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PAI-A Predictors of Treatment Response in a DBT-A-Informed Intervention for Adolescent Boys

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Abstract
Evidence-based assessment (EBA) involves using empirically validated psychological assessment measures to inform case conceptualization and treatment planning. EBA can improve clinical care by providing information relevant for treatment targets and expectations and can clarify how specific client characteristics may be associated with treatment outcomes. Research on EBA practices in relation to particularly challenging clinical problems (e.g., borderline personality disorder) can be especially useful for practitioners. The current study examines Personality Assessment Inventory-Adolescent (PAI-A) predictors of treatment completion, therapeutic alliance, and symptom change in a sample of 44 adolescent boys (M_{age} = 16.70, SD = 0.56; 75.0% White) in a residential boot camp program for at-risk youths. Participants completed Dialectical Behavior Therapy for Adolescents-informed skills training groups. PAI-A scales related to somatic complaints, depression, antisocial traits, aggression, borderline traits, problematic alcohol use, and interpersonal dominance, as well as an index measuring overall clinical severity, distinguished adolescents who completed the intervention from those who discontinued the intervention. Adolescents with more borderline personality features reported more modest improvements in emotion dysregulation. Additionally, interpersonal warmth was positively related to therapeutic alliance suggesting that client interpersonal style is an important contributor to client-rated therapeutic alliance.

Keywords Dialectical behavior therapy · Adolescents · Borderline personality disorder · Emotion regulation · Personality assessment

PAI-A Predictors of Treatment Response in a DBT-A-Informed Intervention

Evidence-based practice in psychology (EBPP), defined by the use of evidence-based assessment (EBA) and evidence-based treatment (EBT) procedures, is endorsed by the American Psychological Association (APA Presidential Task Force on Evidence-Based Practice, 2006), the National Institute of Mental Health (National Institute of Mental Health, 2015), and the Substance Abuse and Mental Health Services Administration (Substance Abuse and Mental Health Service Administration, 2019). As a core component of EBPP, EBA includes the use of empirically validated psychological assessment instruments to inform case conceptualization and treatment selection (APA, 2006). EBA enhances clinical care by providing information that can be used to prioritize treatment targets and select interventions at the outset of treatment (Youngstrom et al., 2015). It can also be used to monitor client progress and intervention effectiveness (Scott & Lewis, 2015), which can ensure that clients receive treatment that matches their individual needs throughout the treatment process.

Many practitioners use broadband assessments of behavior and psychological functioning such as the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) or Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF; Ben-Porath & Tellegen, 2008) in their regular practice, often as part of a formal diagnostic assessment (Camara et al., 2000; Cashel, 2002; Jensen-Doss & Hawley, 2010). These measures have a number of advantages, including norm-referenced scoring, inclusion of response bias indices, and the assessment of multiple aspects of personality, psychopathology, and other factors that may be

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relevant for diagnosis and treatment. Nevertheless, surveys of practicing psychologists have identified resistance to using standardized assessment measures routinely with psychotherapy clients, largely related to concerns about practicality and the sense that they do not add additional information to the psychologists' clinical judgment (Garland et al., 2003; Hatfield & Ogles, 2007; Jensen-Doss & Hawley, 2010). Research providing clinically relevant information about the association between assessment instruments and treatment outcomes might increase enthusiasm for these measures among practitioners. Accordingly, there have been calls for more practically-relevant research on the use of EBA to identify client factors that affect treatment processes, effectiveness, and outcomes in order to bridge the research-practice gap (e.g., Kamphuis et al., 2020; Roberts et al., 2017).

The majority of studies on pre-treatment predictors of treatment outcomes focus on the criterion of completion/non-completion of treatment. Personality features that predict greater likelihood of treatment non-completion include antisocial traits (Anestis, Finn et al., 2015a; Anestis, Gottfried et al., 2015b; Lang & Belenko, 2000; Sellbom et al., 2008; Tarescavage et al., 2015; Tylicki et al., 2019); externalizing behaviors including impulsivity, aggression, and substance misuse (Anestis, Gottfried, et al. 2015b; Mattson et al., 2012; Tylicki et al., 2019); having a dominant (Edens, 2009) or distant and hostile (Tylicki et al., 2019) interpersonal style; and internalizing symptoms like somatization, anxiety, and demoralization (Tarescavage et al., 2015; Tylicki et al., 2019). Additionally, profiles that indicate problematic response styles associated with measure invalidation (Anestis, Finn, et al., 2015a) as well as indicators of more extensive and severe psychopathology (Hopwood, Creech, et al., 2008b; Minnix et al., 2005; O'Reilly, 2007) predict treatment non-completion.

Another subject that may be important to therapists and clients is the degree to which treatment processes can be predicted by pre-treatment EBA. Standardized, broadband measures like the MMPI-2 (Butcher et al., 1989) and the Personality Assessment Inventory (PAI; Morey, 1991) contain indicators that were specifically designed to predict treatment response. The MMPI-2 Negative Treatment Indicators (TRT) scale was developed to identify individuals with negative beliefs about providers and psychological treatment (Butcher et al., 1990). Scores on this scale have been negatively associated with likelihood of treatment initiation and amount of progress while in treatment (Chisholm et al., 1997; Gilmore et al., 2001). Similarly, the PAI includes a Treatment Rejection (RXR) scale, for which higher scores indicate lower motivation for treatment (Morey, 1996). However, there are mixed results for the ability of the RXR scale to predict treatment response (Hopwood et al., 2007; Hopwood, Baker, et al. 2008a; Hopwood, Creech, et al. 2008b).

Pre-treatment assessments are also able to predict the quality of the therapeutic alliance, or the working relationship between the therapist and the client. Meta-analytic findings indicate that therapeutic alliance explains approximately 7.5% of the variance in psychotherapy outcomes (Horvath et al., 2011). Additionally, alliance temporally predicts symptom levels during treatment such that improvements in alliance are associated with later improvements in symptoms (Zilcha-Mano et al., 2014). Further, therapeutic alliance relates negatively to clinically-relevant behaviors such as number of suicide attempts and engagement in non-suicidal self-injury (NSSI) among clients with borderline personality disorder (Bedics et al., 2015). Therapeutic alliance is influenced by a number of factors, including positive predictors like motivation for treatment, interpersonal warmth, age, and income, as well as negative predictors like antisocial traits, borderline traits, somatic symptoms, interpersonal dominance, aggression, and history of interpersonal problems (Patel & Suhr, 2019; Renner et al., 2012; Taft et al., 2004). Broadband assessments that measure a range of factors related to personality, psychopathology, and interpersonal style allow therapists to assess all of these factors in a relatively cost-effective manner.

Practically relevant research on EBA in a variety of clinical populations is needed so that practitioners are better able to apply research findings to specific clients with whom they work. For example, broadband measures that are appropriate for use with adolescents could allow for the type of EBA research conducted on adult samples to be extended to adolescents. One measure that is a good candidate for EBA research with adolescents is the Personality Assessment Inventory-Adolescent (PAI-A; Morey, 2007). The PAI-A is a self-report measure for adolescents that covers a wide range of personality features and symptoms of psychopathology and is based on the PAI for adults (Morey, 1991). It has strong psychometric qualities and contains scales specifically designed to measure treatment-relevant variables (Morey, 2007). The adult PAI is used routinely in clinical (Piotrowski, 2017; Wright et al., 2017) and forensic contexts (Archer et al., 2006). The PAI Aggression (AGG) scale has been found to relate to therapist-rated treatment success (Magyar et al., 2012). Additionally, the Antisocial features (ANT) scale has been related to treatment rule-breaking behavior (Hopwood, Baker, et al. 2008a), and ANT and Borderline personality disorder features (BOR) have been associated with continued substance use among individuals in a substance use treatment program (Marlowe, Kirby, Festinger, Husband, & Platt, 1997). Information about the prevalence of PAI-A use in clinical practice is not readily available, but the PAI-A is taught in many clinical psychology graduate programs (Mihura et al., 2017). Despite this trend, the PAI-A is relatively understudied. There is evidence that it has good clinical utility and external validity (Charles, Bullerjahn, &

Barry, 2021; Krishnamurthy, 2010; Vanwoerden et al., 2018), but more research is needed to provide information that is easily applicable to clinical decision-making for practitioners working with adolescents.

In addition to focusing research on certain demographic populations (e.g., adolescents), research focusing on EBA in the context of some of the more challenging clinical problems that practitioners encounter is also likely to be beneficial. Borderline personality disorder (BPD) is one such presenting problem. BPD involves the presence of problematic personality features such as poorly developed identity, difficulties in interpersonal relationships, negative affectivity, and disinhibition (American Psychiatric Association, 2013). BPD symptoms can emerge during adolescence (Miller et al., 2008) and lead to clinical impairment both during adolescence and into adulthood (Winograd et al., 2008). Practitioners who work with this population often experience burnout and low job satisfaction (Crawford et al., 2010; Linehan et al., 2000; Perseius, 2007). BPD has also historically been associated with high rates of treatment non-completion (McMurran, Huband, & Overton, 2010) and a modest response to interventions (Cristea et al., 2017). In addition, the majority of clients with BPD across all practice settings are female (American Psychiatric Association, 2013). Males, and specifically males with BPD symptoms, receive less mental health treatment and are less represented in the treatment literature that is available to practitioners (Anestis et al., 2020; Goodman et al., 2010; Merikangas et al., 2011; ten Have et al., 2013). Expanding the available research on treatment response among individuals with BPD can help practitioners tailor services for clients with BPD and cope with challenges they may face.

The current study aims to examine PAI-A predictors of treatment completion, client-reported working alliance with their therapist, and symptom improvement in a sample of adolescent boys participating in Dialectical Behavior Therapy for Adolescents-informed skills training groups. Dialectical Behavior Therapy (DBT; Linehan, 1993) is a commonly used and well-researched treatment for BPD (Miller, 2015). There is evidence that DBT can be used as a transdiagnostic treatment for emotional and behavioral dysregulation whether clients have been diagnosed with BPD or not (Neacsiu et al., 2014; Ritschel et al., 2015). Dialectical Behavior Therapy for Adolescents (DBT-A) is an adaptation to the original DBT model involving adolescent-specific modifications (Rathus & Miller, 2015). Previous research has identified emotion regulation (ER) difficulties as a key transdiagnostic mechanism underlying various clinical problems (Gratz & Tull, 2010) that improves following DBT treatment (Anestis et al., 2020; Goodman et al., 2014). In fact, it has been suggested that improvements in ER are the "active ingredient" in DBT-A (Anestis et al., 2020; Lenz et al., 2016). Therefore, changes in emotion regulation from pre- to post-treatment are used as a measure of symptom improvement in the present study.

PAI-A scales associated with constructs related to treatment outcomes in previous research such as internalizing problems (i.e., Somatic Complaints [SOM], Depression [DEP], Anxiety [ANX]), externalizing problems (i.e., Antisocial Features [ANT], Aggression [AGG], Borderline Features [BOR], Alcohol Problems [ALC], Drug Problems [DRG]), interpersonal style (i.e., Dominance [DOM], Interpersonal Warmth [WRM]), and treatment motivation (i.e., Treatment Rejection [RXR]), as well as clients' Mean Clinical Elevation (MCE), are hypothesized to be lower (with the exception of WRM, which is hypothesized to be higher) among youths who completed the DBT-A skills groups compared to non-completers. Although information about predictors of response to treatment and therapeutic alliance in the research literature is more limited, the constructs most closely associated with poor treatment response include elevated AGG, ANT, and BOR. Additionally, overall clinical severity has been associated with more modest treatment response among individuals with BPD (Goodman et al., 1998; Kleindienst et al., 2011). Therefore, AGG, ANT, BOR, and MCE are predicted to be associated with poorer response to treatment (i.e., less symptom improvement and possibly the exacerbation of symptoms). Finally, it is expected that WRM will be positively related to client-reported therapeutic alliance and that RXR, ANT, BOR, DOM, and poorer social support (NON) will be negatively associated with therapeutic alliance.

Methods

Participants

The sample for the current study consisted of cadets recruited from a Youth Challenge Academy (YCA) in the Southeastern United States. YCAs are members of the National Guard Youth Challenge Program, a federally funded military-style residential program for at-risk youths who are 16–18 years old, unemployed, have fallen behind grade level or dropped out of school, and who have voluntarily applied for the program. Youths join the YCA program as a cohort and stay in residence for 22 weeks. While in the program, youths receive educational services, life skills and counseling services, complete volunteer work in the community, and can receive job training. They also are assigned to platoons and participate in military training activities, physical fitness, and other activities as a group based on their platoon. Although mental health is not a primary focus in the YCA program, youths do have the opportunity to participate in psychological services that are offered (e.g., DBT-A-informed skills group) if they choose to do so. Thus, the current study serves as an examination of DBT-A-informed skills training groups provided in addition to the overall YCA program. The present data were collected across four consecutive cohorts of YCA participants, with a

total of 505 adolescents screened for possible participation in the intervention. Of these 505, 73 (14.5%) were identified as potentially qualifying based on elevated BPD traits or suicidality and were evaluated based on the exclusion criteria described below. Following two initial pilot rounds of the intervention ($n = 20$ total participants), eligible participants in each cohort were randomly divided into intervention and control groups (more details available in Anestis et al., 2020). The total number of eligible participants in the intervention groups included in the present analyses is 44. Participants were males ranging in age from 16 to 18 years ($M = 16.70$, $SD = 0.55$). The majority identified as White (73.9%) or African American (23.9%).

Measures

Personality Assessment Inventory-Adolescent (PAI-A; Morey, 2007) The PAI-A is a 264-item self-report assessment of personality, psychopathology, considerations relevant for treatment, and interpersonal behavior for adolescents (i.e., 12–18 years old). Responses are provided on a 4-point Likert-type scale from 1 (*false, not at all true*) to 4 (*very true*). Prior studies have demonstrated the validity and reliability of the PAI-A scale scores (Charles et al., 2021; Morey, 2007). The PAI-A contains four validity scales, 11 clinical scales, five treatment consideration scales, and two interpersonal scales. Analyses in this study focused on the PAI-A scales most likely to relate to treatment processes and outcomes (i.e., SOM, ANX, DEP, BOR, ANT, ALC, DRG, AGG, NON, RXR, DOM, WRM) and the MCE. PAI-A scales used in the present study demonstrated acceptable to good internal consistency (αs ranging from .63 to .77).

Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) The DERS is a 36-item self-report questionnaire that is composed of the following subscales: nonacceptance of emotional responses (Nonacceptance), difficulties engaging in goal-directed behavior when distressed (Goals), difficulties controlling impulsive behaviors when distressed (Impulse), lack of emotional clarity (Clarity), limited access to emotion regulation strategies (Strategies), and lack of emotional awareness (Aware; Gratz & Roemer, 2004). Responses are provided on a 5-point scale from 1 (*almost never)* to 5 (*almost always*), and composite scores are created with higher values indicating greater difficulties in emotion regulation. The DERS has demonstrated high internal consistency, good test-retest reliability, and acceptable predictive and construct validity (Gratz & Roemer, 2004; Gratz & Tull, 2010). The internal consistency of the DERS for the current study was good at pre-treatment (i.e., total $\alpha = 0.92$; subscale αs ranged from 0.77 to 0.87) and post-treatment (i.e., total $\alpha = 0.91$; subscale αs ranged from 0.65 to 0.86).

Working Alliance Inventory-Short Revised (WAI-SR; Hatcher & Gillaspy, 2006) The WAI-SR is a 20-item, self-report measure of alliance in therapy that captures the three facets of agreement on therapy tasks, agreement on therapy goals, and the development of a therapeutic bond (Hatcher & Gillaspy, 2006). The WAI-SR questions were adapted to the current study by changing wording to "group leaders" from "specific therapist." Responses are provided on a 5-point Likert-type scale ranging from 1 (*seldom*) to 5 (*always*). Scores were summed to create a composite score, with greater scores indicating better working alliance. The WAI-SR has demonstrated good reliability and convergent validity in other samples (Hatcher & Gillaspy, 2006; Munder et al., 2009). The WAI-SR achieved good internal consistency in the current study ($\alpha = 0.97$).

Procedure

All procedures for the current study received approval from the Institutional Review Board at the first author's university. The YCA director, who serves as *guardian ad litem* while youths are in the program, provided informed consent for youths to be invited to participate and approved of study procedures. Cadets who were 18 years or older provided informed consent, and those under 18 provided assent to participate. Participation was strictly voluntary, occurred during a free period at the program, and cadets were not incentivized to participate in this study. In addition, participation did not affect the services they received in the residential program and details about their participation in the groups was not shared with program staff.

The PAI-A was completed by all youths who consented/assented to participate in research in each cohort. PAI-A data were examined for validity (i.e., ICN [Inconsistency] < 78 *T* and INF [Infrequency] < 79 *T*; 81.5% valid profiles). Among youths who qualified for the intervention, two participants (2.7%) had PAI-A validity scale scores that exceeded these cutoffs and are not included in the 44 youths that make up the current sample. The BOR total score and BOR subscale scores (>60 *T*), Suicidal Ideation (SUI) score (>60 *T*), and ANT total score (<60 *T*) were used as inclusion/exclusion criteria to identify those who were appropriate for DBT-A skills training (i.e., elevated BOR and SUI), as well as those who may not respond as well to the intervention (i.e., those with elevated antisocial traits; Haas et al., 2011; Hawes et al., 2014; White et al., 2013). These inclusion/exclusion criteria were chosen in order to select the youths most likely to benefit from the intervention given constraints (e.g., space, staffing, duration of contact). Only one potential participant was excluded from the groups due to an elevated ANT score.

DBT-A-informed skills training groups were composed of cadets who met inclusion criteria and consented/assented to

participate in the DBT-A sub-study (85.2% of cadets who met inclusion criteria agreed to participate in the groups). Of the 44 youths with valid PAI-A profiles who consented to participate and provided pre-intervention data, 31 (70.5%) completed treatment. Participants were randomly assigned to one of two skills training groups being led at the program per cohort. Participants completed pre-treatment measures (i.e., PAI-A, DERS) approximately 1 month prior to the start of skills training groups. The WAI-SR was completed during the final skills training group session. The post-test DERS was completed 1–3 weeks following the final skills training group session.

Intervention DBT-A skills training groups were led by clinical psychology PhD student clinicians supervised by licensed clinical psychologists (the first and last authors). The treatment was a modified version of Rathus and Miller's (2015) DBT-A skills training manual. Groups met once a week for 10–12 weeks and covered the domains of mindfulness, emotion regulation, interpersonal effectiveness, and distress tolerance. A complete description of the intervention can be found in (Anestis et al., 2020).

Data Analysis

The distribution of the data was examined and some variables demonstrated non-normality according to Shapiro-Wilk tests. Accordingly, nonparametric tests were used to examine group differences on study variables between participants who completed DBT-A-informed treatment and those who dropped out (i.e., noncompleters). Due to the relatively small sample size for this study, many effects are best interpreted using effect sizes rather than statistical significance. Effect size *d* differences between completers and noncompleters were interpreted through commonly accepted benchmarks of 0.20 for small, 0.50 for medium, and 0.80 for large effects (Cohen, 1992). To test the associations between the PAI-A scales of interest and gains or losses in emotion regulation abilities from pre- to post-treatment, gain and loss scores were calculated for each DERS subscale for each participant (see Kim & Steiner, 2019). These scores are continuous and were calculated by finding the difference between pre- and post-intervention emotion regulation abilities. Gains represent reductions in emotion regulation difficulties, whereas losses indicate increased emotion dysregulation. All gain scores are negative (representing a decrease in difficulties in ER as measured by the DERS) or zero (for participants who had an increase in difficulties with ER). Similarly, all loss scores are positive (representing a higher DERS score at post-test vs. pre-test) or zero (for participants who improved in ER ability). In this way, the scores fall across a bounded range but participants only have a non-zero value for either gains or losses on each DERS scale. A series of separate analyses were conducted by correlating PAI-A scales with DERS gain and loss scores using nonparametric tests. Additional correlational analyses were conducted to assess the relationships between PAI-A pre-intervention variables and WAI (i.e., therapeutic alliance) scores. The magnitude of these correlations was used as an indicator of effect size (small: 0.1, medium: 0.3, large: 0.5; Cohen, 1992).

Results

Missing Data Analysis

Four participants (9.1%) had missing PAI-A data. None were missing more than 20% of the items on any PAI-A scales or subscales; per PAI-A manual instructions (Morey, 2007), missing items were replaced with 0 s prior to calculating scores. Three participants (6.8%) had missing data on the pre-test DERS. Of the 31 participants who completed the intervention, six (13.6%) had missing data on the post-test DERS, and four (9.1%) had missing data on the WAI-SR. DERS and WAI-SR missing data were replaced using hot deck imputation (Myers, 2011).

PAI-A Variables that Distinguish Between Treatment Completers and Noncompleters

Although no statistically significant differences were observed on MCE or any PAI-A scale between DBT-A completers and noncompleters in this small sample using independent-samples median tests ($ps > .05$), effect size comparisons indicated small-sized mean differences on ANT ($d = .27$), RXR ($d = .24$), and MCE ($d = .25$), with higher scores among noncompleters. DBT-A noncompleters also had small-to-medium-sized elevations on DEP ($d = .31$), BOR ($d = .36$), ALC ($d = .42$), AGG ($d = .37$), NON ($d = .33$), and DOM ($d = .40$) compared with completers. Those who completed DBT-A had a small-to-medium-sized elevation on the SOM ($d = .39$) scale in relation to noncompleters. See Fig. 1 for a depiction of the PAI-A scale means in each group.

Predictors of Symptom Change in Completers

Relationships between the PAI-A scales of interest and both gains and losses in emotion regulation abilities from pre- to post-treatment were examined. There was some variability across DERS subscales but over half (55%) of participants demonstrated an overall gain emotion regulation ability (36% average improvement), a significant minority (39%) showed an overall loss in ER abilities (17% average worsening), and two participants showed no change from pre- to post-test. To test how these changes in ER related to PAI-A scales, a series of separate analyses were conducted by comparing PAI-A scales with DERS gain and loss scores (see

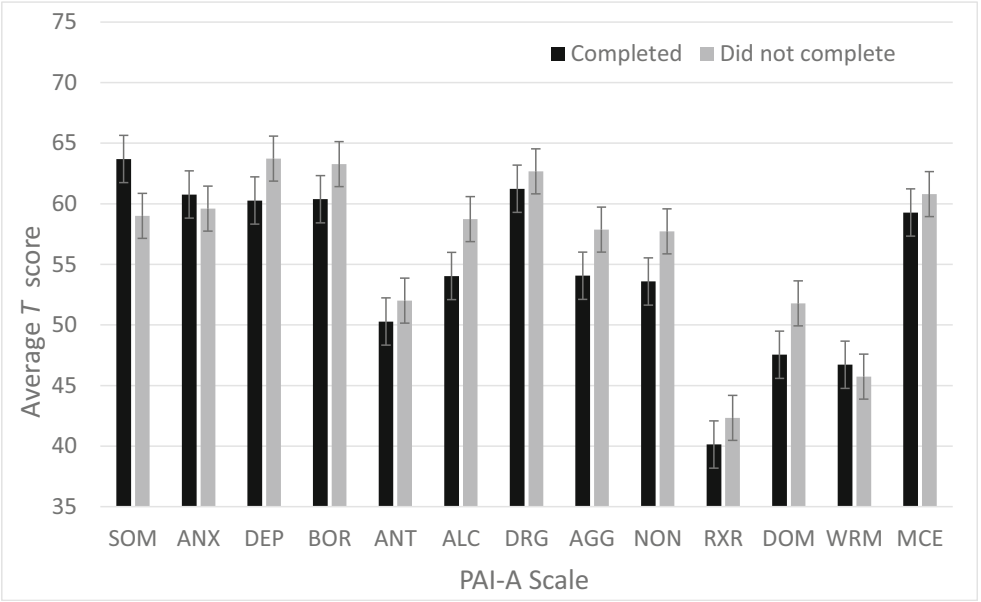

Fig. 1 *Mean scores on the PAI-A for adolescents who did and did not complete a DBT-A-informed group intervention.* ***Note:*** Completed $n = 31$. Did not complete $n = 13$. Error bars = SEM. *SOM* Somatic Complaints, *DEP* Depression, *ANX* Anxiety, *ANT* Antisocial Features, *AGG* Aggression, *BOR* Borderline Features, *ALC* Alcohol Problems, *DRG* Drug Problems, *RXR* Treatment Rejection, *NON* Lack of Social Support, *DOM* Dominance, *WRM* Warmth, *MCE* Mean Clinical Elevation

Tables 1 and 2, respectively) using Spearman correlations for each participant who completed the intervention ($n = 31$). When examining gain scores, there were medium- to large-sized negative associations between BOR and amount of improvement in total emotion dysregulation (DERS Total; $r_s = -.41$, 95% CI [−.68, −.05]), nonacceptance of emotional responses (DERS Nonaccept; $r = -.39$, 95% CI [−.66, −.03]), difficulty controlling behavior when distressed (DERS Impulse; $r_s = -.53$, 95% CI [−.76, −.19]), and limited access to emotion regulation strategies (DERS Strategies; $r_s = -.37$, 95% CI [−.65, −.01]). Thus, those who endorsed higher borderline personality features also reported less improvement in these emotion dysregulation domains following DBT-A-informed skills training groups. In contrast, scores on the DRG scale had medium-sized positive relations with gains in being able to work towards goals when distressed (DERS Goals; $r_s = .30$, 95% CI [−.07, .60]), controlling behavior when distressed (DERS Impulse; $r_s = .40$, 95% CI [.04, .67]), and awareness of emotions (DERS Aware; $r_s = .30$, 95% CI [−.07, .60]). Other associations between PAI-A scores

Table 1 Associations between DERS gain scores and PAI-A variables

	Gain Total	Gain Nonaccept	Gain Goals	Gain Impulse	Gain Awareness	Gain Strategies	Gain Clarity
PAI-A variable							
SOM	.00	.00	.03	−.05	.29	−.07	−.13
ANX	−.23	−.14	−.11	**−.31**	**.33**	−.16	−.09
DEP	−.08	−.15	.12	−.04	**.35**	**−.32**	−.21
BOR	**−.41**	**−.39**	−.25	**−.53**	.20	**−.37**	−.25
ANT	−.05	−.25	.09	−.04	−.00	−.07	−.21
ALC	**−.32**	−.08	−.12	−.28	−.15	−.26	**−.33**
DRG	.25	.18	**.30**	**.40**	**.30**	.17	−.03
AGG	−.12	.11	−.00	**−.34**	**−.33**	−.08	−.14
NON	.24	.11	.27	.11	.15	.06	.15
RXR	.07	.10	−.02	**.31**	−.21	−.01	−.14
DOM	.29	.23	.11	.38	−.25	.23	.23
WRM	−.19	−.03	**−.33**	−.09	**−.34**	.04	.02
MCE	−.02	−.11	.17	−.07	**.43**	−.15	−.17

Note: $N = 31$. Bold = medium or large effect sizes (Cohen, 1992). *SOM* Somatic Complaints, *DEP* Depression, *ANX* Anxiety, *ANT* Antisocial Features, *AGG* Aggression, *BOR* Borderline Features, *ALC* Alcohol Problems, *DRG* Drug Problems, *RXR* Treatment Rejection, *NON* Lack of Social Support, *DOM* Dominance, *WRM* Warmth, *MCE* Mean Clinical Elevation, *DERS* Difficulties in Emotion Regulation Scale

Table 2 Correlational associations between DERS loss scores and PAI-A variables

	Loss Total	Loss Nonaccept	Loss Goals	Loss Impulse	Loss Awareness	Loss Strategies	Loss Clarity
PAI-A variable							
SOM	.05	.00	−.02	−.19	.29	.11	.04
ANX	**−.37**	−.27	**−.31**	**−.35**	.04	−.21	**−.32**
DEP	−.19	−.20	−.07	**−.37**	.21	**−.34**	−.28
BOR	**−.47**	**−.50**	−.21	**−.56**	−.01	**−.38**	**−.40**
ANT	.03	.03	**.40**	.02	.16	−.06	−.09
ALC	**−.43**	−.14	−.01	−.21	−.08	**−.37**	**−.34**
DRG	.05	.18	.25	.14	.07	−.02	−.06
AGG	−.08	.07	.08	−.24	−.12	.03	−.05
NON	.08	−.05	.08	−.18	.00	−.07	.14
RXR	.21	.21	.11	.13	.06	.02	.21
DOM	.18	**.36**	.01	.25	**−.35**	.19	−.04
WRM	−.04	.10	−.28	.14	**−.32**	.17	−.09
MCE	−.22	−.20	.05	**−.33**	.14	−.29	**−.31**

Note: $N = 31$. Bold = medium or large effect sizes (Cohen, 1992). *SOM* Somatic Complaints, *DEP* Depression, *ANX* Anxiety, *ANT* Antisocial Features, *AGG* Aggression, *BOR* Borderline Features, *ALC* Alcohol Problems, *DRG* Drug Problems, *RXR* Treatment Rejection, *NON* Lack of Social Support, *DOM* Dominance, *WRM* Warmth, *MCE* Mean Clinical Elevation, *DERS* Difficulties in Emotion Regulation Scale

and improvements in DERS scores from pre- to post-treatment are displayed in Table 1.

Regarding loss scores, medium to large negative correlations were found between BOR and loss scores for DERS Total ($r_s = -.47$, 95% CI [−.72, −.12]), DERS Nonaccept ($r_s = -.50$, 95% CI [−.74, −.16]), DERS Impulse ($r_s = -.56$, 95% CI [−.77, −.23]), DERS Strategies ($r_s = = -.38$, 95% CI [−.65, −.02]), and DERS Clarity ($r_s = -.40$, 95% CI [−.67, −.04]), meaning that those reporting more borderline features endorsed less worsening of difficulties in these emotion dysregulation domains from pre-treatment to post-treatment than did those with lower BOR scores. When combined with the results for BOR and DERS gain scores, this finding suggests relatively less change in DERS scores from pre- to post-test among individuals with more borderline personality features relative to those with lower BOR scores. ANX also had medium-sized associations with less worsening of difficulties in overall emotion dysregulation, ability to work toward goals when distressed, impulsive behavior when distressed, and clarity about emotions. Other associations between PAI-A scores and exacerbations of emotion regulation difficulties from pre- to post-treatment are depicted in Table 2.

Pre-Treatment PAI-A Predictors of Working Alliance in Completers

Relationships between pre-treatment PAI-A scores and post-treatment therapeutic alliance were examined (see Table 3). There was a large effect for the association between WRM and WAI-SR ($r_s = .54$, 95% CI [.20, .76]), with higher interpersonal warmth related to greater client-rated working alliance. ANX ($r = .30$, 95% CI [−.07, .60]) was also moderately positively associated with WAI-SR, indicating that elevated symptoms of anxiety prior to treatment were associated with

Table 3 Correlational associations between working alliance and PAI-A variables

PAI-A variable	WAI-SR
SOM	−.01
ANX	**.30**
DEP	−.04
BOR	.07
ANT	−.16
ALC	.11
DRG	−.07
AGG	−.23
NON	−.29
RXR	−.12
DOM	.08
WRM	**.54**
MCE	.05

Note: $N = 31$. Bold = medium or large effect sizes (Cohen, 1992). *WAI-SR* Working Alliance Inventory- Short Revised, *SOM* Somatic Complaints, *DEP* Depression, *ANX* Anxiety, *ANT* Antisocial Features, *AGG* Aggression, *BOR* Borderline Features, *ALC* Alcohol Problems, *DRG* Drug Problems, *RXR* Treatment Rejection, *NON* Lack of Social Support, *DOM* Dominance, *WRM* Warmth, *MCE* Mean Clinical Elevation

better client-reported working alliance after receiving the intervention.

Discussion

Broadband assessments that comprehensively measure factors related to personality, psychopathology, and interpersonal style can offer a simple and cost-effective way to provide therapists with a sense of how individuals will respond to treatment. The present study aimed to provide preliminary information about which PAI-A variables may be helpful in predicting treatment completion, treatment response, and therapeutic alliance among a sample of adolescent boys who participated in DBT-A-informed skills training groups. Findings were largely in line with hypotheses. Although the sample size for the present study is relatively small, PAI-A scales designed to assess somatic complaints, depression, antisocial traits, aggression, borderline traits, problematic alcohol use, lack of social support, treatment motivation, and interpersonal dominance, as well as an index measuring overall clinical severity, distinguished adolescents who completed the intervention from those who discontinued the intervention. Differences were not statistically significant but had small to medium effect sizes and were generally in the predicted direction, with higher scores on most scales found among noncompleters. This information may be useful in determining adolescent boys who are at-risk for premature termination from services like DBT-A-informed skills training. Additionally, a number of PAI-A scales were related to changes in emotion regulation skills over the course of the training groups, as well as client-reported therapeutic alliance. These results help clarify how individual characteristics relate to treatment processes beyond completion/non-completion. By targeting problems in empirically relevant personality and psychopathology domains, practitioners may be able to improve adherence to interventions, symptom reduction, and overall clinical outcomes for adolescent boys who are in treatment.

Using prior research on associations between personality and psychopathology constructs and treatment outcomes, it was hypothesized that scores on PAI-A scales assessing internalizing problems, externalizing problems, interpersonal style, treatment motivation, and overall elevation across the clinical profile would be higher (except WRM, which was expected to be lower) among noncompleters relative to those who completed the intervention. Findings were largely consistent with previous studies demonstrating associations between treatment non-completion and depression (Tarescavage et al., 2015; Tylicki et al., 2019), antisocial traits (Anestis, Finn, et al., 2015a; Anestis, Gottfried, et al., 2015b; Lang & Belenko, 2000; Sellbom et al., 2008; Tarescavage et al., 2015; Tylicki et al., 2019), aggression (Anestis, Gottfried, et al., 2015b; Mattson et al., 2012; Tylicki et al., 2019), borderline traits (McMurran et al., 2010), alcohol use (Anestis, Gottfried, et al., 2015b; Mattson et al., 2012; Tylicki et al., 2019), interpersonal dominance (Edens, 2009), and general clinical severity (Hopwood, Creech, et al., 2008b; Minnix et al., 2005; O'Reilly, 2007). Although this study is preliminary in nature, these results suggest that the PAI-A may provide information about clinically relevant constructs that can be used by practitioners to predict treatment completion and identify youths at-risk for premature termination. Specifically, clinicians may be able to use PAI-A results to identify the most salient areas of focus for treatment to make larger early gains, estimate the likelihood that a client will experience success in treatment to manage expectations, and evaluate the appropriateness of an intervention such as DBT-A skills training for a given client presentation.

Scores on PAI-A scales evaluating anxiety, drug problems, and interpersonal warmth were not significantly different across completers and noncompleters, which is inconsistent with previous findings (Anestis, Gottfried, et al., 2015b; Mattson et al., 2012; Tarescavage et al., 2015; Tylicki et al., 2019). Additionally, and also contrary to prior studies (Tarescavage et al., 2015; Tylicki et al., 2019), DBT-A-informed skills training group noncompleters had lower scores on the PAI-A scale measuring somatic complaints than did those who completed the treatment. While these discrepancies may be attributable to study limitations (e.g., low sample size), they may also reflect factors that are specific to the population included in the present study (i.e., boys in a residential program for at-risk youth). Most notably, the previous research was conducted in adult samples, highlighting the importance of examining these research questions in different populations as results may not generalize across demographic groups. Additionally, participants in this sample are somewhat unique given their residential program participation and modest (1 SD) elevations on the DRG, ANX, and SOM scales and a slight (< 1 SD) depression on the WRM scale, on average, relative to community youths in the normative sample (Morey, 2007). Given these nuances and the small sample size, some caution is warranted in interpreting these results as they may not translate to other samples of adolescents. However, these results provide initial evidence for the utility of the PAI-A in differentiating between adolescent boys who completed or did not complete a DBT-A-informed intervention. Results largely mirror findings from other research but also highlight clinically relevant differences for practitioners working with adolescents vs. adults.

In addition to hypotheses about PAI-A scales that would relate to treatment completion, it was expected that some scales would predict the magnitude of changes in emotion regulation from pre- to post-test. Youths in this study were involved both in the larger residential program intervention, which emphasizes conformity and fulfilling obligations to the group rather than individual desires, and in the DBT-A-

informed intervention that focused on their individual needs and skill-building. It was expected that the skills training groups would provide a validating environment that would increase emotion regulation abilities while the larger program might be a more challenging environment that could decrease emotion regulation abilities. In fact, the larger study from which these data are drawn included a control group and found that the DERS scores for the control group *increased* over the study period, whereas the DERS scores for the intervention group decreased (Anestis et al., 2020**)**. This finding stimulated interest in the present study that examines PAI-A predictors of increases and decreases in emotion regulation separately, as we thought some personality features might relate to exacerbated difficulties whereas others might relate to improvements among these youths who were simultaneously experiencing two types of interventions. Results indicate that borderline traits (BOR) were most closely associated with changes in emotion dysregulation, though internalizing symptoms and other factors showed medium effect sizes as well. As predicted, BOR was most strongly correlated with changes from pre- to post-intervention in several domains. These associations were negative, meaning that those with higher BOR scores reported less improvement in emotion dysregulation but also less exacerbation of symptoms from pre-test to post-test. This is consistent with previous literature suggesting that borderline personality features are linked to less positive responses in substance use treatment (Marlowe et al., 1997) and interventions that specifically target BPD (Cristea et al., 2017). The finding that borderline features were also not associated with greater worsening of symptoms may indicate that the intervention mitigated any exacerbation in symptoms that might otherwise have occurred among these youths over the course of the study period; however, further research is needed to determine whether this finding would hold up in a larger sample of youth.

Other PAI-A scales that were associated with changes in emotion regulation from pre- to post-treatment include AGG, which was linked to more modest improvements in impulsivity when distressed and in awareness of emotional responses. This finding is unsurprising, as PAI AGG was related to poorer therapist-rated treatment outcomes among adults in a prior study (Magyar et al., 2012). Interestingly, ANT was not associated with the magnitude of improvement in any emotion dysregulation domain but was positively related to increased difficulties engaging in goal-directed behavior when distressed from pre- to post-treatment. This is consistent with previous research showing that antisocial personality traits have been linked to rule-breaking behavior during treatment (Hopwood, Baker et al., 2008a), and continued substance use during a substance use treatment program (Marlowe et al., 1997) in adult samples. Although it was expected that ANT would negatively relate to treatment gains, it is important to note that the lack of support for this hypothesis may be attributable to the small sample size and the exclusion of individuals with highly elevated (> 1 SD) ANT scores from group participation. Despite this, the finding that antisocial features are associated with increased difficulty meeting goals when distressed does appear consistent with the association between antisocial traits and treatment-interfering behaviors observed in previous research. Another unexpected finding was that the DRG scale was positively associated with gains in working towards goals when distressed, controlling impulses when distressed, and awareness of emotions. Given that stressors and coping processes have previously been linked to adolescent substance use (Charles et al., 2017; Wagner et al., 1999; Wills et al., 2001), it is possible that adolescents who may previously have used substances as a coping mechansim benefited from learning healthier coping behaviors through this intervention. However, it should also be noted that the confidence intervals for two out of three of these associations included zero so these results may not be replicated in future research.

The current study also examined relationships between PAI-A variables and client-reported therapeutic alliance. It is crucial to understand factors that contribute to the client-therapist alliance, as a relatively recent meta-analysis indicated that therapeutic alliance explains approximately 7.5% of the variance in psychotherapy outcomes (Horvath et al., 2011). Specifically, individuals who report a better therapeutic alliance tend to exhibit greater symptom improvement over time (Zilcha-Mano et al., 2014) and reductions in suicidal or self-harming behavior (Bedics et al., 2015). It was predicted that interpersonal warmth (WRM) would be positively associated with client-rated therapeutic alliance. Additionally, it was expected that scales assessing antisocial traits (ANT), borderline traits (BOR), interpersonal dominance (DOM), treatment rejection (RXR), and poor social support (NON) would be negatively associated with client-rated therapeutic alliance. Partially supporting the hypothesis, interpersonal warmth was strongly and positively related to client-rated therapeutic alliance, suggesting that those with greater empathy, engagement, and interest in close relationships (WRM) also reported greater therapeutic alliance post-intervention. Prior research has shown that the working relationship between the client and therapist is influenced by a host of factors, two of which are the client's level of interpersonal warmth and history of interpersonal problems (Renner et al., 2012; Taft et al., 2004). Although relationships for the other variables of interest (RXR, ANT, BOR, DOM) were in the expected directions, negligible to small effect sizes were observed. This pattern suggests that client interpersonal style may be most central to establishing and maintaining a strong working alliance with a therapist. Given the small sample size in the present study, future research should examine specific factors that contribute to therapeutic alliance between adolescent clients and adult practitioners in larger and diverse samples.

Taken together, the results of this study indicate that the PAI-A may provide useful information for treatment planning with adolescents. Specifically, clinicians can use PAI-A profiles to determine which youths may require additional support or targeted approaches when building a therapeutic alliance, promoting treatment completion, and delivering DBT-A-informed skills training. This is in line both with EBA practices and the arguments made by Harkness and Lilienfeld (1997) about personality assessment having significant utility for treatment planning. This work has valuable implications for clinical practice, as treatment noncompletion and difficulties in the therapeutic alliance have negative impacts on both clinicians and clients.

Clients who withdraw from treatment early may find that their symptoms have exacerbated (Jacobson et al., 1999) and may express dissatisfaction with their mental health treatment (Knox et al., 2011; Kokotovic & Tracey, 1987) that could reduce their motivation to seek treatment in the future. For clinicians, having a client terminate services prematurely can be disheartening, reduce one's sense of professional efficacy, and indicate that limited resources in many mental health settings are being used ineffectively (Carpenter et al., 1979; Wierzbicki & Pekarik, 1993). The results of this study also preliminarily suggest that psychological assessment can produce data that would allow clinicians to provide personalized information about treatment targets, goals, and outcomes that could be expected based on their assessment results (Youngstrom & Van Meter, 2016). This approach can aid not only in the planning of treatment and selection of progress monitoring measures but also in supporting psychologists' ethical obligation to communicate realistic treatment expectations to clients (Harkness & Lilienfeld, 1997). It may further help practitioners understand why certain clients are more challenging, seem to form a poorer connection with the therapist, or seem more "stuck" in treatment, potentially reducing their frustration with such cases.

This study has several strengths, including the use of an understudied, non-treatment-seeking sample of at-risk adolescent boys with symptoms of BPD, the inclusion of clinically relevant outcomes, and the use of two fairly recently developed evidence-based practices in psychology aimed at adolescents-the PAI-A and DBT-A skills training groups. The PAI-A and DBT-A were both developed using rigorous methodology and have some empirical support; more research on them, particularly in diverse settings and populations, is needed. Additionally, this study is not without limitations. The sample is relatively small, consists of only boys, and was recruited from the nontraditional setting of a residential program for at-risk youths. The residential program setting likely improved attendance at intervention sessions, highlighting how interventions that are brought into settings in which potential clients are already spending time (e.g., schools) may improve access to care. Of course, there are more barriers to treatment in outpatient settings and the findings reported here may not generalize to other samples or settings. Further, modifications to the procedures in the DBT-A manual were necessary due to the setting (e.g., no inclusion of parents/guardians; for more information see Anestis et al., 2020), so the intervention used in the present study does not represent strict adherence to the DBT-A skills training groups as outlined in the treatment manual (Rathus & Miller, 2015). Moreover, inclusion criteria for the DBT-A-informed skills training groups involved PAI-A scores, so there is a restricted range of scores on those scales that may affect interpretation of results. For example, given that a high ANT score was an exclusion criterion, there may have been a "ceiling effect" when interpreting the impact of ANT on treatment outcomes; however, it is notable that only one participant was excluded from participation due to a high ANT score. In addition to restricted score ranges, it is also possible that the small sample size may have contributed to some unexpected findings (e.g., SOM being higher among completers). Finally, youths were only followed through the end of their stay at the residential program, so longer-term outcomes are not available.

Despite the potential limited generalizability of the present findings and the impact of implementation within a residential setting, these results should have some parallels to outpatient work as participation in the intervention was truly voluntary. Future research could address some of the limitations of the present study and contribute further to the emerging research on the PAI-A, DBT-A, and BPD symptoms in understudied groups. Specifically, these procedures may be replicated in larger samples representing different demographic groups and settings. It will also be useful to follow youths for a longer length of time after the intervention to assess the durability of treatment gains and examine the effectiveness of some of the specific tactics described above for youths whose psychological profiles indicate that they are at-risk for less-than-optimal outcomes following this type of intervention. By continuing to focus research efforts on the clinical utility of assessment instruments like the PAI-A in predicting treatment outcomes, a more convincing case may be made for practitioners to incorporate EBA into the intervention process.

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Code Availability Not applicable.

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Data Availability Data are stored in the Open Science Framework: doi: https://doi.org/10.17605/OSF.IO/CE7QS

Declarations

Ethics Approval This study was approved by the University of Southern Mississippi institutional review board and was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Conflict of Interest The authors declare that they have no conflicts of interest.

Research Involving Human Participants This study was approved by the institutional review board at the first author's institution and was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed Consent Written informed consent was obtained from participants' legal guardian and participants provided written informed consent (if 18 years old) or assent (if under 18).

Consent to Participate Written informed consent was obtained from participants' legal guardian and participants provided written informed consent (if 18 years old) or assent (if under 18).

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