Thin Slice Ratings of Client Characteristics in Intake Assessments: Predicting Symptom Change and Dropout in Cognitive Therapy for Depression

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Abstract

Thin slice ratings of personality have been shown to predict a number of outcomes, but have yet to be examined in the context of psychotherapy. In a sample of 66 clients participating in cognitive therapy for depression, we examined the predictive utility of thin slice rated pre-treatment client traits. On the basis of short video clip excerpts (i.e., thin slices) of intake assessments, trained observers rated clients on personality characteristics and specific personality disorder (PD) traits. Clients' therapy interest and neuroticism predicted lower odds of dropout. Ratings of extraversion predicted greater symptom change across treatment; ratings of clients' Avoidant and Schizoid PD traits predicted less marked symptom improvement. Ratings of agreeableness and likeability also predicted greater symptom change, but these relations were only significant in one of two analytic approaches used. Evidence for the predictive validity of thin slice ratings was generally stronger than that observed for self-reported PD traits and PD status. Moreover, these self-report and diagnostic assessments failed to account for the thin slice-outcome relations identified. Findings support the clinical utility of quick, thin slice impressions of clients, as these ratings could be used to identify clients with a high risk of dropout or poor treatment outcome.

Keywords

Personality traits; self-report; depression; cognitive therapy

Cognitive Therapy (CT) has been established as an efficacious treatment for depression (Strunk & DeRubeis, 2001). However, clients show considerable variability in their response to treatment, and not all clients achieve optimal outcomes (Hollon, Thase, & Markowitz, 2002). This variability in outcomes can be decomposed into three sets of causal factors: those associated with therapists, with clients, and any interactions of therapist and client factors (DeRubeis, Brotman, & Gibbons, 2005).

In this paper, we examine the relation of pre-treatment client characteristics to subsequent therapeutic outcomes (i.e., both treatment dropout and symptom improvement) in CT for

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depression. We assessed these characteristics using observer ratings of short (< 1 min) video excerpts, taken from clients' intake evaluations. Such 'thin slice ratings' of personal characteristics have demonstrated predictive validity in a number of different domains (i.e., marital outcomes, sales effectiveness, and intelligence test scores; Ebling & Levenson, 2003; Ambady, Krabbenhoft, & Hogan, 2006; Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004). However, thin slice ratings have yet to be examined in the context of psychotherapy. We hypothesized thin slice ratings of client characteristics would have predictive validity in this context. Further, we suspected these thin slice ratings would serve as predictors of outcome above and beyond commonly used diagnostic and self-report measures. To place our work in context, we first review evidence for the relation of personality disorder (PD) status and other client characteristics with treatment outcome. Then, we consider the potential utility of a thin slice method for assessing client traits.

Client Characteristics and Treatment Outcome

In considering individual client differences that may predict treatment outcome, researchers have focused considerable attention on personality variables including personality traits and indicators of personality disorders. The five factor model of personality is arguably the most prominent model of the higher level personality characteristics. A series of structural analyses of trait descriptors in the natural language have consistently revealed the model's five broad factors: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience (John & Srivastava, 1999). The model has been well validated as the same five factors have been observed across a variety of languages, cultures, and age groups (Digman, 1997; McCrae & Costa, 1997).

Beyond the overall traits of the five factor model, more specific characteristics such as depressed clients' perceived logicalness of therapy, therapeutic expectations, and orientation to change have been found to predict subsequent treatment outcomes (Carter et al., 2011; Meyer et al., 2002; Lewis, Simons, & Kim, 2012) and dropout (Callahan, Aubuchon-Endsley, Borja, & Swift, 2009). With regard to dimensional personality traits, neuroticism has emerged as the most consistent predictor of outcome, with higher levels of neuroticism being related to less symptom improvement (Quilty et al., 2008; Klein, Kotov, & Bufferd, 2011). Neuroticism has also been found to predict poorer response to CT relative to pharmacotherapy (Bagby et al., 2008). Though less consistent, there is some evidence that extraversion (Quilty et al., 2008) and openness to experience (Bagby et al., 2008) are associated with superior treatment outcomes. It is noteworthy that each of these studies relied on self-report measures of personality traits. In recognition of this limitation, Klein et al. (2011) called for future work emphasizing complementary methods, such as observer ratings.

PD traits and diagnoses have been related to poorer treatment outcome both across different treatments and in CT for depression specifically. Several studies have found comorbid PDs to be associated with a less favorable response to treatment for depression (Newton-Howes, Tyrer, & Johnson, 2006). Although one study failed to find PD status was related to outcome, authors of this study did find clients' maladaptive avoidant and paranoid beliefs predicted worse outcomes (Kuyken, Kurzer, DeRubeis, Beck, & Brown, 2001). In a more recent study, Fournier and colleagues (2008) found that PD status differentially predicted therapeutic outcomes. Relative to clients in the antidepressant medication condition, PD status predicted a particularly poor outcome among clients in CT for depression. Among CT clients, comorbid PD pathology was associated with a poorer rate of response to CT (44%) than that achieved by clients without a PD (70%).

PDs have also been associated with higher risk of premature treatment termination. Clients with a PD diagnosis have been found to be at high risk for premature dropout in both inpatient (Chiesa, Drahorad, & Longo, 2000) and outpatient (Gunderson, Frank, Ronningstam, & Wachter, 1989) treatment settings. In a recent meta-analysis of the adult psychotherapy literature, Swift and Greenberg (2012) found clients' diagnosis and age to be the most consistent predictors of dropout, with clients with PD diagnoses having significantly higher rates of dropout.

Beyond Self-Report: Methods of Assessing Client Traits

Much of the research on client characteristics that may impact depression treatment outcome has utilized either self-reported client traits or diagnostic information regarding PDs. However, reliance on these measures raises important concerns, as what the measures actually reflect is sometimes unclear. While self-report measures may demonstrate reasonable reliability, they are based on the questionable assumption that people are able to identify and accurately report on a wide variety of characteristics indicative of PDs (Mulder, 2002; Hogan, 1996). However, this may not be the case, as self-report responses are susceptible to self-presentation biases, including self-deception and limited insight. Scales intended to assess self-presentation biases have yielded disappointing results in detecting and correcting for such distortions (Connelly & Ones, 2010; Ellingson, Sackett, & Hough, 1999).

Arguably, how one is perceived by others may be more consequential than one's self-views. For example, Klein (2003) found informant reports of PDs served as stronger predictors of subsequent social adjustment than self-reported PD traits. Likewise, in their meta-analysis, Connelly and Ones (2010) found that, relative to self-report ratings, others' ratings (e.g., friends or complete strangers) of an individual's personality had substantially greater validity in predicting academic achievement and job performance. Finally, relative to self-reports, peer reports of PD traits were better predictors of early discharge from the military (Oltmanns & Turkheimer, 2009).

Self-report measures of client traits may not reflect how others perceive these traits; consequently, this reliance on self-reports might prevent the identification of true relations of client traits and treatment outcome (Oltmanns, Friedman, Turkheimer, & Fiedler, 2004). As interpersonal difficulties common among depressed clients may be due in part to quick first impressions made without conscious effort (Oltmanns et al., 2004; Hammen, 2005), research is needed to measure client characteristics from multiple perspectives (Klein et al., 2011). Observer ratings of client traits may serve as an important alternative assessment method; as such ratings are easily obtained and likely have high ecological validity. Beyond diagnostic information, we suspected that ratings of client traits, evident in an intake evaluation, would be predictive of treatment outcome. Should these ratings prove to be useful predictors of client dropout and symptom change, they might be used as a basis for identifying clients at high risk of poor therapeutic outcomes who might ultimately be found to benefit from alternative intervention strategies.

Thin Slice Method

One unobtrusive method of assessing personality dimensions that does not rely on self-report is the use of thin slice ratings. Thin slice clips are short (typically < 5 min) video or audio clips of a target individual interacting with someone else (Oltmanns et al., 2004). Using the thin slice method, raters identify problematic interpersonal relationship and personality traits based upon these brief video samples of a person's behavior.

Early evidence suggests that thin slice ratings of personality have predictive validity in a number of different domains. Borkenau et al. (2004) found thin slice ratings of intelligence predicted target individuals' intelligence test scores. Similarly, Ambady and colleagues (2006) found thin slice ratings from audio clips of interviews with regional sales managers predicted independent nominations of these managers for strong sales performance. Additionally, thin slice ratings of married couples predicted separation or divorce over a six-year period (Ebling & Levenson, 2003). Given the predictive validity thin slice ratings have demonstrated in these varying domains, we suspected thin slice ratings of client traits may also serve as important predictors of treatment outcome.

While thin slice ratings have yet to be utilized in the context of CT research, previous studies support thin slice raters' ability to accurately assess psychopathy and PD traits. For example, Fowler, Lilienfeld, and Patrick (2009) found that thin slice ratings of psychopathy features in maximum-security inmates were related to well-validated assessments of psychopathy. Thin slice ratings of both violence proneness and antisocial PD also correlated significantly with the number of evaluator determined antisocial PD symptoms.

In a sample of military recruits, Oltmanns et al. (2004) found that untrained undergraduate students rating 30-second clips were able to make reliable judgments about personality traits related to PDs and the five factor model of personality (Costa & McCrae, 1992). These thin slice ratings of several personality traits predicted independent diagnostic indicators of PDs. On the basis of thin slice ratings, individuals with self-reported traits of Schizoid PD were rated as less extraverted and less likeable. Those with self-reported Histrionic PD traits were rated as more extraverted and likeable. Although non-significant, raters judged those who self-reported traits of Avoidant PD as less likeable and extraverted. While untrained raters cannot formally diagnose PDs, these results attest to the idea that quick judgments may convey meaningful information about personality characteristics, including those in the clinical range (Oltmanns et al., 2004).

Purpose of this Study

In this study, we examine thin slice ratings of client characteristics, as evaluated by independent observers, as predictors of treatment outcome. We hope this study serves as a useful complement to previous studies of client characteristics, which have tended to rely on self-report measures of personality traits. On the basis of thin slice video clips taken from clients' intake assessments, trained raters evaluated clients on key personality traits of interest. We test the ability of these thin slice ratings to predict both symptom change and dropout, and compare the predictive validity of our thin slice ratings of client traits to corresponding self-report and diagnostic measures.

Consistent with Oltmanns and colleagues (2004), we anticipated clients who self-reported high traits of Schizoid and Avoidant PDs would be judged less likeable and extraverted by thin slice raters; clients with self-reported high Histrionic PD traits would be rated as more likeable and extraverted. These findings would speak to the construct validity of our thin slice ratings. To address our primary research questions, we tested whether thin slice ratings of client traits (e.g., Big Five and PD traits) would predict client dropout and improvement in depressive symptoms. We also tested whether any such relations would hold after controlling for self-report and diagnostic measures. On the basis of previous literature examining self-report and diagnostic assessments of client traits, we expected the following specific relations: (1) thin slice ratings of high neuroticism or PD traits will be associated with poorer treatment outcomes, and; (2) thin slice ratings of high extraversion, openness, and therapy interest will be associated with superior treatment outcomes.

Methods

Participants

The full sample of participants included 67 adults with a primary diagnosis of Major Depressive Disorder (MDD) according to DSM-IV who participated in 16-weeks of CT. Because one client's intake evaluation was not recorded, the sample was reduced to 66 clients for our study. These 66 clients were largely Caucasian (83%); with 11% being African American and 5% Asian. 58% were women. Ages ranged from 18–69 years (M = 36.3, SD = 13.4).

Inclusion criteria for the study were: (a) diagnosis of MDD, according to DSM-IV criteria (American Psychiatric Association, 1994); (b) 18 years or older; and (c) willing and able to give informed consent. Exclusion criteria were: (a) current Axis I disorder other than MDD if it constituted the predominant aspects of the clinical presentation and if it required treatment other than that being offered; (b) Bipolar I disorder or psychosis; (c) subnormal intellectual potential (IQ < 80); (d) evidence of any medical disorder or condition (including pregnancy) that could cause depression; (e) clear indication of secondary gain (e.g. court ordered treatment); and (f) current suicide risk sufficient to prevent treatment on an outpatient basis. In addition to meeting these criteria, clients previously on medication were asked to maintain a stable dosage over the course of the study. The protocol was approved by our Institutional Review Board. All participants provided written informed consent prior to research activity.

Dropout—Clients were deemed dropouts if they prematurely terminated treatment (i.e., prior to completing the full 16 weeks of treatment). Clients who missed sessions without declaring an intention to discontinue treatment were encouraged to return to therapy. If clients returned to treatment, they were not considered dropouts. Of the 66 clients examined, 22 (33%) dropped out prior to completing the full 16 weeks. Of these 22 clients, 17 dropped out within the first five weeks of treatment.

Measures

Diagnoses—At the intake evaluation, Axis I and Axis II diagnoses were assessed with the Structured Clinical Interview for the DSM-IV (SCID-I; First, Spitzer, Miriam, & Williams, 2002) and Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997). As part of the SCID-II, clients completed the self-report SCID-II pre-screener questionnaire. We used clients' SCID-II pre-screener sum score (i.e., total of all 119 items) to reflect overall self-reported PD traits. Using the SCID-II, evaluators follow the pre-screener and assess any possible PD diagnoses. For analyses, we also utilized a categorical summary variable reflecting whether clients met diagnostic criteria for one or more PDs.

Depressive symptoms—To assess depressive symptoms, trained interviewers administered the 17-item Hamilton Rating Scale for Depression and coded responses and behavior of interviewees based on formal criterion (modified to assess atypical symptoms; HRSD; Hamilton, 1960; Williams, 1988). HRSD evaluators completed approximately 40 hours of training prior to conducting study evaluations. Reliability for total scores on the HRSD in the current sample based on double-ratings for 30 cases was excellent (ICC = .99). The HRSD was administered at the intake evaluation, during the fourth week of treatment, and during the post-treatment evaluation. Higher scores on the HRSD indicate more severe symptoms.

Thin slice ratings of client characteristics—We assessed 10 client characteristics using thin slice ratings (full materials are available upon request). We used three sets of items previously used in thin slice studies (Oltmanns et al., 2004; Friedman, Oltmanns, & Turkheimer, 2007). The first set of items assessed each of the Big Five personality traits (i.e., extraversion, agreeableness, conscientiousness, neuroticism, and openness)[1]. The second set of items consisted of six items total, with two assessing each of three PDs (i.e., Avoidant, Histrionic, and Schizoid). We limited ratings to these three PDs, as they have been discernible to thin slice raters in previous studies (Oltmanns et al., 2004; Friedman et al., 2007). Pairs of items were averaged to yield scores for each of the three PDs. Third, a single item assessed each client's likeability. All of these items were rated on a 10-point scale ranging from 1 (not at all) to 10 (completely). Finally, we included three original items to assess clients' interest in therapy. These three items attempt to gauge a client's potential fit with treatment (i.e., "*Did the client express any reservations about this form of therapy?*"). Each of these items was rated on a Likert-scale ranging from 0 (not at all) to 6 (completely). Two items were reversed scored and the average of the three items was taken as an overall therapy interest score.

Intake Assessors and Therapists

Five advanced graduate students served as both assessors and study therapists. The therapist to whom a client was assigned never conducted that client's assessments. Supervision was provided by DRS.

Thin Slice Video Clips

For each of the 66 clients, we examined three separate thin slice video clips, all less than one minute in length. Clips were selected to include clients' responses to the following three intake evaluation prompts: (1) "Tell me a little bit about what brought you in here today." (2) "What was going on in your life when this all began (i.e., your most recent depressive episode)?" and; (3) "Who have been the important people in your life?" Each of the three respective clips contained both the assessor asking the question and 30-seconds of the client's response. The following is a client-assessor dialogue typical of content contained the thin slice clips:

> Evaluator: "Tell me a little bit about what brought you in here today?"

> Client: "Well, my wife has been on my case about getting help for my 'issues'. She says she can't stand to be around me because I've been so irritable lately. I don't really think I have a problem, but I figured coming here may calm her down a bit."

Procedure

Following 40 hours of training, 12 undergraduate raters provided thin slice ratings of the selected intake evaluation clips. Raters were randomly assigned to code clips with the constraint that each clip was to be coded by four raters and no raters were to code more than one clip per client. Therefore, for each client for whom all three clips were available, each of the three clips was rated four times for a total of 12 independent ratings per client.[2] For all analyses, the average of all available ratings made for each client was utilized. All raters were blind to the study rationale and hypotheses.

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[1]To keep consistency with the Five Factor Model and Oltmanns et al. (2004), we use the terms neuroticism and openness in describing our results. The terms emotionality and curiosity were used in order to describe these concepts to our thin slice raters and ease interpretation.

[2]When video recordings were not available, backup audio recordings were used. Some clients did not have all three clips available due to recordings not being available or a focus question not being asked. All available clips were used. The mean number of clips available per client was 2.7.

Analytic Strategy

We conducted a preliminary data screening and identified non-normality in three thin slice variables. We transformed two of these variables by multiplying the inverse of clients' values by negative one (i.e., neuroticism and Avoidant). For the third variable (i.e., Histrionic), we applied a cubic transformation. Our primary models examine the relation of thin slice ratings to: (1) treatment dropout; (2) pre to post treatment change in depressive symptoms (i.e., post treatment symptom scores covarying pre-treatment symptom scores), and; (3) the slope of symptom change over the course of CT for depression. For modeling treatment dropout, we used logistic regression to examine the ratings as predictors of clients' dropout odds. For these analyses, predictor variables were standardized (M = 0, SD = 1) for ease of interpretation. Odds ratios from these models indicate the expected change in odds of dropout associated with a 1 SD unit change in the predictor variables. For the second of these analyses, we used a regression model to examine the relation between thin slice ratings and clients' post treatment HRSD scores, while controlling for clients' intake HRSD scores. To examine the incremental validity of the thin slice ratings, we also considered clients' PD status and overall self -reported PD traits (as assessed via SCID-II) as possible covariates in this model. For the last of these analyses, we used hierarchical linear modeling (HLM) to examine individual thin slice ratings of client traits as predictors of change in clients' HRSD slope over the course of treatment. An unstructured covariance structure was identified as achieving the best fit. To examine the incremental validity of thin slice ratings in this model, we also examined the relation of clients' PD status and overall self -reported PD traits (as assessed via SCID-II) with the slope of symptom change; we included each variable and the interaction of the variable with time in the model.

Results

Inter-Rater Reliability of Thin Slice Ratings

ICCs were calculated by estimating the variance attributable to the random effects for clients and intake assessors and dividing the total of these components by variance attributable to the total of these factors along with raters and measurement error. ICCs were corrected for the harmonic mean of the number of ratings available per client (M = 10.7). ICCs for the Big Five personality traits were: .80 for extraversion, .64 for agreeableness, .79 for conscientiousness, .66 for neuroticism, and .50 for openness. ICCs for the three personality disorders of interest were: .72 for Schizoid, .56 for Histrionic, and .66 for Avoidant. ICCs for other client characteristics were: .59 for therapy interest and .66 for likeability.

Construct Validity of Thin Slice Ratings

Correlations of thin slice ratings of extraversion and likeability with clients' self-reported traits of Avoidant, Histrionic, and Schizoid PDs are provided in Table 1. Consistent with expectations, thin slice ratings of extraversion were significantly related to lower Avoidant traits and likeability ratings were related to lower self-reported Schizoid traits. While the other associations were not significant, all but one (i.e., the relationship between self-reported Histrionic PD traits and likeability) were consistent with direction of effects reported by Oltmanns et al. (2004).

Thin Slice Ratings and PD Traits as Predictors of Dropout

In a series of models, we examined thin slice ratings as predictors of dropout using logistic regression with clients' intake symptom severity covaried. Clients' intake HRSD scores were included as a covariate in all analyses of dropout. For ease of interpretation, predictors were standardized (M = 0, SD = 1). Two variables emerged as significant predictors of lower odds of dropout in these models: (1) neuroticism, β = −.70, *SE* = .32, Wald statistic =

4.68, p = .03, odds ratio = .50, 95% CIs [.26, .94] and (2) therapy interest, β = −.64, SE = .31, Wald statistic = 4.28, p = .04, odds ratio = .53, 95% CIs [.29, .97]. Each of the other eight predictors failed to predict odds of dropout (all ps > .3). For interpretation, we focus on the reciprocal of the Odds Ratios reported above. According to these models, each one standard deviation decrease in neuroticism was associated with a 2.01 times greater odds of treatment dropout. Similarly, for each one standard deviation decrease in therapy interest, clients were 1.89 times more likely to drop out of treatment.

In order to examine the incremental validity of the two thin slice ratings identified as predictors of dropout, we planned to examine these ratings as predictors while controlling for any significant predictors identified when examining PD status or clients' "overall self-reported PD traits"[3]. As a preliminary step, we separately examined clients' PD status and overall self-reported PD traits as predictors of dropout while controlling for intake HRSD scores. PD status did not significantly predict dropout (β = .05, SE = .52, Wald statistic = .01, p = .92, odds ratio = 1.05, 95% CIs [.38, 2.94]), but clients' overall PD traits did significantly predict higher odds of dropout, β = .56, SE = .28, Wald statistic = 4.07, p = .04, odds ratio = 1.76, 95% CIs [1.02, 3.04]. For every standard deviation increase in clients' overall PD traits score, clients were 1.76 times more likely to drop out. We then examined the two previously significant thin slice predictors in models that included overall PD traits as an additional covariate. As shown in Table 2, neuroticism remained a significant predictor of dropout. Therapy interest was reduced to the level of a non-significant trend. In both of these models, clients' overall traits no longer significantly predicted dropout, suggesting the relation of PD traits and dropout was captured by either of these two thin slice variables.

Thin Slice Ratings and PD traits as Predictors of Symptom Change

We used two analytic approaches to examining thin slice ratings as predictors of symptom change: regression and HLM. Using linear regression, we examined thin slice ratings as predictors of pre to post treatment change in HRSD scores. In these models, thin slice ratings served as the independent variable and clients' post treatment HRSD scores served as the dependent variable, with intake HRSD scores being entered as a covariate (see Table 3). In these models, thin slice ratings of extraversion, agreeableness, and likeability significantly predicted lower post treatment depressive symptoms, and a trend emerged for ratings of conscientiousness. Conversely, thin slice ratings of Avoidant and Schizoid PD traits predicted significantly higher post treatment symptom severity.

We then examined these relations using HLM. We used SAS PROC MIXED to model person-specific intercept and slope parameters in HRSD scores over time. The primary effects of interest in these models were the interactions of each thin slice rating and time. Significant interactions would indicate a thin slice rated variable predicted the rate of symptom change over the 16 weeks of CT, with negative t-scores indicating that the thin slice rating predicts a faster than average rate of symptom change.

As Table 3 shows, we used a series of models to examine the thin slice ratings of interest as predictors of symptom change. Among the personality dimensions, only extraversion emerged as a significant predictor. As the negative t-value indicates, extraversion predicted steeper slopes of symptom change. Among the PD traits, only Avoidant traits significantly predicted the slope of symptom change, with Avoidant traits predicted a slower, weaker response to treatment. There was a non-significant trend for Schizoid traits to predict the

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[3]Clients' self-report Histrionic, Schizoid, and Avoidant PD traits were also examined individually as predictors of dropout. In a series of logistic regression models similar to those reported above, each client's SCID-II prescreener sum score corresponding to these three PDs of interest was examined as a predictor of dropout. HRSD intake scores were entered as a covariate. None of the three SCID-II sum scores emerged as significant predictors of dropout (all ps > .11).

slope of HRSD scores. The direction of this effect was that Schizoid traits were related to slower rates of symptom change. Neither therapy interest nor likeability predicted symptom change. Thus, the regression approach proved more sensitive to identifying relations between thin slice ratings and outcome, with all relations identified using HLM also being identified through regression (but not vice versa).

To examine the incremental validity of those thin slice ratings that emerged as predictors of symptom change, we planned to consider either PD status or clients' self-reported overall PD traits as an additional covariate[4]. First, we applied this to our regression models. We separately examined PD status and clients' overall self-reported PD traits as predictors of post treatment HRSD scores (while controlling for pre-treatment HRSD scores). Neither emerged as a significant predictor of clients' post treatment symptom severity (for overall PD traits: $\beta = .12$, $t = .78$, $p = .44$; for PD status: $\beta = -.14$, $t = -.91$, $p = .37$); consequently, we did not examine them as covariates in additional analyses. Next, we planned to control for either PD status or clients' self-reported overall PD traits for each of the thin slice ratings that previously emerged as significant predictors of the slope of symptom change[5]. As a preliminary step, we separately examined the interaction of time with either PD status or clients' overall self-reported PD traits. Neither of these interactions was significant (for overall PD traits: ($r = -.05$, $t(45) = -.33$, $p = .74$); for PD status: ($r = -.21$, $t(45) = -1.45$, $p = .15$)). Because neither of the variables was related to the slope of change in HRSD scores, we did not examine them as covariates in additional analyses.

Discussion

Using pre-treatment thin slice ratings, we found others' perceptions of clients' traits predicted client dropout and symptom change across the course of CT. Thin slice ratings of neuroticism and therapy interest significantly predicted premature treatment termination. Ratings of extraversion predicted greater change in depressive symptoms. Ratings of Avoidant and Schizoid PD traits predicted less marked symptom change. Each of these thin slice-outcome relations was evident using either regression or HLM approaches. In contrast, agreeableness and likeability predicted greater symptom change, but these relations were only evident using linear regression.

While the predictive relation of therapy interest and dropout was accounted for by clients' overall self-reported traits, each of the other predictive relations was not accounted for by available self-report or diagnostic measures. Thus, our findings attest to the incremental validity of utilizing thin slice ratings to assess client traits, as these ratings predicted important clinical outcomes above and beyond traditional self-report and diagnostic measures. Our findings also have several relevant clinical applications; they illustrate the potential utility of using the thin slice methodology to inform clinicians about clients' likely response to CT.

We found moderate evidence for the construct validity of our ratings, as thin slice ratings of extraversion and likeability demonstrated the expected associations with clients' self-reported PD traits (Oltmanns et al., 2004). However, not all of the relations identified by Oltmanns et al. (2004) achieved significance in our sample. This might be due to our relatively low power in a sample of 66 clients as compared with their larger sample of 231.

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[4]Clients' self-report Histrionic, Schizoid, and Avoidant PD traits were also examined as predictors HRSD scores at post. In a series of models similar to those described above, we separately examined clients' SCID-II prescreener scores corresponding to these three PDs as predictors of post treatment severity, while controlling for intake severity. We failed to find any significant relations; (all ps > .35).
[5]Paralleling the analyses we reported in footnote 4, we separately examined clients' SCID-II prescreener scores corresponding to these three PDs as predictors of the slope of HRSD scores. We failed to find any significant relations; all interactions of PD traits and time were non-significant (all ps > .60).

In addition, Oltmanns et al. (2004) achieved somewhat higher reliability than was true in our study. The lower reliability for some thin slice ratings (particularly likeability) likely reduced our capacity to detect relations between these thin slice ratings and clients' self-reported PD traits, as random error would have attenuated the effects of interest. In fact, all correlations were in the expected direction with only one exception (i.e., the relationship between self-reported Histrionic PD traits and likeability).

Thin slice ratings of clients' therapy interest and neuroticism proved to be significant predictors of dropout likelihood, with clients high in these traits having a significantly lower risk of terminating treatment prematurely. Our finding regarding clients' therapy interest is consistent with both our expectations and previous evidence of an association between clients' treatment expectations and premature treatment termination (Callahan et al., 2009). We also found evidence for an association between neuroticism and dropout. While some previous studies have examined the relation of neuroticism and treatment response (Mulder, 2002; Quilty et al., 2008), we are unaware of previous studies examining the relation of neuroticism and dropout specifically. While our failure to find an association between neuroticism and symptom change is at odds with these studies (Mulder, 2002; Quilty et al., 2008), considerable variation exists in the methods used to assess neuroticism in our study and these prior ones (thin slice observer ratings vs. self-report measures of client traits). It may be that neuroticism as reported by clients differs from neuroticism as assessed through thin slice ratings. Whereas clients may be able to more accurately report on internal emotional states, observers may be more able to ascertain behavioral evidence of negative affect. Such behavioral indicators may be particularly important if clients consider high levels of negative affect normative or have biases that lead them to either over or under report their experience with negative affect. Our finding that thin slice rated neuroticism predicted lower odds of treatment dropout is consistent with clients with observable negative affect being especially likely to complete a course of treatment. We suspect that clients higher in neuroticism, who are more emotionally dysregulated, are more strongly motivated to see through the full course of treatment because of their negative affect.

Client extraversion was also a strong predictor of a positive treatment response, as clients rated high in extraversion had significantly greater improvements in HRSD scores over the course of treatment. These finding are consistent with our expectation and with previous results that suggest an association between high self-reported extraversion and superior treatment outcomes for MDD (Quilty et al., 2008). Although we did not find evidence for a significant association between openness and positive treatment response as predicted, the relatively weak reliability of our ratings of openness (ICC of .50) may have compromised our ability to detect this effect.

Additionally, thin slice ratings of agreeableness and likeability predicted positive treatment response, as both were significantly related to a more marked improvement in depressive symptoms. Clients perceived as likeable and agreeable may tend to form good relationships with their therapists and be more likely to engage in therapeutic tasks. Clients who are likeable and agreeable might also be more likely to be well received by others when carrying out therapist assigned homework which requires them to interact with others. Future research could examine the relation of thin slice ratings as a possible moderator of the relation of psychotherapy process variables and outcome in order to examine whether thin slice ratings provide contextual information relevant to selecting optimal treatment strategies.

Clients rated as high in traits of Avoidant PDs (and Schizoid PD at the level of a non-significant trend) had a less marked symptom change over the course of CT. This is a pattern broadly consistent with previous studies suggesting that PDs (Fournier et al., 2008; Newton-

Howes et al., 2006) and PD related traits (Kuyken et al., 2001) are related to poorer outcomes in CT. Given the strategies employed in CT, one might expect those high in Avoidant and Schizoid PD traits would respond poorly (Saatsi, Hardy, & Cahill, 2007). CT aims to boost clients' mood, in part, by engaging them in activities they once enjoyed. Several homework assignments (e.g., activity logs, behavioral experiments) designed to stimulate such activity often require individuals to interact with others. Thus, a client who prefers to do things alone, or frequently worries about rejection and criticism, may be less likely to employ such strategies or find them beneficial.

Lastly, our findings attest to the advantages of using observer ratings of client traits, as our thin slice ratings predicted information regarding outcome and dropout above and beyond traditional diagnostic information. We established the incremental validity of our thin slice ratings by examining clients' diagnostically determined PD status and self-reported PD traits as predictors of dropout and symptom change. When examined individually, clients' PD status did not emerge as a significant or trend predictor of dropout, pre to post change in HRSD scores, or the slope of change in HRSD scores. Clients' overall self-reported PD traits and self-reported Histrionic, Schizoid, and Avoidant PD traits individually failed to emerge as significant or trend predictors of improvement in HRSD scores. In fact the only significant relationship between self-report measures of personality and outcome that emerged was between clients' overall self-reported PD traits and increased dropout likelihood. However, controlling for clients' overall self-reported PD traits did not change the statistical significance of the neuroticism-dropout relation—though it did reduce the relation of therapy interest and dropout to a non-significant trend.

Limitations

While this study supports the value of considering client traits from an observer perspective in future studies, it is important to note several limitations. First, due to its naturalistic observational design, strong causal inferences cannot be drawn. While thin slice ratings did temporally precede symptom change and dropout, we cannot rule out the role of an unmeasured third variable. We were able to consider the role of initial symptom severity. Intake symptom severity was unrelated to any of the thin slice ratings (all $ps > .05$). In each of our primary models we considered symptom severity—including it as a covariate in the dropout and regression based symptom change models. Second, while the reliability of thin slice ratings was generally acceptable, a few items had relatively low ICCS (ranging from .50–.59 for openness, histrionic, and therapy interest). Low inter-rater reliability can indicate compromised validity of the construct. Thus, insofar as our results were impacted by low reliability, we suspect we had reduced capacity to detect thin slice-outcome relations that may truly exist (Type II errors). The items with low reliability may have been less reliable because our sample may have had a restricted range due to it being composed entirely of depressed clients seeking treatment, whereas previous thin slice research used largely non-depressed samples of military recruits (Oltmanns et al., 2004; Friedman et al., 2007). In addition, unlike these previous studies, thin slice ratings in our study were made at prompts occurring during a standard intake evaluation meaning that we could not ensure that clients would be actively responding to a question during the full duration of the thin slice rating segment. Third, it is important to take into consideration the nature and accuracy of thin slice ratings when interpreting our findings. Consistent with Oltmanns et al. (2004), correlations between thin slice ratings of likeability and extraversion exhibited only moderate relations to diagnostic measurements of PD traits. Thin slice ratings are by no means perfect gauges of one's personality pathology or substitutes for traditional assessment measures (Oltmanns et al., 2004). Nonetheless, as our results suggest, thin slice ratings may provide important complementary information that possesses unique predictive validity. Fourth, our results were obtained in a sample of clients in CT. Results may not generalize to

other forms of treatment for depression as PD-treatment response relations have also been shown to vary across different treatment modalities (see Joyce et al., 2007). Finally, the relatively small sample size is a limitation of the study, as a larger sample may have allowed us to detect less robust effects.

Conclusion

Our findings support the notion that individuals quickly become aware of certain personality traits on the basis first impressions, and that some of these impressions can predict subsequent symptom change and dropout in CT for depression. Thin slice ratings have the potential to serve as tools that might ultimately be used to help formulate treatment plans that will enhance responsiveness to the clients' needs. Future research could pursue this possibility by both replicating our results and examining how different intervention strategies might be used to maximize outcome across clients with different characteristics.

Acknowledgments

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- We assess personality using thin slice ratings of clients' intake assessments.

- Thin slice ratings predicted dropout and treatment outcome.

- Ratings of clients' therapy interest and neuroticism predicted lower dropout odds.

- Ratings of Extraversion predicted a faster rate of symptom change.

- Ratings of Avoidant and Schizoid traits predicted slower rates of symptom change.

Table 1

Correlations between Thin Slice Ratings of Extraversion and Likeability and Client Scores on SCID-II Prescreener

| | **Thin Slice Ratings** | |
	Extraversion	**Likeability**
SCID-II Prescreener		
Schizoid	−.16	−.29[*]
Avoidant	−.26[*]	−.11
Histrionic	.22[†]	−.15

Note. N = 66. SCID-II = Structured Clinical Interview for DSM-IV Axis II Personality Disorders.

[*]
$p < .05.$

[†]
$p < .10.$

Table 2

Thin Slice Ratings Predicting Dropout (Controlling for Intake Depressive Symptoms and Self-Reported Personality Disorder Traits)

	Wald χ^2	Odds Ratio	95% CI
Big Five			
Extraversion	.14	1.11	.64–1.92
Agreeableness	.08	1.08	.61–1.93
Conscientiousness	.08	.93	.53–1.61
Neuroticism	3.92[*]	.53	.28-.99
Openness	.92	1.31	.76–2.26
PD traits			
Avoidant	.23	.87	.50–1.52
Histrionic	.28	1.16	.67–1.99
Schizoid	1.46	.70	.39–1.25
Other Client Characteristics			
Therapy Interest	2.74[†]	.59	.31–1.10
Likeability	.23	1.16	.64–2.08

Note. Each predictor was examined in a separate model. All models included intake HRSD and the SCID-II total score from the pre-screener questionnaire as covariates. Models with only intake HRSD entered as a covariate yielded similar results except the non-significant trend for therapy interest reported above was significant when SCID-II total score was not entered as a covariate.

[*]
$p < .05$.

[†]
$p < .10$.

Table 3

Thin Slice Ratings Predicting Symptom Change Over 16 Weeks of CT

	Pre to Post Treatment Symptom Change[1]	Slope of Change[2]	
	β	r	t
Big Five			
Extraversion	−.46**	.35	−2.51*
Agreeableness	−.41*	.16	−1.09
Conscientiousness	−.30†	.14	−.95
Neuroticism	−.18	.20	−1.35
Openness	−.11	.03	.19
PD traits			
Avoidant	.39**	.33	2.36*
Histrionic	−.20	.17	−1.13
Schizoid	.44**	.28	1.92†
Other Client Characteristics			
Therapy Interest	−.14	.06	−.38
Likeability	−.35*	.15	−1.04

Note:

[1] Regression model of post-treatment HRSD scores with intake HRSD scores entered as a covariate.

[2] Hierarchical linear model of HRSD scores over the course of treatment with thin slice rating, time and the interaction of thin slice rating and time entered as predictors. Results provided are for the interaction of each thin slice rating and time.

In both models, negative values indicate that the thin slice rating is associated with a more rapid decrease in symptoms from intake to Week 16. For regression models, n = 44. For HLM, n = 66.

**
p < .01

*
p < .05.

†
p < .10.