abuse and Mental Health Services Administration, 2010). While many young people who meet criteria for SUD remit without formal treatment, others experience problems chronically over years and even decades (Dennis et al., 2005; Hser and Anglin, 2011). These disorders contribute substantially to the global burden of disease (Rehm et al., 2009), impair work and social functioning, and lead to crime and lost productivity. Research has shown that the earlier SUD treatment is initiated, the better the prognosis and the shorter the time to full remission (Dennis et al., 2005). Yet, little is known about the mechanisms of treatment and early recovery in this population. Greater knowledge about recovery processes in this distinct life-stage is critical to inform intervention efforts (National Institute on Alcohol Abuse and Alcoholism, 2007).

1.2 Mechanisms of Treatment

Elucidation of the mechanisms through which psychotherapeutic interventions, including SUD treatment, effect changes in health and behavior is a recognized priority for clinical research (Nock, 2007; Willenbring, 2010). SUD treatment interventions are designed to target a variety of symptoms and psychosocial deficits that are presumed to underlie and maintain the disorder. The particular focus of a given intervention is determined by program theory of how behavior change is achieved (Finney, 1995; McCrady, 1994). Across therapeutic modalities, however, SUD interventions commonly seek to enhance patients' motivation to change their substance use behavior, increase self-efficacy or confidence in their ability to achieve and maintain the change, and to impart or bolster new coping skills to manage high-risk situations (Finney et al., 1998; Morgenstern et al., 1997). Similarly, psychological distress and psychiatric symptoms are expected to diminish over the course of a treatment episode, either because of abstinence or reduced use, or because psychiatric symptoms are explicitly targeted (Gossop et al., 2006). Most US treatment programs also strongly encourage patients to make use of free community mutual-help recovery resources, such as Alcoholics Anonymous (AA) and Narcotics Anonymous (NA) post-discharge (Humphreys et al., 1991; Kelly et al., 2008; Knudsen et al., 2008; Roman and Blum, 2005). Consequently, commitment to AA and NA participation is expected to increase during treatment.

Collectively, these factors (i.e., motivation, self-efficacy, coping skills, psychological distress, and commitment to AA/NA) provide a set of common, measureable, benchmarks for documenting processes of change and assessing early recovery across various treatment modalities. The majority of research on during-treatment change in these common process variables has been conducted with adults. Longitudinal naturalistic studies have documented significant improvements in motivation, self-efficacy, coping skills, and commitment to 12-step groups, as well as decreases in psychological distress (Feeney et al., 2006; Finney et al.,

1998; Kelly et al., 2005; Morgenstern et al., 1997; Young et al., 2011). In many cases, authors have noted fairly high sample means for constructs such as motivation, self-efficacy, and 12-step-related beliefs and intentions at treatment entry (Finney et al., 1998; Kahler et al., 2006; Morgenstern et al., 1996), and pre-treatment levels of self-efficacy, motivation, coping, and psychological symptoms have consistently predicted post-treatment outcomes (Adamson et al., 2009; McKay and Weiss, 2001; Project MATCH Research Group, 1997). However, we are aware of no studies examining processes of change among young adults.

From a treatment theory evaluation perspective, a treatment "success" involves statistically and clinically meaningful during-treatment change in these processes that, in turn, predict positive behavioral outcomes after discharge (Finney, 1995; Suchman, 1967). Here it has been found in adults that during-treatment change in psychological symptoms are related to better retention and more positive post-treatment alcohol-related outcomes (Gossop et al., 2006; Long et al., 2000). Levels of self-efficacy at discharge have predicted more positive post-treatment outcomes (DiClemente et al., 2001; Morgenstern et al., 1997). Commitment to AA/NA predicted total days of alcohol use among those who returned to drinking, although it did not predict abstinence overall (Morgenstern et al., 1996).

The above studies all involved older, adult, samples. One recent study of during-treatment changes among adolescents attending a residential treatment program showed significant improvements in coping skills, while motivation remained fairly stable from admission to discharge (Wei et al., 2011). In general, however, there is little available evidence on the mechanisms of treatment and early recovery processes in adolescents and emerging adults with SUD, which may well differ from older adults as has been shown with mechanisms of behavior change within mutual-help groups, such as AA/NA. Specifically, studies have shown that among adolescents, AA/NA appears to effect post-treatment recovery-related changes by maintaining and enhancing motivation for abstinence (Kelly et al., 2000; Kelly et al., 2002), whereas in adult samples AA has been shown to enhance post-treatment outcomes more through increases in coping and self-efficacy (Morgenstern et al., 1997). From the perspective of understanding treatment-assisted recovery and identifying key targets for intervention in this crucial age group, more information is needed examining during-treatment changes in these common process variables and their influence on post-treatment outcomes.

1.3 Study Aims

Using data from a longitudinal cohort study of young adults entering residential treatment for SUD, we examine during-treatment changes in key treatment processes (i.e., psychological distress, motivation, self-efficacy, coping skills, and commitment to AA/NA), and test their ability to predict short-term, post-treatment outcome. We hypothesized significant improvements on these therapeutic targets would be observed during treatment and that these changes would predict greater abstinence in the 3 months following discharge.

2. Method

2.1 Participants

Participants were young adults (N=303; 18–24 years) entering a private residential treatment center in the upper US Midwest. A total of 607 young adults were admitted to treatment during the recruitment period (October 2006 to March 2008). A small number of potential participants left treatment before recruitment could occur (n=6). To ensure sufficient representation of all ages within the target range (18–24 years), a stratified sampling procedure was used to select potential participants from total admissions. All clients aged 21–24 years and every second client aged 18–20 was approached for the study. Of those

approached (n=384), 64 declined. Reasons for non-participation included not wanting to participate in the follow-ups (44%), not interested (31%), wanting to focus on treatment (14%), and legal issues (2%). Following enrollment, an additional 17 participants withdrew prior to baseline assessment. The final sample of 303 represents 78.9% of those approached.

Average age was 20.4 years old (SD = 1.6). Participants were predominantly male (73.9%), and all were single. Most were Caucasian (94.7%); 1.7% identified as American Indian, 1.3% identified as African American, and 1.0% as Asian (1.4% reported "other" or missing). At admission, 24.1% were employed full-or part-time, and 31.7% were students. Most had completed high school: 43.6% had a high school diploma and 39.6% had attended college. The most common primary substance used was alcohol (28.1%) or marijuana (28.1%), followed by heroin or other opiates (22.4%), cocaine or crack (12.2%), and amphetamines (5.9%). In terms of severity of dependence, average Leeds Dependence Questionnaire (LDQ) scores (see measures section) at baseline were 18.7 (SD=8.7) in this sample, similar to the mean of 19.7 in a larger clinical sample of older adults, with primary alcohol or opiate dependence (Heather et al 2001). The prevalence of current, co-occurring Axis I mental disorders (other than SUD) has ranged from 40–60% in other studies of youth in SUD treatment (Kelly et al., 2010; Langenbach et al 2010; Schroder et al 2008), comparable to the prevalence rate of 51.2% found in this sample. Participants were more likely to be Caucasian than other young adults (18–24) in public sector residential treatment (76%) (Substance Abuse and Mental Health Services Administration, 2009), or adults (18+) in private sector treatment (71%; Roman and Johnson, 2004). They were, however, comparable in terms of gender, marital status, and employment status (Roman and Johnson, 2004). Regarding payment source, 61% of treatment funding was from insurance reimbursement and 35% from family. Also, 34% of the sample came from households below the US median household income of $50, 221; 50% of our sample came from households in areas where the median household income was below $56,000.

2.2 Treatment

Treatment was based on an eclectic and multidisciplinary residential approach for SUD, based primarily on the 12-step framework of AA (McElrath, 1997). Services were comprehensive and multi-faceted employing evidence-based interventions based in Twelve Step facilitation, motivational, cognitive-behavioral, and family therapy approaches. Programming included clinical assessment, individual and group therapy, and specialty groups, such as relapse prevention, anger management, eating issues, dual disorders, gender issues, assertiveness training, and trauma. Integrated mental health care was available on-site, including clinical assessment, therapy, and medication management. Participants' average length of stay was 25.6 days (SD = 5.7, ranging from 4–35 days). The majority (83.8%) were discharged with staff approval.

2.3 Procedure

Research staff conducted assessments at baseline, mid-treatment, discharge, and 3 months post-discharge. Each assessment included an interview, completed in person or by telephone, and self-administered surveys completed online or returned by mail. Participants were reimbursed $30 for the baseline, discharge, and 3-month follow-up assessments, and $10 for the mid-treatment assessment. Follow-up rates were 91.1% (n=276) at mid-treatment, 87.1% (n=264) at discharge, and 81.8% (n=248) at 3 months post-discharge. Baseline comparisons were made for those who did and did not complete the assessment at each time point. Results revealed that relative to those with post-secondary education, participants with a high school education or less were less likely to be followed at *each* time point. Those who missed the *discharge* assessment were younger and less likely to be Caucasian. Participation in the *3-month* follow-up was more likely among those who

reported opiates as their primary substance. Predictors of attrition were controlled for in all analyses (Judd and Kenny, 2010; Singer and Willett, 2003).

The study was conducted in accordance with the Institutional Review Board at Schulmann Associates IRB, an independent review board, and all participants signed informed consent documents.

2.4 Measures

Demographics—Demographic characteristics, including age, gender, ethnicity, education, and marital status, and drug of choice were abstracted from clients' records as part of the study.

Psychological distress was measured at admission, mid-treatment, and discharge with the Global Severity Index (GSI) of the 18-item Brief Symptom Inventory (BSI-18; Derogatis, 2001). Items were rated on a 5-point scale measuring past-week distress. Raw scores were converted to standardized T scores (M=50, SD=10) using published gender-specific community norms (Derogatis, 2001). The measure has shown good internal and test-retest reliability (coefficients =.74–.89), and construct validity in similar populations (Derogatis, 2001). Construct validity of the BSI-18 among substance users is also supported by multi-group confirmatory factor analysis confirming invariance of the scale's second-order factor structure in different drug-using populations, with the GSI underlying the more specific symptom factors of depression, anxiety, and somatization (Wang et al., 2010).

Motivation and self-efficacy for abstinence were assessed at admission and discharge with single items, rated on a 10-point scale: "How important is it for you to not drink or use drugs in the next 90 days or 3 months?" and "How confident are you that you will be able to stay clean and sober in the next 90 days or 3 months?", respectively. These measures did not form part of the mid-treatment assessment battery. The single-item measure of self-efficacy demonstrated convergent and discriminant validity in this sample, and showed better predictive utility for substance-related outcomes relative to a 20-item measure (Hoeppner et al., in press).

Coping skills were assessed at admission and discharge with the 9-item abstinent-focused coping subscale of the Adolescent Relapse Coping Questionnaire (ARCQ; Myers and Brown, 1996). This measure presents respondents with a commonly encountered relapse situation (i.e., a social gathering at which alcohol and drugs are present), followed by items assessing the likelihood of using different coping strategies, rated on a 7-point scale. Summed totals range from 9–63, with higher scores indicating greater coping resources. The subscale has demonstrated good internal consistency, concurrent and predictive validity among adolescents in SUD treatment (Myers and Brown, 1996).

Commitment to AA/NA was assessed at admission and discharge with a 6-item subscale from the Addiction Treatment Attitudes Questionnaire (ATAQ; Morgenstern et al., 1996). Items are rated on a 5-point scale based on level of agreement with attitudes toward treatment and recovery. Summed totals range from 6–30, with higher scores indicating greater commitment. The subscale has shown high internal consistency and construct validity among adults in SUD treatment (Morgenstern et al., 1996).

Substance use at baseline and 3-month follow-up was captured using a modified version of the Form-90 (Miller and Del Boca, 1994). The Percentage of Days Abstinent (PDA) from all substances was derived at both time points. For baseline interviews, PDA was assessed for the 90 days prior to treatment entry. PDA assessed for the 60 days (M=56.3, SD=17.3 days) prior to the 3-month follow-up constitutes the main outcome measure. Due to the skewed

distribution, PDA at follow-up was dichotomized as any use (36.1%) versus abstinence (63.9%). The Form-90 has good test-retest reliability and construct validity in both adult and adolescent samples (Slesnick and Tonigan, 2004; Tonigan et al., 1997). To verify self-reported abstinence, saliva tests (Cone et al., 2002) were administered on a sub-sample of subjects that lived within 50 miles of the treatment facility and could attend follow-up interviews in-person (15%). Abstinence was confirmed in 97% of subjects who self-reported abstinence.

A binary variable describing whether participants spent time in a *controlled environment* in the 60 days prior to the 3-month follow-up was also derived from the Form-90, and is included here as a covariate due to its influence on abstinence at follow-up. For the purposes of this analysis, a "controlled environment" refers to additional inpatient treatment, hospital detoxification programs, or jail.

2.5 Analysis

To assess during-treatment change in each process variable, repeated-measures models were fit with a linear time effect with models adjusted for factors associated with participants missing follow-up assessments [i.e., age, race (Caucasian vs. other), and education (≤high school graduate vs. post-secondary); Judd and Kenny, 2010; Singer and Willett, 2003)] and other confounds (i.e., pre-treatment PDA to account for the variation in levels of substance use at treatment entry). Standardized within-subjects effects sizes were calculated to reflect the magnitude of during-treatment changes on the process variables (Dunlap et al., 1996; Morris and DeShon, 2002). Psychological distress, coping skills and commitment to AA/NA were modeled as normally distributed using maximum likelihood estimation. Motivation and self-efficacy, both highly negatively skewed, were reflected and fitted with Poisson models. Due to variation in the assessments across the various time points (see *Measures*), the model predicting psychological distress incorporated data from three time points (i.e., admission, mid-treatment and discharge), while the others incorporated data from admission and discharge.

Logistic regression models were used to assess the impact of the process variables on the dichotomized post-discharge outcome of abstinence (yes/no). Three-month abstinence was regressed on the discharge scores for each of process variable, and in the second model, regressed adjusting for the baseline values to determine the predictive utility of during-treatment change on outcome. We tested each of the process variables individually in separate models, followed by a full model assessing all five variables simultaneously. As above, models controlled for factors associated with missing the 3-month follow-up [i.e., education and opiate drug of choice (yes vs. no)], as well as pre-treatment PDA and the indicator of time spent in a controlled environment. Multiple imputation was used to handle missing values (m=10), as recommended (Graham, 2009). Pseudo-R^2 statistics were estimated by averaging across imputations. Analyses were conducted in Stata 11.0 and used a two-tailed alpha of .05.

3. Results

3.1 During-treatment Change in Therapeutic Processes

Table 1 displays means, standard deviations, effect sizes and significance tests of the changes in the five process variables during treatment. All process variables changed significantly during treatment in the expected therapeutic direction, but varied substantially in magnitude. For example, scores for motivation were high at treatment intake and showed only a small magnitude standardized effect size change during treatment compared to the other processes. In contrast, psychological distress, which was substantially higher than

community samples at admission (i.e., > 50), declined to approximately average levels at discharge and represented a large standardized effect size change. For the other process variables of abstinence self-efficacy, abstinence-focused coping, and commitment to AA/NA, a medium to large standardized effect size was observed in the expected therapeutic direction (Cohen, 1988; Morris and DeShon, 2002).

3.2 Post-treatment Abstinence

Tested individually, discharge scores for motivation, self-efficacy, coping skills, and commitment to AA/NA each predicted abstinence at 3 months (Table 2). Adjusting for baseline scores to test the predictive ability of during-treatment change (i.e., the effect of discharge scores above and beyond intake scores), motivation, self-efficacy, and coping skills predicted abstinence at the conventional significance level of $p<.05$, with commitment to AA/NA and psychological distress doing so at the level of a statistical trend ($p<.10$; Table 2). Also shown in Table 2, the Pseudo-R^2 values increased by 0.01–0.08 with the addition of discharge scores for the process variables to models containing the attrition predictors (i.e., education and opiate drug of choice) and covariates (i.e., pre-treatment PDA and time spent in a controlled environment). Changes in abstinence self-efficacy accounted for the largest increase in pseudo-R^2 values in predicting abstinence at 3 months post-discharge.

Tested simultaneously in a single model, adjusting for baseline scores to assess the predictive ability of during-treatment changes, the change in self-efficacy was the sole unique predictor of abstinence (Table 3). The pseudo-R^2 value increased by 0.07 with the addition of the discharge scores to models adjusting for admission scores, attrition predictors, and other covariates.

4. Discussion

This study examined during-treatment changes on key processes in a sample of young adults undergoing residential treatment for SUD and examined the influence of such changes on post-treatment outcome. With the exception of motivation, which saw a significant but small magnitude change, during-treatment changes on all processes were in the medium-large effect size range and these changes to varying degrees were associated with abstinence at 3 months. When combined in a single model, abstinence self-efficacy was found to have the strongest relationship to outcome.

As predicted by theories of treatment-facilitated change (Finney, 1995; Howard et al., 1993), the young adults in our study demonstrated significant declines in psychological distress, with concomitant increases in abstinence motivation and self-efficacy, abstinence-focused coping skills, and commitment to AA/NA over the course of treatment. These results are broadly consistent with prior research in older adult and adolescent samples (Kelly et al., 2005; Morgenstern et al., 1996; Wei et al., 2011). However, while all therapeutic processes improved significantly during treatment, there was broad variation in the magnitude of these changes.

Large effect size declines in psychological distress were observed over the course of treatment, along with medium to large effect size increases in self-efficacy, abstinence-focused coping skills, and commitment to AA/NA. In contrast, however, and similar to recent findings among adolescents treated in a residential setting, there were only small concomitant increases in abstinence motivation. This was due, in part, to the fact that participants entered treatment already high in motivation (i.e., M=9.1 on a 1–10 scale). If one considers the notion that successful behavior change requires individuals to be "ready, willing, and able" (Miller and Rollnick, 2002), then the high degree of motivation for abstinence at intake (with only a small magnitude during-treatment increase observed

subsequently), when compared to the lower intake levels of coping, self-efficacy, and AA/NA commitment (with more substantial during-treatment changes observed) may reflect the notion that these young adults are "ready and willing" but are "*un*able" to change, without some kind of additional help. Findings here suggest that residential treatment appears to provide that help: bolstering change efforts by reducing stress and facilitating the learning of new recovery-focused coping skills, including using AA/NA groups post-treatment to help prevent relapse. These changes, in turn, may help strengthen individuals' abstinence self-efficacy which is a strong predictive summary indicator of post-treatment abstinence.

Placing these magnitude increases in the context of other clinical findings, it is notable that motivation to change at admission seems higher in our sample than in the Wei et al, (2011) adolescent residential SUD sample (where the mean was 9.6 [SD=2.8] on a scale from −2 to +14) but the effect size for during-treatment change was similarly small in magnitude (i.e., 0.22 for Wei et al, and.17 in our sample). Also, effects sizes were smaller in that study ranging from 0.15–0.40 across the subscales assessing coping skills. In two studies of adults in inpatient treatment (Morgenstern et al. 1996, 1997), commitment to abstain was also high at admission, averaging 4.4 (SD=0.8) and 4.5 (SD=0.7) out of 5. Commitment to AA was likewise high at admission, averaging 4.3 (SD=0.7) out of 5. However, these studies did not report effect sizes for during-treatment changes. Different measures, assessment time points, and sample characteristics hamper exact comparisons, but the pattern of findings suggest motivation often may be high at intake among treatment-seeking populations; treatment may help maintain these initially high levels or even slightly enhance them.

The increases in motivation, coping (including the use of AA/NA) and self-efficacy, and decrease in distress, are consistent with the two initial phases of the three-phase general model of psychotherapeutic change espoused by Howard and colleagues (1993). The first of these is "remoralization" (instillation of hope and increase in subjective morale), followed by "remediation" (decreases in subjective distress and symptoms) and finally "rehabilitation" (changes in lifestyle that support long-term change). The ultimate "rehabilitation" component of the model realistically can be evaluated only in the months and years as individuals stabilize and achieve long-term remission (Kelly and White, 2011). Given the additional predictive clinical utility of these changes on important post-treatment outcomes, our findings provide support for such models of therapeutic change.

When tested in separate models, the treatment discharge levels of motivation and self-efficacy for abstinence, abstinence-focused coping skills, and commitment to AA/NA were all associated with continued abstinence 3 months later, resulting in increases of 0.04–0.08 in model pseudo-R^2 statistics. These findings were over and above the effect of pre-treatment levels of substance use, or whether the participant spent time in a controlled environment (i.e., inpatient treatment or jail) during the follow-up period and other confounds. Further, during-treatment *changes* in motivation, self-efficacy and coping also predicted 3-month abstinence, while distress and commitment to AA/NA predicted at the trend level. The fact that both the change on these process variables during treatment as well as the absolute level observed at treatment discharge, were prognostic of better post-treatment outcomes indicates that regardless of whether high levels at treatment entry are maintained at that same high level throughout treatment or whether they increase as a function of treatment, these variables may be important therapeutic targets in SUD treatment.

Of the five process variables that we tested, self-efficacy resulted in the largest increases in pseudo-R^2 statistics and, in full models containing all variables, was the only one independently associated with outcome. Results from the models evaluating the influences of discharge status and during-treatment change converge to suggest that self-efficacy is an

important predictor of short-term outcome. Self-efficacy measured at various points over treatment has been consistently associated with outcomes (Adamson et al., 2009; DiClemente et al., 2001; Long et al., 2000; McKay and Weiss, 2001; Morgenstern et al., 1997; Project MATCH Research Group, 1997; Young et al., 2011). Thus, evidence suggests, therefore, that self-efficacy likely represents a clinically meaningful summary indicator for monitoring progress and relapse potential during early recovery among young adults.

4.1 Limitations

Although the study design permitted evaluation of change over time in multiple, theory-based processes and temporality in their associations with outcomes, the lack of an experimental design does not permit causal attribution to the treatment intervention (Nock, 2007) and we cannot rule out regression to the mean as a potential partial explanation for during-treatment improvement (Campbell and Kenny, 1999; Finney, 2008). Despite being recruited at a single treatment facility, the sample was widely geographically dispersed. As a result, biological verification of abstinence was possible only on the subsample who resided close enough to the facility to attend their follow-up assessments in-person. Nonetheless, the high concordance rate between self-reported and biochemically verified abstinence increases our confidence in the accuracy of self-reports. Caution should be taken regarding generalizations from our findings as this was a residential facility and all treatment staff were licensed and trained in the implementation of evidence-based practices. Also, one third of the sample came from families of below average financial means and two thirds from above average means. To the extent that programs and samples differ along these dimensions similar results may not be obtained.

4.2 Conclusions

The prevalence of SUD peaks during emerging adulthood (Substance Abuse and Mental Health Services Administration, 2010) and beginning the treatment process during this developmental period is associated with a shorter time to full sustained remission (Dennis et al., 2005). However, little is known about the mechanisms by which young adults may benefit from treatment (Willenbring, 2010). Findings here support existing models describing the process of treatment-assisted recovery, and contribute valuable preliminary data on mechanisms of behavior change and early recovery among young adults. Although significant during-treatment changes were found in all key processes and most were substantial, the magnitude of these changes varied substantially. At treatment intake, the high levels of abstinence motivation but lower levels of coping, self-efficacy, and commitment to AA/NA, suggests many entering treatment may be "ready and willing" to change, but "unable" to do so without help. Treatment appears to work, in part, by conferring greater ability and confidence to enact such change. Furthermore, given the predictive utility of abstinence self-efficacy, this construct may serve as a useful clinical summary indicator for estimating global treatment response among young adults.

Acknowledgments

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Table 1

Means, standard deviations, effect sizes, and significance tests of during-treatment change in process variables

Process Variable	Intake Mean (SD)	Discharge Mean (SD)	% Change	Effect size d	Effect size interpretation	Est[1] (se)	z
Distress	63.4 (10.0)	53.4 (8.7)	−16%	1.09	Large	−5.09 (.26)	−19.43**
Abstinence Motivation	9.1 (1.8)	9.4 (1.3)	3%	0.17	Small	1.09 (.04)	2.39*
Abstinence Self-efficacy	7.0 (2.5)	8.4 (1.8)	20%	0.55	Medium	1.23 (.03)	8.02**
Abstinence Coping	42.4 (10.8)	48.6 (9.0)	15%	0.66	Medium–large	3.13 (.28)	11.00**
AA/NA Commitment	21.8 (5.0)	24.4 (4.1)	12%	0.66	Medium–large	1.30 (.12)	10.45**

[1] Regression coefficient (distress, abstinence coping, and AA/NA commitment) or rate ratio (abstinence motivation and self-efficacy) indicating during-treatment change, controlling for age, race, education, baseline PDA

*
p<.05,

**
p<.01

Table 2

Individual models of discharge scores and during-treatment change in process variables on abstinence at 3-month follow-up (n=303)[a]

Independent variable	Discharge Scores			During Treatment Change		
	OR	se	t	OR	se	t
Distress (BSI)			$R^2=0.07$			$R^2=0.08$
Admission				1.03	0.02	1.38
Discharge	0.98	0.02	−1.12 $\Delta R^2=0.01$	0.97	0.02	−1.71 [†] $\Delta R^2=0.01$
Motivation for abstinence			$R^2=0.10$			$R^2=0.11$
Admission				1.15	0.10	1.72 [†]
Discharge	1.45	0.17	3.13 ** $\Delta R^2=0.03$	1.35	0.17	2.38 * $\Delta R^2=0.02$
Abstinence self-efficacy			$R^2=0.15$			$R^2=0.15$
Admission				0.98	0.06	−0.26
Discharge	1.50	0.14	4.41 ** $\Delta R^2=0.08$	1.51	0.15	4.22 ** $\Delta R^2=0.08$
Abstinence-focused coping (ARCQ)			$R^2=0.12$			$R^2=0.12$
Admission				1.01	0.02	0.67
Discharge	1.07	0.02	3.48 ** $\Delta R^2=0.05$	1.06	0.03	2.22 * $\Delta R^2=0.03$
Commitment to AA/NA (ATAQ)			$R^2=0.10$			$R^2=0.11$
Admission				1.04	0.05	0.85
Discharge	1.12	0.04	3.17 ** $\Delta R^2=0.03$	1.09	0.06	1.74 [†] $\Delta R^2=0.02$

[†] $p < .1$;

* $p < .05$;

** $p < .01$

[a] Abstinence defined as no use of any substances (excluding nicotine) in the 60 days prior to the 3-month follow-up. Estimates derived using multiple imputation to handle missing values (m=10). Models adjusted for baseline PDA, proportion of follow-up period spent in a controlled environment, and subject characteristics associated with missing the 3-month follow-up assessment [education (<high school and high school graduate vs. post-secondary) and opiate drug of choice] (coefficients not shown due to space)

Table 3

Full model of during-treatment influences on abstinence at 3-month follow-up (n=303)[a]

Independent variable	Discharge Scores			During Treatment Change		
	OR	se	t	OR	se	t
Distress (BSI)						
Admission				1.01	0.02	0.49
Discharge	1.00	0.02	0.16	0.99	0.02	−0.27
Motivation for abstinence						
Admission				1.08	0.12	0.74
Discharge	0.91	0.15	−0.55	0.87	0.15	−0.80
Abstinence self-efficacy						
Admission				0.93	0.07	−0.92
Discharge	1.45	0.17	3.16 **	1.52	0.19	3.39 **
Abstinence-focused coping (ARCQ)						
Admission				1.00	0.02	0.19
Discharge	1.05	0.03	1.83 †	1.04	0.03	1.29
Commitment to AA/NA (ATAQ)						
Admission				1.06	0.05	1.17
Discharge	1.02	0.05	0.42	0.97	0.06	−0.50

† p<.1;

* p<.05

** p<.01

[a] Abstinence defined as no use of any substances (excluding nicotine) in the 60 days prior to the 3-month follow-up. Estimates derived using multiple imputation to handle missing values (m=10). Models adjusted for baseline PDA, proportion of follow-up period spent in a controlled environment, and subject characteristics associated with missing the 3-month follow-up assessment [education (<high school and high school graduate vs. post-secondary) and opiate drug of choice] (coefficients not shown due to space)