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Replication and Extension: Separate Personality Traits from States to Predict Depression

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Abstract

Changes in personality trait levels often parallel episodes of major depressive disorder (MDD), whereas trait factor structures and substantial retest correlations are preserved. We explicated this dual state/trait nature of personality assessments among adults with recurrent MDD ($N=351$) receiving cognitive therapy (CT). We tested stability and change in the Schedule for Nonadaptive and Adaptive Personality, 2nd Edition (SNAP-2; Clark et al., in press), separated state and trait variance, and predicted depressive symptoms and clinical outcomes. Many SNAP scale scores changed in CT (e.g., positive temperament increased, negative temperament decreased), and decreases in depressive symptoms accounted for most scales' score changes. Nonetheless, SNAP scales' state and trait components predicted depressive symptoms early and late in CT as well as clinical outcomes, and state components predicted changes in symptoms and clinical outcomes. These results support the validity of the SNAP-2 among depressed patients and highlight the salience of personality-relevant state affect.

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Keywords

depression; cognitive therapy; state; trait; Schedule for Nonadaptive and Adaptive Personality (SNAP)

Recurrent episodes of major depressive disorder (MDD) are characterized by discrete periods of mood disturbance (American Psychiatric Association, 2000), correlate with temperament and personality variables (e.g., Clark, 2005), and can be treated with interventions including pharmacotherapy and cognitive therapy (CT; e.g., Hollon et al., 2005). The episodic nature of MDD presents challenges and questions regarding the disorder's relations with personality when personality is defined as generally stable. For example, how should changes in trait dimensions such as negative temperament (NT; also known as neuroticism, negative emotionality, and negative affectivity) and positive temperament (PT; also known as extraversion, positive emotionality, and positive affectivity) that parallel changes in depressive symptoms be interpreted? Are patients able to give valid accounts of their personality or "usual selves" when acutely depressed and displaying negatively biased cognition (e.g., Beevers & Miller, 2004)? The current analyses aim to clarify these conceptual issues in a sample of patients with recurrent MDD ($N = 351$) assessed twice with the trait-dimensional Schedule for Adaptive and Nonadaptive Personality, 2nd Edition (SNAP-2; Clark, Simms, Wu, & Casillas, in press) during a 12-week course of acute-phase CT (Beck, Rush, Shaw, & Emery, 1979).

The cross-sectional relations of depression with major personality dimensions are generally clear. For example, a recent meta-analysis (Kotov, Gamez, Schmidt, & Watson, 2010) yielded moderate average correlations of MDD with low PT ($r = -.25$) and high NT ($r = .47$), consistent with current structural models of personality and psychopathology (e.g., Clark, 2005; Klein, Kotov, & Bufferd, 2011; South, Eaton, & Krueger, 2010). Among three- and five-factor model personality dimensions, MDD also related weakly to disinhibition ($r = .13$) but, interestingly, more strongly to low conscientiousness ($r = -.36$; Kotov et al., 2010), perhaps because conscientiousness better reflects goal-directed behavioral activation (e.g., industriousness, responsibility) impaired in MDD (Fayard, Roberts, Robins, & Watson, 2012; Vittengl, Clark, & Jarrett, 2010). Others have concluded similarly that high NT and low PT relate robustly to depression cross sectionally (e.g., Klein et al., 2011).

Although personality usually is defined as relatively stable and resistant to change, depressed patients' high NT and low PT scores tend to parallel the severity of their depressive symptoms (Zinbarg, Uliaszek, & Adler, 2008). For example, MDD patients' self-reported NT decreases and PT increases during both acute-phase pharmacotherapy and CT (e.g., Clark, Vittengl, Kraft, & Jarrett, 2003; Costa, Bagby, Herbst, & McCrae, 2005; Tang et al., 2009), and changes in NT and PT often correlate with changes in depressive symptoms (e.g., .54 for NT and -.51 for PT among depressed patients receiving a variety of treatments, Griens, Jonker, Spinhoven, & Blom, 2002; .50 for NT and -.49 for PT among MDD patients receiving CT, Clark et al., 2003). Similarly, in naturalistic longitudinal studies of MDD, NT is increased and PT decreased during depressive episodes, whereas NT is lower and PT higher during periods of euthymia (e.g., Jylhä, Melartin, Rytälä, &

Isometsä, 2009; Karsten et al., 2012). Importantly, although the findings are mixed (see Clark, Watson, & Mineka, 1994, for a review), the preponderance of evidence indicates that depressive episodes in adulthood do not permanently “scar” personality; that is, NT and PT eventually return to near-baseline levels with recovery from depressive episodes (e.g., Jylhä et al., 2009; Nery et al., 2009).

Interestingly, personality changes may be accounted for better by depressive symptom improvement during psychotherapy than during pharmacotherapy. Tang et al. (2009) examined changes in NT and PT among MDD patients randomized to receive pharmacotherapy, placebo, or CT. Depressive symptoms and NT decreased, and PT increased, more so in active treatments (pharmacotherapy and CT) than in the placebo condition. But after controlling change in depressive symptoms, changes in NT among patients receiving CT no longer exceeded changes in the placebo group (and PT change was reduced substantially relative to placebo), whereas NT and PT changes among pharmacotherapy patients remained larger than among placebo patients. It is possible that some pharmacotherapies target neurochemical processes that reduce NT and depressive symptoms independently (cf. Terracciano et al., 2011), whereas CT achieves its outcomes via pathways common to patients' experience of both symptoms and NT (e.g., learning that thoughts and emotions can be changed). Moreover, nearly all changes in personality disorder scales were accounted for by reduction in depressive symptoms in a study of psychodynamic psychotherapy for outpatients with a variety of diagnoses (Jensen, Mortensen, & Lotz, 2008). In this context, we tested whether changes in personality were accounted for by improvement in depressive symptoms in the current sample of acute-phase CT patients.

Although systematic changes in NT and PT during treatment strongly suggest that personality measures contain state components, measures of NT and PT also display stable trait qualities for depressed patients. As expected for stable personality dimensions, retest correlations are moderate to moderately high suggesting that rank order of personality trait levels among persons with MDD is largely preserved despite changes in level (e.g., retest r of .70 for NT and .79 for PT among non-responders to pharmacotherapy, Costa et al., 2005; .48 for NT and .64 for PT among combined responders and non-responders to CT, Clark et al., 2003; .55/.55 for NT and .65/.67 for PT for persons with/without comorbid personality disorders at a 6-year naturalistic follow-up; Morey et al., 2010). In addition, internal consistency and factor structures of personality inventories typical of normal samples replicate among persons with MDD (e.g., Costa et al., 2005; De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006; Sato et al., 2001). Finally, greater personality pathology scores among depressed patients often (e.g., Gorwood et al., 2010; Morey et al., 2010; Quilty et al., 2008; Vittengl et al., 2010), but not always (e.g., Bagby, Joffe, Parker, & Kalembe, 1995; Boyce & Parker, 1985; Sato et al., 1999), predict poorer outcomes (e.g., treatment non-response, relapse; Klein et al. 2011).

Explication of personality measures' dual state/trait qualities among depressed persons has been addressed empirically by differentiating various types of stability and change. For example, Santor, Bagby, and Joffe (1997) argued that relative stability (test-retest correlations) must be distinguished from absolute stability (mean-level changes). Among

MDD patients treated with pharmacotherapy, Santor et al. (1997) found both high relative stability (retest r for NT = .76 and PT = .80) and substantial absolute instability (mean change d for NT = -0.89 and PT = 0.53), consistent with the review above. More recently, DeFruyt et al. (2006) distinguished five types of continuity versus change: structural (relations among personality scales at each time point; e.g., factor structure), differential (retest correlations; cf. Santor et al.'s relative stability), mean-level (changes in scale means; cf. Santor et al.'s absolute stability), ipsative (changes in one person's profile of scores in a multi-scale personality inventory), and individual-level (changes in one person's scores compared to a reliable change index). Among MDD patients receiving pharmacotherapy (tianeptine or fluoxetine) plus psychotherapy (supportive, psychodynamic, or cognitive), the structure of a five-factor model personality inventory was stable from 1 to 6 months in treatment. Retest correlations for NT (.57) and PT (.77) were moderate, NT decreased moderately ($d = -0.55$), and PT increased slightly ($d = 0.07$) but statistically significantly. The median ipsative profile retest correlation was high (.90), although about half (47%) of patients had reliable changes on at least one of five trait scales (DeFruyt et al., 2006). The latter two idiographic results match the robust findings of nomothetic relative stability (substantial retest correlation) and absolute instability (mean-level changes) of personality trait scales among depressed patients.

Understanding personality measures' dual state/trait qualities among depressed persons has also been advanced by partitioning changeable state from stable trait variance among repeated measures. Examining separate state and trait components may advance understanding of personality measures, as well as the role of personality functioning in depression. Clark et al. (2003) made an initial effort using data from 108 patients with recurrent MDD who completed the SNAP early and late in CT. Clark et al. separated SNAP scales' stable trait and changeable state variance. Clark et al. isolated portions of the scales' variances that were constant longitudinally (trait) from unstable longitudinally but convergent cross-sectionally (state) across acute-phase CT using factor and regression analyses. Both stable trait (median $r = .30$) and concurrent state (median $r = .46$) components correlated with depression symptom severity, whereas state changes ($r = .58$) more so than stable trait components (median $r = .15$) correlated with symptom change. A more recent study using different analytic methods complemented this result. Naragon-Gainey, Gallagher, and Brown (2012) separated trait from state variance in repeated measures of PT and NT using a large sample of patients with a variety of anxiety and depressive disorders receiving assessment and/or treatment. Most of the variance (median 79%) in PT and NT measures was stable (trait) variance, and when controlling baseline symptoms, patients with higher NT and lower PT trait scores had greater symptom change during treatment (e.g., path coefficients of .87 for NT and -.49 for PT predicted depressive symptom slopes). Thus, Clark et al. and Naragon-Gainey et al. provided initial direct evidence that personality assessments tap both state and trait variance, with the state variance partly masking traits when patients are acutely depressed.

Using a new, larger dataset of patients with recurrent depression treated with acute-phase CT (Jarrett & Thase, 2010), we aimed to replicate and extend Clark et al. (2003)'s findings. In general, we hypothesized that both the changeable "state" and stable "trait" components

of SNAP trait scales are valid in predicting depressive symptoms and functioning (e.g., social, interpersonal, cognitive content) among recurrent MDD patients receiving acute-phase CT. However, we expected the time frame for prediction to vary by component type. In particular, consistent with Clark et al. (2003) we expected that (a) the stable trait components would predict depressive symptom levels early and late in CT but not *changes* in symptoms; and (b) the changeable state components predict depressive symptoms both concurrently (i.e., symptom levels) and longitudinally (i.e., symptom changes). We extended prior research to test the additional hypotheses that (c) CT patients' changes in the SNAP scales during CT are accounted for by changes in depressive symptoms; and (d) SNAP scale scores, as well as the scales' state and trait components, predict acute-phase CT clinical outcomes (stable remission, response, and non-response; social-interpersonal functioning, depressive cognitive content). In this context, our aim is not to inform clinical practice with the current analyses, but instead to explore the “conceptual utility” of personality assessment to improve understanding of the stability of and change in patients' trait scores during acute-phase CT for depression (Hayes, Nelson, & Jarrett, 1987/in press).

Method

Participants

The current analyses draw data from the acute phase of a multi-phase clinical trial (Jarrett & Thase, 2010). Participants were self- and practitioner-referred outpatients who (a) provided written informed consent for evaluation and treatment; (b) met *DSM-IV* criteria for recurrent MDD (American Psychiatric Association, 2000); (c) previously had remitted between depressive episodes, 1 depressive episode with complete inter-episode recovery, or antecedent dysthymic disorder; and (d) scored ≥ 14 on the 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960).¹ Excluded patients (a) had severe or poorly controlled concurrent medical disorders that could cause depression, (b) had psychotic or organic mental disorders, bipolar disorder, active substance dependence, or primary obsessive-compulsive or eating disorders, (c) could not complete questionnaires in English, (d) were an active suicide risk, (e) were <18 or >70 years old, (f) had not responded previously to ≥ 8 weeks of CT or 6 weeks of fluoxetine, or (g) were pregnant or planned to become pregnant during the first 11 months after intake. Psychiatric diagnoses were made via the Structured Clinical Interview for *DSM-IV* (First, Spitzer, Gibbon, & Williams, 1996). Data from patients ($N = 351$) who entered the study after the first SNAP assessment was added to the acute-phase protocol are analyzed in this report. These 351 patients had age $M = 43.3$ years ($SD = 12.4$) and completed $M = 15.0$ ($SD = 3.0$) years of education; 67.8% were women; 1.4% were Asian, 12.3% black, 4.0% Hispanic, 80.3% white, and 2.0% other ethnicities. Patients' mean age of onset of MDD was 21.3 years ($SD = 11.1$) and their current major depressive episode had lasted $M = 23.8$ months ($SD = 43.4$).

¹Two patients erroneously entered CT with HRSD = 13 at one of two diagnostic visits. During CT, one of these patients responded and one dropped out. As recommended by the Data Safety and Monitoring Board (DSMB), the two patients are analyzed here as they were treated during data collection.

Acute-Phase CT

Participants withdrew from psychotropic medications before entering the study and were not prescribed antidepressant medications during the acute-phase CT protocol. Cognitive therapists ($N=16$)² demonstrated competence by achieving and maintaining Cognitive Therapy Scale (Young & Beck, 1980) scores ≥ 40 , submitted videotaped sessions for review, participated in weekly group supervision, and received feedback on strengths and weaknesses. The CT protocol lasted 12 (maximum 14) weeks and included 16 or 20 CT sessions. Patients received 2 sessions per week for 4 weeks, after which those who were improving (as operationalized by at least a 40% reduction in HRSD scores) received 8 additional weekly sessions (16 total sessions), whereas those who were not responding received 4 additional weeks of twice-weekly sessions before beginning weekly sessions (20 total sessions).³ A higher “dose” of CT was provided to patients who were not showing much early improvement to increase their odds of response and eligibility to participate in later phases of the trial comparing relapse/recurrence rates among acute-phase CT responders randomized to continuation-phase CT, fluoxetine, or pill placebo (see Jarrett & Thase, 2010). Nonetheless, the acute-phase protocol for all patients was 12 weeks of CT and they comprise a single sample in the current analyses drawing data only from the acute phase of the clinical trial.⁴

Measures

Schedule for Non-adaptive and Adaptive Personality-2nd Edition (SNAP-2)—

Personality was measured with the SNAP-2 (Clark et al., in press), a 390-item, factor analytically derived self-report inventory that uses a true-false format to assess 15 dimensions of personality functioning relevant to personality disorder (e.g., mistrust, impulsivity).⁵ The SNAP scales have demonstrated good internal consistency (*Mdn* alphas = .79 to .92 in student, adult, and patient samples; grand *Mdn* = .82), test-retest reliability (e.g., in normal adults, 1 week to 4.5 months, mean interval = 49 days; mean $r = .87$), and discriminant validity (mean interscale $r = \sim|.20|$) (Clark et al., in press). The three temperament scales (positive temperament, negative temperament, and disinhibition) reflect the factor structure of the instrument, and the scales' validity has been supported in multiple studies (e.g., Morey et al., 2012; Pryor, Miller, & Gaughan, 2009; Ready & Clark, 2002; Vittengl, Clark, & Jarrett, 2003). Because the SNAP scales are internally consistent, the current analyses testing stability and change used total scale scores and not disaggregated items. The Appendix contains brief descriptions of the scales' content.

Depressive Symptom Severity—Patients completed the 21-item Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and 30-item Inventory

²We tested therapist effects and found none. In a repeated-measures ANOVA including SNAP and depression severity scales early and late in CT, the main effect of therapist and scale-by-therapist, therapist-by-time, and scale-by-therapist-by-time interactions were not significant, $ps > .30$.

³Four (1 early and 3 late) responders were misclassified as late and early responders, respectively. As recommended by the DSMB, they are analyzed here as they were treated during data collection.

⁴We tested dose effects and found none. In a repeated-measures ANOVA predicting SNAP scales early and late in CT from CT dose (i.e., 16- or 20-session protocol) and controlling depressive symptoms, the main effect of dose and scale-by-dose, dose-by-time, and scale-by-dose-by-time interactions were not significant, $ps > .30$.

⁵The instrument also contains six validity scales, an overall index of validity, and 12 *DSM-IV* personality disorder scales that are not included in this article.

of Depressive Symptomatology—Self-Report (IDS-SR; Rush, Gullion, Basco, Jarrett, & Trivedi, 1996), and clinicians administered the 17-item HRSD at the diagnostic evaluation, weekly during CT, within 7 days of the last CT session, and any time a patient exited the protocol. Because the three measures have well-established validity for assessing depressive symptoms and mark the same symptom severity construct in acute-phase CT (Vittengl, Clark, Kraft, & Jarrett, 2005), we aggregated them to form a robust symptom index. Specifically, we standardized the measures based on their distributions at the intake assessment using a T-score metric ($M = 50$, $SD = 10$). Then, we averaged symptom measures completed at weeks 1-2 (composite alpha = .92) and 13-14 (composite alpha = .97) during acute-phase CT to correspond with the timing of the personality assessments.

Major Depressive Episode (MDE)—MDE was assessed with the Current MDD section of the *Structured Clinical Interview for DSM-IV* (First et al., 1996) administered at the diagnostic evaluation, within 7 days of the last CT session, and any time a patient exited the protocol. Interrater reliability was moderately high in the current dataset ($ICC = .61$ based on a multilevel analysis of 39 patients rated by 4 to 21 clinicians each).

Acute-phase CT categorical outcomes—Patients were divided into 3 groups at the end of acute-phase CT based on their symptom levels and MDE status. *Stable remission* was defined as the absence of MDE and HRSD scores < 7 on each of the last seven (approximately weekly) sessions during acute phase CT (i.e., weeks 6-12 of the treatment protocol). *Response* was defined as the absence of MDE plus HRSD ≤ 12 at the end of acute-phase CT, but at least one of the last seven HRSD scores ≤ 7 . *Non-response* was defined by the presence of MDE and/or HRSD > 12 at the end of acute-phase CT. These outcomes were defined a priori (Jarrett & Thase, 2010) to separate patients with substantive improvements in acute-phase CT and low (stable remission) versus high (response) risk for relapse from patients without substantive improvement and in need additional acute-phase treatment (non-response).

Social-interpersonal Functioning—At the end of acute-phase CT, participants completed the 56-item Social Adjustment Scale—Self-Report (Weissman & Bothwell, 1976) and the 127-item Inventory of Interpersonal Problems (Horowitz et al., 1988). We analyzed the total scores for these self-report measures, which mark poorer social adjustment and greater interpersonal problems, respectively. Alpha internal consistency was acceptable for the Social Adjustment Scale-Self-Report (.87) and Inventory of Interpersonal Problems (.98) at this assessment.

Cognitive Content—At the end of acute-phase CT, patients completed the 40-item Dysfunctional Attitudes Scale (Form A; Weissman, 1979) and the 20-item Beck Hopelessness Scale (Beck et al., 1974). We analyzed total scores for these self-report measures, which reflect unrealistic attitudes related to depression and pessimistic views of the future, respectively. Alpha internal consistency was acceptable for the Dysfunctional Attitudes Scale (.94) and Beck Hopelessness Scale (.92) at this assessment.

Missing Data

We analyzed the intent-to-treat sample of patients entering the study after the early SNAP assessment was added to the acute-phase protocol ($N = 351$; an additional 172 patients entered the study before the SNAP was added to the early assessment battery and are not analyzed here). Among these 351 patients, 324 and 229 provided early and late SNAP data, and 351 and 325 provided early and late depressive symptom severity scores, respectively. In addition, at the end of acute-phase CT, 237 patients provided data on the Social Adjustment Scale—Self-report, 239 on the Inventory of Interpersonal Problems, 242 on the Beck Hopelessness Scale, and 261 on the Dysfunctional Attitudes Scale. To maximize the generalizability and power of our analyses, we estimated missing SNAP, depression symptom severity, social-interpersonal functioning, and cognitive content scores by averaging 5 imputations generated via the Markov Chain Monte Carlo method (Schafer, 1997), an iterative technique that uses observed means and covariances. We present only analyses including estimated data, but analyses without estimated data supported substantively equivalent conclusions. We did not impute missing categorical acute-phase outcomes (non-response vs. response vs. stable remission data were available for 325 patients) for patients who dropped out because the categories were defined a priori for specific clinical decisions (e.g., whether patients were randomized to continuation phase treatments).

Results

Personality Over the Course of Acute-phase CT

For analyses with multiple SNAP scales, we used a conservative $p < .01$, two-tailed, statistical significance threshold and focused interpretations using effect sizes and patterns of results rather than isolated findings. Table 1 shows norm-based T -scores for the SNAP trait scales early and late in CT. Patients initially showed high ($mean T = 60$) NT, self-harm (especially its low self-esteem facet), and detachment, and low ($mean T = 40$) PT, consistent with depression. By late in CT, all SNAP scales changed significantly in mean level, and patients' greatest improvements (ds 0.74–0.94) were in the scales most abnormal early in CT (NT, self-harm, detachment, and PT). Relative to trait scales, depressive symptoms improved much more ($d = 2.27$) from early to late in CT. In support of our hypothesis (c) that CT patients' changes in the SNAP scales during CT are accounted for by changes in depressive symptoms, controlling changes in depressive symptoms left little mean change in the SNAP scales (median $|d| = 0.45$ reduced to median partial $|d| = 0.04$); only disinhibition decreased and mistrust increased by small amounts when controlling symptom changes (see partial d values in the right-hand column of Table 1). The reverse was not true—considerable change in depressive symptoms ($d = 1.04$, $p < .01$) remained after accounting for changes in all of the SNAP scales shown in Table 1 in a general linear model. The SNAP scales' retest stability from early to late in CT was moderate (median $r = .77$, range .66–.87) and increased slightly when controlling change in depressive symptoms (median partial $r = .80$, range .72–.88). Depressive symptoms were not as stable from early to late in CT ($r = .45$) as any of the SNAP scales.

Predicting Depressive Symptoms from Raw Personality Scale Scores

Table 2 shows concurrent (early/early and late/late in CT), change (early-late/ early-late), and predictive (early/ late) correlations of the SNAP scales with depressive symptoms. Several patterns are evident. First, the more affectively based trait scales (i.e., NT, PT, and related scales) generally were correlated more strongly with depressive symptoms concurrently and in changes (median $|r| = .26$) than were the non-affectively based traits (i.e., disinhibition and related scales; median $|r| = .09$). The early, late, and change correlations, respectively, of NT (.36, .55, .47), self-harm (.45, .61, .54), PT (-.25, -.44, -.46), and detachment (.33, .43, .40) were among the strongest. Second, changes in many SNAP scales paralleled changes in depressive symptoms to a moderate extent. Scales with correlations of .40 included NT, mistrust, self-harm and its low self-esteem facet, (low) PT, and detachment. Third, concurrent (median $|r| = .21$) and change (median $|r| = .21$) correlations typically were higher than predictive correlations (median $|r| = .12$). Among SNAP scales completed early in CT, stronger predictors ($r = .20$) of depressive symptoms late in CT were NT (.20), self-harm (.26) and its low self-esteem facet (.28), and detachment (.26).

Separating State and Trait Components of Personality Scales to Predict Depressive Symptoms

Following methods detailed by Clark et al. (2003), we focused on the subset of SNAP trait and temperament scales more robustly related to depressive symptoms (early, late, change, and predictive correlations all $p < .01$ in Table 2): NT, mistrust, self-harm, PT, exhibitionism, and detachment. We used regression and factor analyses to partition stable (trait) from unstable (state) variance. First, for each scale we predicted early and late scores as a function of the other (e.g., early NT predicting late NT and vice versa) with regression analyses. The average predicted scores from the two regression analyses (equivalent to the first factor score in a factor analysis) contained the trait component for each SNAP scale. Second, we factored the six scales' residual scores together at each assessment (early and late) and retained the first factor score. The factor scores contained the state variance common among the personality scales at each assessment, parallel to assessing depressive symptoms as a single dimension, and omitted random (error) variance.

We correlated the trait and state components with depressive symptoms, as shown in Table 3, to test our hypotheses that (a) the stable trait components would predict depressive symptom *levels* early and late in CT but not *changes* in symptom levels; and (b) the changeable state components would predict depressive symptoms both concurrently (i.e., symptom levels) and longitudinally (i.e., symptom changes). In support of our hypotheses, the trait components predicted depressive symptoms early in CT (median $|r| = .33$) and late in CT (median $|r| = .35$), and the state components predicted symptoms concurrently, weakly but statistically significantly early in CT ($r = .28$) and more strongly late in CT ($r = .61$). All 14 of these correlations met the $p < .01$ significance threshold. In addition, higher scores on the early state component and greater change in the state component predicted lower levels of symptoms late in the acute phase, which may reflect both regression to the mean and patients' return to their "usual selves." Also consistent with our hypotheses, none of the trait components predicted changes in symptoms significantly (median $|r| = .10$)⁶, whereas change

in state components aligned strongly with changes in symptoms ($r = .59$). Finally, higher scores on the state component early, and lower scores on the state component late, in CT predicted greater change in depressive symptoms. Thus, our findings in this larger data set largely replicate those found in Clark et al. (2003).

Relations of Raw, Trait, and State Personality Scores to Acute-phase CT Categorical Outcomes

We next considered patients' categorical outcomes at the end of acute-phase CT. In particular, stable remission and response mark short-term improvements with lower and higher risk for relapse, respectively (Jarrett & Thase, 2010), whereas non-response reflects current need for additional treatment (e.g., augmenting or switching treatment modalities; see Method for operational definitions). Response (49.8%) was more common than stable remission (10.8%) and non-response (39.4%) among patients completing the acute-phase CT protocol ($n = 325$).

In support of our hypothesis (d) that SNAP scale scores would be related to acute-phase CT outcomes, patients who achieved stable remission generally had more normal SNAP profiles early in CT than did patients with either response or non-response (see Table 4). In particular, patients with stable remission had significantly lower NT, self-harm (and its low self-esteem facet), detachment, and higher PT scores than patients with either response or non-response. In addition, patients with stable remission had lower eccentric perceptions than patients with non-response. Response and non-response groups did not differ significantly on any SNAP scale.

Late in CT, patients in the three outcome groups (stable remission, response, and non-response) were more strongly differentiated on the SNAP (see Table 5). The average scores for patients with stable remission were in the normal range ($mean T > 40$ and < 60), whereas responders and non-responders continued to show pathological-level profiles (low self-esteem and PT in both groups, plus high NT, mistrust, self-harm, and detachment among non-responders). In support of our hypothesis (d) that SNAP scale scores would predict acute-phase CT outcomes, the stable remission group scored significantly lower than the response group (and, moreover, than the non-responders) on NT, mistrust, self-harm and low self-esteem, dependency, detachment, and higher in PT. In addition, patients with stable remission had lower aggression, suicidality, and eccentric perceptions than non-responders. Finally, patients with response showed lower NT, aggression, self-harm (including low self-esteem and suicidality), eccentric perceptions, detachment, and higher PT scores than non-responders.

Table 6 shows differences among patients with stable remission, response, and non-response in the trait and state components of the most depression-relevant SNAP scales. In support of our hypothesis (d) that SNAP scale trait and state components would predict acute-phase CT outcomes, patients with stable remission showed lower trait levels of NT, self-harm,

⁶However, consistent with Naragon-Gainey et al. (2012), controlling early depressive symptoms in a partial correlation analyses did produce significant correlations between trait components and symptom change for most scales (NT = $-.29$, mistrust = $-.21$, self-harm = $-.35$, PT = $.26$, detachment = $-.26$).

detachment, and higher trait levels of PT than did patients with response and non-response. In addition, patients with stable remission showed less trait mistrust than non-responders, and patients with response showed less NT, mistrust, self-harm, and detachment than patients with non-response. In contrast, the trait component of exhibitionism did not differ among outcome groups.

Early, late, and change in personality-state components also differed significantly among CT outcome groups (see Table 6). Patients with stable remission showed lower state levels late in CT and greater state change from early to late in CT than did non-responders. In addition, patients with response showed higher state levels early, lower state levels late, and greater state change than did non-responders.

Prediction of Social Functioning and Cognitive Content after Acute-phase CT

To clarify the validity of the trait and state components of the SNAP scales, we examined their correlations with patients' social-interpersonal functioning and cognitive content measured at the end of acute-phase CT (see Table 7). In support of our hypothesis (d), both trait and state components of the SNAP scales predicted social adjustment, interpersonal problems, dysfunctional attitudes, and hopelessness. Among trait components, higher NT, mistrust, self-harm, detachment, and low PT and exhibitionism were associated with poorer social adjustment, greater interpersonal problems, more dysfunctional attitudes and greater hopelessness (with the exception of the non-significant correlation between exhibitionism and dysfunctional attitudes). Similarly, higher scores on the personality-state component late in CT and smaller changes in states from early to late in CT predicted poorer social adjustment, greater interpersonal problems, greater hopelessness, and more dysfunctional attitudes. Finally, higher scores on the early state component predicted better social adjustment and less hopelessness (but not interpersonal problems or dysfunctional attitudes) late in CT. These moderately large validity coefficients suggest that the state and trait components of personality both capture important information.

Discussion

Assessment of personality among patients with depression presents both challenges and useful information. Using a larger sample, the current analyses largely replicated Clark et al. (2003) and extended the literature concerning the validity of the SNAP trait in their raw-score forms, as well as distinct properties of the scales' stable trait and changeable state components. Among recurrent MDD patients ($N = 351$) treated with CT, we found that SNAP profiles early in CT were consistent with depression (e.g., high NT, low PT), improved considerably by late in CT (e.g., NT decrease $d = 0.86$, PT increase $d = 0.76$), and maintained moderate rank-order (i.e., relative) stability (e.g., retest r for NT = .66 and PT = .75), consistent with past research (e.g., Santor et al., 1997). Prediction of depressive symptoms at the end of CT from the SNAP early in CT was modest (e.g., maximum $r = .26$ for self-harm, including $r = .28$ for its low self-esteem facet), although several SNAP scales early in CT predicted categorical outcomes at the end of CT (i.e., non-response vs. response vs. stable remission): Patients with lower NT, self-harm (and low self-esteem), eccentric perceptions, detachment, and higher PT had more favorable outcomes.

In support of our hypotheses, the data suggest that personality-state variance, likely to due to depressed mood, may partly mask stable trait components of the SNAP scales. In particular, we found that changes in many SNAP scales correlated substantially with changes in depressive symptoms (e.g., NT $r = .47$ and PT $r = -.46$), replicating Clark et al. (2003). In addition, in the current analyses mean-level change in SNAP scales was greatly reduced when controlling changes in depressive symptoms (e.g., reduction in median $|d|$ from 0.45 to 0.04). Our division of the SNAP scales' variance into stable trait and changeable state components provided additional evidence: The stable trait components predicted depressive symptoms substantively both early and late in CT but did not predict changes in symptoms, whereas changeable state components were moderate to strong predictors of depressive symptoms longitudinally (changes from early to late in CT) and concurrently (early, and especially late, in CT). The early concurrent correlation between the state component and depressive symptoms ($r = .28$) is lower than might be expected and supports our hypothesis only modestly, whereas the later concurrent correlation between the state component and depressive symptoms ($r = .61$) more clearly supports our interpretation of the state component as personality-relevant affect. One explanation for this pattern of results is that the early correlation is an underestimate of the true relation because patients were all acutely depressed at intake, restricting the range of depressive symptoms, thus deflating the correlation.

Weather may provide an instructive (albeit imperfect) analogy for the current pattern of state versus trait validity. Suppose that the past 100-year average indicates that the month of July tends to be warm (e.g., daily high temperature mean of 90° F / 32° C) for a particular location. The 100-year average is analogous to a stable trait measure and helps us predict that next July 11 will be relatively warm (e.g., compared to March). How much hotter or colder next July 11 will be compared to next July 10, however, is not predictable from the 100-year monthly average. Instead, predicting the change in temperature from July 10 to 11 would be improved by knowing the actual daily temperature (the changeable state) on next July 10. If next July 10 is unusually cool (e.g., high of 70° F), then we might forecast that the temperature will increase from July 10 to 11, whereas if July 10 is unusually hot (e.g., high of 105° F), we might predict that the temperature will decrease from July 10 to 11. Similarly, the current analyses showed that MDD patients with higher state scores at the beginning of CT tended to benefit more (e.g., had greater decrease in depressive symptoms, were more likely to be responders) than patients with lower state scores at the beginning of CT. In contrast, trait components predicted early and late depression scores roughly equally well, but did not predict change in symptom levels from early to late CT, analogous to the 100-year monthly average predicting temperatures roughly equally well on July 10 and 11, but not the change in temperature between July 10 and July 11.

We also found moderately strong support for our hypothesis that the SNAP scales (both raw, and partitioned into stable trait and changeable state components) would predict clinical outcomes. Among raw SNAP scale scores, we found that patients reporting greater personality pathology early (higher NT, self-harm and low self-esteem, eccentric perceptions, detachment, and lower PT) and especially late (same scales as for early plus lower mistrust, aggression, suicidality, and dependency) in CT were generally less likely to

achieve favorable categorical outcomes (stable remission vs. response vs. non-response), consistent with prior research (e.g., Zinbarg et al., 2008). When we divided SNAP scales' variance into trait and state components, higher levels of trait NT, mistrust, self-harm, detachment, and lower PT, predicted less favorable categorical outcomes, as well as poorer social-interpersonal functioning (social adjustment and interpersonal problems) and greater depressive cognitive content (dysfunctional attitudes and hopelessness). Similarly, lower state levels late in CT, and greater change in state levels predicted better categorical, social-interpersonal, and cognitive content outcomes. In contrast, higher state levels early in CT to a lesser extent predicted *better* categorical outcomes (response vs. non-response), social adjustment, and fewer dysfunctional attitudes (but not interpersonal problems or hopelessness) at the end of acute-phase CT. This pattern of findings implies that some patients' depression—attributable more to traits and less to states—has poorer outcomes after acute-phase CT. Based on our results, we speculate that patients' depression arising from stable processes (whether internal, environmental, or some combination is unknown) is more resistant to acute-phase CT, whereas patients' depression arising from unstable processes readily addressable during CT fare better.

The current study's conclusions are limited by characteristics of the sample, measures, and analyses. First, our results were obtained from patients with carefully diagnosed recurrent MDD treated by competent, carefully supervised cognitive therapists following a research protocol. Without comparison acute-phase treatment conditions, we are not able to comment directly on the efficacy of CT to manage or change personality pathology. Further, our results may not generalize fully to patients with other diagnoses (e.g., chronic MDD, dysthymic disorder) receiving different treatments (e.g., pharmacotherapy, interpersonal psychotherapy) in different contexts (e.g., routine clinical practice). However, a recent study of naturalistic outcomes among persons with bipolar disorders also found state and trait relations between personality measures and mood symptoms longitudinally (Barnett et al., 2011), highlighting possible generalizability. Similarly, analyses of the continuation and follow-up phases of the current clinical trial in future reports may offer opportunities to clarify longitudinal prediction of depressive symptoms from state and trait components of SNAP scales.

Second, although the SNAP converges strongly with other measures of personality pathology (e.g., Widiger, Livesley, & Clark, 2009), different personality inventories might show different state and trait properties among MDD patients. Similarly, although patients were not selected for the study based on SNAP scores, depressed patients have characteristically abnormal personality profiles (e.g., high NT and low PT, as demonstrated in the current analyses). More deviant trait levels may demonstrate greater changes over time, especially in the context of an effective treatment for depression. Replicating and extending our results using different samples and measures may be a profitable topic for future research.

Third, because CT aims to reduce depressive symptoms in MDD and does so substantially (e.g., Hollon et al., 2005), our definitions of “state” and “trait” as unstable (changed from early to late in CT) and stable (unchanged from early to late in CT) variance in SNAP scales, respectively, potentially confound the state component with symptom change.

Testing correlations of the SNAP state and trait components with measures in addition to depressive symptoms (especially social-interpersonal functioning which is not targeted directly in CT and does not change as much as depressive symptoms; e.g., Vittengl, Clark, & Jarrett, 2004) clarifies the external validity of the state and trait components and reduces concerns about circularity in correlations with depressive symptoms.

Similarly, although acute-phase CT does not focus on personality change, it is possible that some changes in SNAP scales may have reflected changes in trait levels that were not detectable with our methods. Moreover, because acute-phase CT is designed to decrease depressive symptoms, correlations between the unstable components of the SNAP and changes in depressive symptoms may be due partly to correlated “error” among measures. However, the moderately strong correlations of both state and trait SNAP components with measures of social-interpersonal functioning and cognitive content support the components’ external validity. Nonetheless, when more than two assessments are available, other analytic strategies may provide complementary methods to separate trait from state variance and test their changes (e.g., Kenny & Zautra, 1995).

Finally, the current analyses’ use of two time points (early and late in acute-phase CT) to differentiate trait from state components in personality measures do not allow clinicians to know from a single assessment (e.g., pre-treatment) the extent to which a depressed patient has greater trait versus state liabilities. Consequently, the current results build theory but have limited clinical relevance. As frequent assessment in measurement-based care becomes standard (e.g., Harding, Rush, Arbuckle, Trivedi, & Pincus, 2011), the potential for cumulative data-driven decisions may grow (e.g., which patients require shorter vs. longer courses of CT based on personality profiles and changes in temperament and trait scales). More immediately, our analyses demonstrated that both state and trait components of the SNAP are relevant to patients’ acute-phase CT outcomes, including the quality of their response to this treatment, social-interpersonal functioning, and cognitive content. In sum, although our current analyses were not intended to guide treatment or clinical decisions directly, our analyses demonstrate the conceptual utility of trait dimensional instruments to understand in what ways patients’ personalities change and remain stable in acute-phase CT for depression (Hayes, Nelson, & Jarrett, 1987/in press).

Our analyses build on past assertions that assessment of personality among depressed patients, and changes in personality inventory scores among depressed patients receiving treatment, are valid (e.g., Costa et al., 2005; Morey et al., 2010; Zinbarg et al., 2008). We showed that the dual state/trait nature of personality inventory scores can be accessed by partitioning SNAP scale scores into state and trait variance longitudinally over a trial of CT. The SNAP dimensional scores contained separable state and trait components with different construct validity profiles. Both state and trait components showed moderate concurrent validity in their correlations with depressive symptoms and clinical outcomes, whereas the changeable state components held greater predictive validity for changes in depressive symptoms. Thus, as temperament models of psychopathology predict (e.g., Clark et al., 2005), personality-relevant state affect was salient among MDD patients in the current study, and personality traits per se do play a role in depression levels and treatment

outcomes of MDD patients. However, separating the state and trait components of personality measures for clinical decision-making remains a challenge.

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Appendix

Personality Scales of the Schedule for Non-adaptive and Adaptive Personality-2nd Edition

Scale	Brief Description of:	
	Low Scorers (T scores 40)	High Scorers (T scores 60)
Negative Temperament	Experience little distress; recover quickly from negative experiences.	Experience a wide range of negative emotions; overreact to daily stresses and hassles.
Mistrust	Have a trustful, even naïvely positive, attitude toward others.	Have a pervasively suspicious and cynical attitude toward others.
Manipulativeness	Respect others' rights and property; do not bend the truth or use others to their advantage.	Report willingness to use people and systems for personal gain without regard for others' rights or feelings.
Aggression	Do not readily become angry; easily control their tempers; rarely argue or fight.	Report high frequency and intensity of anger and aggression.
Self-Harm	Are satisfied with themselves; do not consider suicide as a solution to their problems.	Have very low self-esteem; engage in self-destructive thoughts and behaviors.
Eccentric Perceptions	Deny depersonalization, derealization, and unusual perceptual experiences.	Report odd somatosensory perceptions, cognitions, and beliefs.
Dependency	Enjoy and are confident in handling their own problems and making their own decisions.	Express little self-reliance and low self-confidence or enjoyment in decision making.
Positive Temperament	Do not find their lives exciting; are easily fatigued; rarely feel enthusiastic or interested.	Experience a wide variety of positive emotions; are pleasurably and actively engaged in their lives.
Exhibitionism	Prefer not to be noticed; dress and act to avoid attention.	Seek overt attention through their behavior; take the limelight whenever possible.
Entitlement	Are self-effacing and humble; do not believe they deserve special recognition.	Have unrealistically positive self-regard; feel that they should be treated as special.
Detachment	Are open, warm, and seek social contact.	Are interpersonally aloof, reserved, and express a preference for being alone.
Disinhibition	Are serious people with conservative values; follow all rules; do things in the proper order.	Act spontaneously with little concern for consequences; seek stimulating experiences; fail to honor obligations.
Impulsivity	Act in a thoughtful, planful, cautious manner; prepare for the future.	Act on a momentary basis without an overall plan; take chances of all kinds.
Propriety	Reject social rules and convention with little concern for traditional "right" and "wrong."	Express a preference for traditional, conservative morality and proper conduct.

Scale	Brief Description of:	
	Low Scorers (T scores < 40)	High Scorers (T scores > 60)
Workaholism	Do not enjoy hard work; do not push themselves; always find time to have fun; enjoy laziness.	Favor work over leisure; are perfectionistic; have self-imposed demands for excellence.

Note. Scale descriptions copyright © 1993 University of Minnesota Press; used by permission. Patients with more extreme scores will match the descriptions to increasing degrees and/or in more situations.

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Table 1
Stability and Change in SNAP Scales and Depressive Symptoms from Early and Late in A-CT

SNAP scale	Early		Late		Relative Stability: Retest Correlation		Absolute Stability: Mean Change	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>r</i>	<i>pr</i>	<i>d</i>	<i>pd</i>
Negative Temperament	62.4	7.8	56.4	9.0	.66*	.72*	0.86*	0.01
Mistrust	59.8	11.4	55.9	11.1	.74*	.79*	0.49*	-0.17*
Manipulativeness	51.2	9.9	49.1	8.8	.83*	.85*	0.37*	0.10
Aggression	54.0	10.5	51.2	9.0	.77*	.78*	0.42*	0.03
Self-harm	70.2	12.5	60.4	12.8	.66*	.75*	0.94*	-0.02
Low Self-esteem	77.0	14.0	64.3	15.0	.61*	.70*	0.99*	0.02
Suicidality	58.7	12.7	54.3	10.9	.76*	.78*	0.52*	-0.07
Eccentric Perceptions	49.1	9.5	46.6	7.6	.75*	.76*	0.39*	0.10
Dependency	57.9	13.1	53.5	10.6	.76*	.79*	0.51*	-0.10
Positive Temperament	33.6	9.7	39.1	10.7	.75*	.80*	-0.76*	0.04
Exhibitionism	43.6	9.4	45.0	9.3	.87*	.88*	-0.30*	0.02
Entitlement	43.0	9.7	45.9	9.7	.77*	.78*	-0.45*	0.01
Detachment	61.5	10.3	56.8	10.9	.82*	.84*	0.74*	0.01
Disinhibition	49.8	8.5	47.9	8.1	.85*	.85*	0.42*	0.23*
Impulsivity	50.3	9.4	49.0	8.9	.80*	.80*	0.22*	0.03
Propriety	52.2	8.9	51.5	9.1	.85*	.85*	0.14*	-0.12
Workaholism	52.6	11.5	51.4	10.4	.80*	.80*	0.17*	-0.08
Depressive Symptoms	44.7	11.1	21.4	13.1	.45*	---	2.27*	---

Note. *N* = 351. SNAP values are T-scores based on community norms. *r* is the retest correlation from early to late CT. *pr* is the partial retest correlation, controlling change in depressive symptoms. *d* is difference between early and late means divided by the standard deviation of difference scores (i.e., the effect size). *pd* is the change effect size controlling change in depressive symptoms. The depressive symptoms composite includes the Hamilton Rating Scale for Depression, Beck Depression Inventory, and the Inventory for Depressive Symptomatology—Self-report. Early SNAP data are from the A-CT session 1 or 2; late SNAP data are from the A-CT session 16 (early responders) or 20 (late responders). Early depressive symptoms data are the average of standardized values from A-CT sessions 1 and 3; late depressive symptoms data are the average of standardized values from A-CT sessions 16 (early responders) or 20 (late responders) and the blind evaluation immediately post-A-CT. SNAP scores $\pm$ 1 *SD* from the norm mean are **bolded**.

* *p* < .01, two-tailed.

Table 2
Relations between SNAP and Depressive Symptom Scores

SNAP scale	Concurrent Correlations			Predictive
	Early	Late	Change	Correlations
Negative Temperament	.36*	.55*	.47*	.20*
Mistrust	.35*	.45*	.44*	.17*
Manipulativeness	-.07	.07	.09	-.06
Aggression	.09	.28*	.19*	.09
Self-harm	.45*	.61*	.54*	.26*
Low Self-esteem	.47*	.62*	.53*	.28*
Suicidality	.26*	.40*	.35*	.14*
Eccentric Perceptions	.19*	.33*	.11	.17*
Dependency	.19*	.20*	.39*	-.03
Positive Temperament	-.25*	-.45*	-.46*	-.19*
Exhibitionism	-.26*	-.22*	-.19*	-.15*
Entitlement	-.26*	-.13	-.26*	-.05
Detachment	.33*	.43*	.40*	.26*
Disinhibition	-.08	.01	-.04	-.05
Impulsivity	.02	.06	.09	.00
Propriety	.17*	.15*	.21*	.12
Workaholism	.17*	.13	.18*	.03

Note. $N = 351$. The depressive symptoms composite includes the Hamilton Rating Scale for Depression, Beck Depression Inventory, and the Inventory for Depressive Symptomatology—Self-report. Early SNAP data are from the A-CT session 1 or 2; late SNAP data are from the A-CT session 16 (early responders) or 20 (late responders). Early depressive symptoms data are the average of values from A-CT sessions 1 and 3; late depressive symptoms data are the average of values from A-CT sessions 16 (early responders) or 20 (late responders) and the blind evaluation immediately post-A-CT. Early correlations are between early SNAP and early symptom measures. Late correlations are between late SNAP and late symptom measures. Change correlations between change in SNAP scores and change in symptom measures (early minus late). Predictive correlations are between early SNAP and late symptom measures.

* $p < .01$, two-tailed; $r_s \geq .40$ are **bolded**.

Table 3
Correlations of Personality Trait and State Scores with Depressive Symptoms

SNAP Scale	Symptoms		
	Early	Late	Change
<u>Trait Components</u>			
Negative Temperament	.38*	.41*	-.09
Mistrust	.35*	.33*	-.04
Self-harm	.45*	.48*	-.11
Positive Temperament	-.24*	-.34*	.14
Exhibitionism	-.26*	-.19*	-.02
Detachment	.31*	.36*	-.11
Median trait <i>r</i>	.33*	.35*	.10
<u>State Components</u>			
Early	.28*	-.27*	.52*
Late	.07	.61*	-.57*
Change	.11	-.48*	.59*

Note. $N = 351$.

* $p < .01$, two-tailed; $r_s \geq .40$ are **bolded**.

Table 4
SNAP Scale T-scores Early in A-CT by Status at the End of A-CT

SNAP Scale	Stable Remission (<i>n</i> =35)		Response (<i>n</i> =162)		Non-Response (<i>n</i> =128)		ANOVA <i>F</i> (2,322)	<i>R</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Negative Temperament	58.1 ^a	8.8	62.3^b	7.4	63.8^b	7.7	7.85*	.047
Mistrust	56.1	10.5	59.4	11.3	61.9	11.4	4.02	.024
Manipulativeness	50.6	11.0	51.2	10.0	50.7	9.1	0.11	.001
Aggression	50.1	7.3	53.5	10.3	55.8	11.0	4.65	.028
Self-harm	61.5^a	12.7	70.4^b	11.9	72.6^b	12.0	11.56*	.067
Low Self-esteem	67.7^a	16.2	77.3^b	13.6	79.6^b	12.3	11.01*	.064
Suicidality	52.9	9.9	58.7	12.4	60.1	13.3	4.48	.027
Eccentric Perceptions	45.5 ^a	7.7	48.7 ^{ab}	9.6	50.8 ^b	9.8	4.71*	.028
Dependency	52.8	14.1	59.3	13.9	57.3	12.0	3.60	.022
Positive Temperament	39.1^a	11.3	33.1^b	9.4	32.4^b	9.1	7.06*	.042
Exhibitionism	46.1	11.0	43.7	9.4	42.6	9.0	1.92	.012
Entitlement	43.8	9.1	42.6	10.3	43.0	9.4	0.24	.001
Detachment	55.9 ^a	10.0	61.4^b	10.0	63.5^b	9.9	7.93*	.047
Disinhibition	47.7	10.3	50.0	8.2	49.4	7.7	1.05	.007
Impulsivity	48.7	12.0	50.0	9.0	50.8	9.0	0.77	.005
Propriety	53.0	8.7	51.7	9.7	53.1	8.1	0.96	.006
Workaholism	53.8	12.7	51.9	11.2	53.6	11.3	1.03	.006

Note. SNAP values are *T*-scores based on community norms. Within each row, means without a common superscript differ at $p < .01$, two-tailed. Scores ± 1 *SD* from the norm mean are **bolded**.

* $p < .01$.

Table 5

SNAP Scale T-scores Late in A-CT by Status at the End of A-CT

SNAP Scale	Stable Remission (<i>n</i> =35)		Response (<i>n</i> =162)		Non-Response (<i>n</i> =128)		ANOVA <i>F</i> (2,322)	<i>R</i> ²
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Negative Temperament	47.7 ^a	8.5	55.3 ^b	8.5	60.5^c	7.9	36.23 *	.184
Mistrust	50.2 ^a	10.0	54.1 ^b	10.9	60.3^b	10.7	17.51 *	.098
Manipulativeness	47.2	9.8	48.8	9.0	49.6	7.9	1.08	.007
Aggression	46.8 ^a	6.7	50.2 ^a	9.2	53.9 ^b	9.0	11.56 *	.067
Self-harm	49.0 ^a	8.3	58.7 ^b	11.8	66.1^c	12.5	33.19 *	.171
Low Self-esteem	50.3 ^a	9.4	62.1^b	14.6	71.6^c	13.4	38.63 *	.194
Suicidality	48.2 ^a	8.3	53.6 ^a	10.1	57.0 ^b	11.9	9.35 *	.055
Eccentric Perceptions	42.4 ^a	6.5	45.7 ^a	7.3	49.2 ^b	7.9	14.21 *	.081
Dependency	47.3 ^a	10.2	53.2 ^b	10.8	55.4 ^b	10.4	8.31 *	.049
Positive Temperament	47.6 ^a	11.2	39.6^b	10.8	35.6^c	9.2	19.69 *	.109
Exhibitionism	48.2	10.4	45.4	9.7	43.5	8.6	3.71	.023
Entitlement	48.1	9.5	45.7	10.6	45.5	9.0	0.80	.005
Detachment	50.3 ^a	10.2	55.4 ^b	10.5	60.6^c	10.3	16.76 *	.094
Disinhibition	46.3	10.0	47.5	7.8	48.2	7.5	0.85	.005
Impulsivity	48.2	10.9	48.3	8.6	49.8	8.5	1.22	.008
Propriety	51.3	10.1	51.0	9.9	52.7	7.8	1.34	.008
Workaholism	50.9	9.8	50.4	10.5	53.2	10.5	2.63	.016

Note. SNAP values are T-scores based on community norms. Within each row, means without a common superscript differ at $p < .01$, two-tailed. Scores ± 1 SD from the mean are **bolded**.

* $p < .01$.

Table 6
SNAP Trait/State Component Scores by Status at the End of A-CT

SNAP Scale	Stable Remission (<i>n</i> =35)		Response (<i>n</i> =162)		Non-Response (<i>n</i> =128)		ANOVA	Model
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i> (2,322)	<i>R</i> ²
<u>Trait Components</u>								
Negative Temperament	-0.77 ^a	0.90	-0.07 ^b	0.85	0.32 ^c	0.88	22.82 [*]	.124
Mistrust	-0.41 ^a	0.84	-0.10 ^a	0.90	0.29 ^b	0.94	10.81 [*]	.063
Self-harm	-0.79 ^a	0.74	-0.06 ^b	0.82	0.32 ^c	0.91	24.56 [*]	.132
Positive Temperament	0.68 ^a	1.04	0.00 ^b	0.91	-0.22 ^b	0.85	13.88 [*]	.079
Exhibitionism	0.30	1.09	0.03	0.99	-0.13	0.92	2.91	.018
Detachment	-0.57 ^a	0.88	-0.07 ^b	0.92	0.27 ^c	0.92	12.77 [*]	.074
<u>State Components</u>								
Early	0.00 ^{ab}	1.20	0.17 ^a	1.08	-0.22 ^b	0.80	5.56 [*]	.033
Late	-0.65 ^a	0.97	-0.22 ^a	1.05	0.49 ^b	0.77	30.14 [*]	.158
Change	0.36 ^a	1.10	0.21 ^a	1.08	-0.39 ^b	0.76	16.05 [*]	.091

Note. Within each row, means without a common superscript differ at $p < .01$, two-tailed.

^{*} $p < .01$.

Table 7
Prediction of Social Functioning and Cognitive Content Post Acute-phase CT from SNAP
scale Trait and State Components

SNAP Scale	Social Adjustment Scale	Inventory of Interpersonal Problems	Beck Hopelessness Scale	Dysfunctional Attitudes Scale
<u>Trait Components</u>				
Negative Temperament	.41 *	.61 *	.33*	.46 *
Mistrust	.43 *	.43 *	.34*	.38*
Self-harm	.56 *	.42 *	.53 *	.44 *
Positive Temperament	-.36*	-.28*	-.34*	-.18*
Exhibitionism	-.21*	-.20*	-.16*	.00
Detachment	.45 *	.40 *	.40 *	.24*
Median trait $ r $	.42 *	.41 *	.34*	.31*
<u>State Components</u>				
Early	-.22*	-.08	-.24*	-.08
Late	.61 *	.47 *	.58 *	.39*
Change	-.45 *	-.30*	-.44 *	-.26*

Note. $N = 351$. r s $|.40|$ are **bolded**.

*
 $p < .01$.