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Changing Criminal Thinking: An Examination of Heterogeneity in Treatment Effects in a Sample of Justice-Involved Persons with Dual Diagnoses

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CHANGING CRIMINAL THINKING: AN EXAMINATION OF HETEROGENEITY
IN TREATMENT EFFECTS IN A SAMPLE OF JUSTICE-INVOLVED PERSONS
WITH DUAL DIAGNOSES

by

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ABSTRACT

Recent studies have indicated variability in cognitive change for justice-involved persons with mental illness exposed to treatments for criminal thinking and psychiatric risk factors. Research suggests that proactive styles of criminal thinking may be more difficult to change than impulsive or reactive styles. To date, however, no studies have identified risk factors for a limited response or modeled observed disparities in responsivity to interventions aimed at reducing criminal thinking. Using an archival dataset comprising 206 probationers with a dual diagnosis who were exposed to active CBT-based treatment, a latent profile analysis modeled unobserved heterogeneity in treatment response per observed changes in criminal thinking. Results found that a majority of participants endorsed significant changes in reactive criminal thinking with minimal changes in reported proactive criminal thinking. Neither pre-treatment severity of psychopathology nor compliance with psychotropic medication predicted response to treatment. While diagnosis largely did not predict responsiveness, a self-reported previous diagnosis of a psychotic spectrum disorder predicted increased criminal thinking post-treatment. Moreover, those expressing greater levels of criminal thinking after treatment were also found to express more attitudes supportive of violence. Limitations and treatment recommendations are discussed, including the need for correctional treatments to improve the responsiveness of treatment to individual factors.

ACKNOWLEDGMENTS

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CHAPTER I – Introduction

Although more recent trends indicate a gradual decrease in the United States' correctional

populations (Kaeble & Cowhig, 2016; Kaeble et al., 2016; Maruschak & Boncza, 2012),

national demographics still show approximately 1 in 40 American adults are involved in

the criminal justice system, resulting in over 6.4 million people under some form of

supervision by a United States adult correctional system (Maruschak & Minton, 2020).

Of those individuals, more than 4 million are on parole or probation (Maruschak &

Minton, 2020). As such, the majority of individuals under some form of government

supervision are either under supervision in lieu of incarceration or are under supervision

following incarceration. Unfortunately, at present, individuals on community supervision

exhibit both notable rates of recidivism and failure to meet terms of supervision (Kaeble,

2018). Recent estimates have indicated that only 50% of probationers and 57% of

parolees complete their supervision terms successfully (Kaeble, 2018). Given these

figures, programming has been developed and assessed to better address risk factors for

re-offending with the development of formalized approaches for effective community

supervision (Bonta et al., 2008; Robinson et al., 2012; Smith et al., 2012).

Changing Lives and Changing Outcomes (CLCO), a program for justice-involved

persons with mental illness, has been shown to effectively address pro-criminal attitudes

and criminal thinking patterns in this population (Morgan et al., 2018; Gaspar et al.,

2019). However, existing research suggests that individual differences may influence a

lack of response to this program (Gaspar et al., 2019; Morgan et al., 2014). To date,

however, no known research has examined whether specific factors influence a lack of

responses to treatment for persons under community supervision. Using participants

exposed to *CLCO*, the primary purpose of this project is to examine individual factors that may lead to differential changes in primary treatment targets (primarily criminal thinking). This work has the potential to inform recommendations to improve the effectiveness of this program, as well as those with similar treatment objectives.

Empirical Support for the Risk-Need-Responsivity (RNR) Model

Research suggests that successful correctional programs tend to be those that integrate the Risk-Need-Responsivity (RNR) model (Andrews & Bonta, 2017; Andrews & Bowden, 2006). This model is used to conceptualize risk for re-offending and guide treatment planning (Bonta & Andrews, 2017; Robinson et al., 2012; Smith et al., 2012). The RNR model uses three basic principles to provide clinicians with an atheoretical framework for evaluating and structuring interventions for correctional populations (Andrews et al., 1990). The risk principle consists of two aspects: behavioral prediction and matching of risk to intensity of treatment (Andrews et al., 1990). Prediction includes the systematic assessment of prognostic indicators associated with re-offending. Of these prognostic indications, eight factors (known as the Central 8) have been identified as highly predictive of recidivism: criminal associates, pro-criminal attitudes, antisocial behaviors and personality, history of criminal behaviors, leisure time, difficulties with school or employment, family issues, and substance abuse (Bonta et al., 1998). The first four of these (i.e., history, associates, attitudes, and antisocial personality) are considered the Big Four, as they are consistently found to have the highest predictive power in regard to recidivism (Bonta & Andrews, 2017; Andrews et al., 2006; Gendreau et al., 1996). The number and severity of these prognostic indicators provide an indication of the appropriate dosage of treatment (Bonta & Andrews, 2017). A study evaluating the risk

principle found that high-risk offenders matched to higher intensity treatment (i.e.,

approximately 137 days of enhanced residential programming) exhibited lower rates of

recidivism (r value of .18) relative to those provided treatment as usual (i.e., standard

non-residential programming, r value of -.14; Lowenkamp et al., 2006).

The needs principle focuses on which of the changeable prognostic indicators, or

dynamic risk factors, can then be used to develop individualized risk management

strategies. Dynamic risk factors are defined as malleable traits identified through

empirically supported risk assessments (Andrews et al., 1990). In the context of RNR,

dynamic factors of the Central 8 include antisocial cognition, antisocial associates,

antisocial personality, family/marital, school/work, leisure/recreation, and substance

abuse (Bonta & Andrews, 2017).

Lastly, the responsivity principle focuses on individual-level characteristics that could

impact the efficacy of treatment (Andrews et al., 2011). This principle includes the use of

prosocial modeling to reinforce adaptive behaviors independent of the type of offender

(Dowden & Andrews, 2004). Moreover, in addition to distinct individual-level factors

(e.g., below-average intellectual functioning, literacy), clinicians are encouraged to

accommodate individual characteristics such as personal strengths and abilities (Andrews

et al., 2011).

Studies examining the efficacy of the RNR model generally support its use (Andrews et

al., 1990; Morgan & Flora, 2002; McGuire, 2008). Programs that integrate the model

have been shown to result in significant decreases in recidivism. Further, the more

principles adhered to, the larger the effect (Andrews & Dowden, 2005; Ward et al., 2007;

Vieira et al., 2009). For example, within a residential/custodial program, programs

adhering to all three principles of the RNR model produced a 17% decrease in recidivism compared to an increase in recidivism for programs that integrated none of the principles (Andrews & Bonta, 2006).

What Works: RNR-Informed CBT

At present, RNR-informed cognitive behavioral therapy (CBT) programs that address criminogenic needs are the most studied and considered the more efficacious in terms of reducing recidivism (Andrews et al., 1990; Landenberger & Lipsey, 2005; McGuire, 2008; Morgan & Flora, 2002; Polaschek et al., 2005). In fact, meta-analyses also have shown that interventions adhering to RNR-informed CBT significantly decreased rates of recidivism across samples and settings (Tong & Farrington, 2006; Gendreau, 1996; Morgan et al., 2012; Wooditch et al., 2014; Bourgon & Armstrong, 2005). These reductions also are seen in community supervision programs. An examination of RNR-informed community supervision resulted in a 16% reduction in failures to successfully complete probation (Robinson et al., 2011).

At the core of these programs is an emphasis on restructuring maladaptive cognitions (i.e., antisocial or criminal cognitions) and reinforcing cognitive skills associated with prosocial behaviors (e.g., monitoring one's own thought processes, identifying and compensating for distortions and errors in thinking, reasoning about right and wrong behavior, generating alternative solutions, and making decisions about appropriate behavior; Landenberger & Lipsey, 2005). Research has shown that the primary mechanism of change driving the efficacy of these programs is this emphasis on cognitive restructuring. Using a meta-analytic framework, research examining components of CBT treatment elements and contributing factors (e.g., duration of

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treatment) indicated that cognitive restructuring is an independent predictor of intervention efficacy (Lipsey et al., 2007). These results complement research showing a robust relationship between antisocial cognitions (i.e., criminal thinking styles and pro-criminal attitudes) and recidivism (Banse et al., 2013; Walters, 2012).

Of note, within the context of correctional treatment, effective cognitive restructuring requires modifying both thinking patterns and attitudes associated with engaging in criminal activities. Although conceptually similar, pro-criminal attitudes reflect thought content, and criminal thinking patterns are thought processes that are used to justify antisocial behavior (Mills et al., 2004; Walters, 2012; Simourd & Van De Ven, 1999). Specifically, pro-criminal attitudes encapsulate an associated network of beliefs and sentiments that are commonly expressed by justice-involved persons toward judicial institutions, goals, violence, or other individuals engaging in criminal activities (Simourd, 1997; Mills et al., 2002). Whereas, criminal thinking styles are recognized as more ingrained and systematic thought processes that support antisocial behaviors that may be categorized as reactive (unplanned, emotional, and impulsive) or proactive (planned and goal-directed; Mitchell & Tafrate, 2012; Walters, 2012). Consequently, to effectively address antisocial cognitions, effective interventions must address both criminal thinking styles and pro-criminal attitudes.

The Problem of Mental Illness: Does RNR Apply?

Though there is considerable evidence supporting the efficacy of the RNR model for the general population of justice-involved persons, there is less research on the applicability of the RNR principles to persons with mental illness (Skeem et al., 2015). Research indicates that a disproportionate number of individuals in prisons and jails exhibit serious

mental health concerns relative to the general population (Prins, 2014; Bronson &

Berzofsky, 2017). Similarly, prevalence rates of mental illness (MI) amongst individuals

on probation are also higher than the general population across western countries

(Brooker et al., 2012; Sirdifield, 2012; Wetterborg et al., 2015). Across these studies,

individuals under supervision were found to exhibit high rates of psychotic spectrum

disorders, mood disorders, personality disorders, and anxiety disorders. Lurigio et al.

(2003) likewise found high rates of mental illness and considerable diversity in terms of

clinical presentation among probationers to include psychotic disorders (18.80% reported

a lifetime occurrence), antisocial personality disorder (15.90%), hypomanic episodes

(13.90%), manic episodes (7.50%), and major depressive episodes (6.70%). Using a

sample of 231,905 U.S. probationers, Van Deinse et al. (2019) more recently estimated

that 14.61 to 18.73 percent of probationers exhibit symptoms of mental illness.

Furthermore, individuals under community supervision are also significantly more likely

to meet the criteria for substance abuse and dependence relative to the general population,

with general trends indicating addiction is a pervasive and enduring problem in this

population (Fearn, 2016).

Research has also shown that individuals under community supervision have

considerable clinical needs that can lead to more intensive mental health services, with

8.20% reporting hospitalization for mental illness and 13% to 18.20% at risk for

completing suicide (Cardarelli et al., 2014; Ditton, 1999; Lurigio et al., 2003). Moreover,

individuals under community supervision may also be required to take medication or

engage in treatment per terms of their supervision (Skeem et al., 2006). Rates of success

on community supervision also appear considerably worse for probationers with mental

illness. Dauphinot (1996) found that probationers with symptoms of mental illness were revoked at two times the rate of their non-mentally ill counterparts. These poorer outcomes also may be associated with the relationship between mental illness and other risk factors for re-offending, such as substance abuse (Santucci, 2012; Ross & Peselow, 2012) and unemployment (Baron & Salzer, 2002). Collectively, these results indicate this population requires considerable resources in terms of the level of care and the types of services required.

Because mental illness alone is not a risk factor for crime (Skeem et al., 2014), the RNR model appropriately does not include mental illness as a primary risk fact within the Central 8; yet, as noted above, it is clear mental illness is prevalent among criminal justice populations, including those on supervision. Rather than being a strong predictor in and of itself, unmanaged mental illness can intersect with criminogenic needs, making it more difficult for these individuals to remain crime-free. For example, several prior studies suggest that justice-involved persons with mental illness endorse levels of criminal thinking that are comparable to their non-mentally ill, justice-involved counterparts (Morgan et al., 2010; Wilson et al., 2014). That is, justice-involved persons seem to express criminal cognitions regardless of whether they have a mental illness or not. Poor adherence to medication and co-occurring substance abuse has also been found to significantly increase the odds ($OR = 2.29$, 95% CI [1.01, 5.21]) of serious violent behavior for persons with severe mental illness (Swartz et al., 1998). Similarly, dual diagnosis and medication-nonadherence were shown to result in parolees being 5.19 (95% CI [1.42, 19.03]) times more likely to re-offend in a twelve-month period (Farabee & Shen, 2004). In another sample of probationers with mental illness and co-occurring

substance abuse, compliance with psychotropic medication dropped the risk of future offending (Balyakina et al., 2014).

The Bi-Adaptive Model for Justice-Involved Persons with Mental Illness

Considering the extant literature, effective programming for justice-involved persons with serious signs and symptoms of mental illness must address severe psychopathology, associated risk factors (e.g., medication adherence), and known criminogenic needs. To better target this subpopulation, Morgan et al. (2018) proposed a bi-adaptive model (BA model). The BA model provides a CBT-based framework for simultaneously addressing both criminogenic and psychological needs. The BA model of change postulates that so-called "criminalness" (i.e., factors associated with a propensity to violate the rights and safety of others and contribute to possible arrest) and mental illness are divergent yet not mutually exclusive constructs, as both share common areas of dysfunction: emotional dysregulation, cognitive distortions, impaired interpersonal functioning, and deficits in effective coping strategies. For example, noncompliance with medication is an exemplification of the lack of responsibility-taking characteristic of a criminal lifestyle and, therefore, represents a manifestation of criminal thinking. Additionally, although synthesizing common elements of dysfunction, the model also acknowledges and addresses features distinct to criminogenic needs, such as pro-criminal attitudes and criminal thinking styles, through targeted cognitive restructuring. In addition to following cognitive-behavioral principles, programs following this model include psycho-educational and interpersonal processing approaches.

The Efficacy of the BA Model. At present, there are two programs available that provide a holistic framework for addressing the co-occurrence of criminogenic and mental illness

via the BA model: Changing Lives and Changing Outcomes (CLCO; Morgan et al., 2018) and Stepping Up, Stepping Out (SUSO; Batastini et al., 2019). Although both models use the BA model and contain common content, CLCO was developed for use in general in-custody or community supervision settings and is primarily delivered through a group-format; SUSO was developed to cater to inmates in restrictive housing and is delivered primarily through self-administration with supplemental counselor feedback. Preliminary analyses of efficacy for CLCO were conducted by Morgan et al. in 2014 with a sample of 47 male offenders with mental illness in a secure psychiatric prison or residential facility. Initial results indicated small to moderate effect sizes across dimensions of psychopathology: Depression (Cohen's d = .71), Anxiety (d = .39), Hostility (d = .39), Paranoid Ideation (d = .42), Psychoticism (d = .42), Global Severity Index (d = .44), and Positive Symptom Distress (d = .64; Morgan et al., 2014). Results also indicated small to large effect sizes on indicators of psychosocial functioning, with a large effect size associated with global estimates of psychosocial functioning as measured by the Outcome Questionnaire (OQ-45; Lambert et al., 1996): Symptom Distress (d = .42), Interpersonal Relations (d = .67), Social Role (d = .34), and Total Scores (d = .93; Morgan et al., 2014). Results, however, were more varied for criminal thinking, with significant changes found for reactive criminal thinking patterns (i.e., those that are more impulsive in nature; d = .59) and non-significant results for proactive criminal thinking patterns (i.e., those that are more intentional or planful; d = −.11; Morgan et al., 2014). These findings were corroborated in a later analysis conducted with a mixed sample of male and female probationers with dual diagnoses (Gaspar et al., 2019). Analyses showed significant changes across psychiatric and criminogenic domains, as indicated by small to

large effect sizes (Cohen's *d* ranged from .29 to .87; Gaspar et al., 2019). Of note, although estimates showed cross-gender efficacy, a general trend was found among female participants, who expressed greater improvements across psychiatric domains relative to males: depression (Cohen's d = .81 vs. .43), anger (d = .98 vs. .18), mania (d = .73 vs. .29), anxiety (d = .76 vs. .46), somatic (d = .80 vs. .38), and dissociation (d = .67 vs. .32; Gaspar et al., 2019). Regardless of gender, evaluations of treatment efficacy also indicated significant changes in reactive criminal thinking (d = .84) and significant change in dimensions of pro-criminal attitudes: entitlement (d = .46), intent (d = .87), and attitudes toward violence (d = .77; Gaspar et al., 2019). However, treatment again resulted in marginal gains for proactive criminal thinking patterns (d = .001; Gaspar et al., 2019).

Although *SUSO* is a newer program, so far, findings are consistent with Morgan et al. (2016) and Gaspar et al. (2019) and provide evidence for the generalizability of the BA model. Using a sample of 39 male prisoners placed in administrative segregation, results indicated treatment was efficacious in terms of reducing pro-criminal attitudes (d = .64) and psychological distress (d = .64; Batastini et al., 2020). However, contrary to studies on *CLCO* that showed greater reductions in reactive criminal thinking relative to proactive criminal thinking, criminal thinking patterns did not significantly change from pre- to post-treatment (d = .10; Batastini et al., 2020).

Explaining Differences in Criminal Thinking Outcomes

These results indicate that the BA program model results in clinically significant change as assessed by measures of psychiatric severity and symptom. Results also support the versatility of CLCO given the diversity of psychiatric needs addressed, with significant

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effects found across a range of psychiatric symptoms. Regarding criminogenic needs and specifically antisocial cognitions, results from these program evaluations were more mixed, with reliable changes found for pro-criminal attitudes but divergent effects found for criminal thinking patterns. At present, researchers have not been able to provide an empirically derived explanation for these results. However, it has been hypothesized that criminal thinking patterns (perhaps especially proactive styles) either reflect more fixed cognitive processes relative to attitudes and/or are not targeted with enough intensity or emphasis within treatment protocols (Morgan et al., 2015; Batastini et al., 2020). Additionally, research has indicated that these constructs may require different intervention approaches, with reactive criminality requiring behavior-focused skills and proactive criminality requiring cognitive interventions that target outcome expectancies for criminal behavior (Walters, 2008; Walters, 2009)

Although these considerations are theoretically sound, a more parsimonious explanation would be that this variability is due to differences in treatment responsiveness and variability in population-specific factors associated with the efficacy of CBT. Further, these differences in individual responsiveness may be contributing to the more diluted aggregate effects observed on measures of criminal thinking patterns, suggesting that some program participants may be responding quite well and showing desired reductions while other types of participants are struggling.

Heterogeneity in Treatment Efficacy and the Need to Examine Responsivity Differences in Correctional Samples

Heterogeneity in treatment efficacy (HTE) is understood as patient diversity in regard to responsiveness to treatment, risk of disease, and susceptibility to an adverse outcome

(Kravitz et al., 2004). HTE is considered to explain observed differences in the robustness of the effectiveness of treatment. Inherent to the consideration of HTE is the criticism that, although variability is central to fields like psychology and biomedical research, commonly used population-based analyses produce aggregate results that minimize or exclude differences among participants exposed to treatment (Sacristán & Avendaño-Solá, 2015). Consequently, due to the exclusion of individual differences, estimates of efficacy may not apply to all groups within a population and therefore under- or overestimate the effectiveness of an intervention (Kent et al., 2007). Recent research has provided evidence that current estimates of efficacy for CBT-informed RNR are likely overestimated. Lester et al. (2020) found that approximately 24.11% of individuals exposed to 200-hours of treatment were non-responsive, as indicated by post-treatment assessments of the acquisition of skills, changes in pro-criminal attitudes, and rates of recidivism. These results are incongruent with past recommendations derived from population-wide estimates indicating that medium to high-risk offenders benefit most from 200 to 249 hours of treatment (Makarios et al., 2014). Moreover, in both the 100-hour and 200-hour dosage groups, results from Lester et al. (2020) showed observed estimates of treatment efficacy were sensitive to individual differences, whereby partial removal of members with a high response to treatment resulted in non-significant changes in rates of recidivism relative to the no-treatment group.

Expanding upon the factors noted by Kravitz et al. (2004), estimates of HTE may also benefit from integrating variability in factors occurring within a specific sub-group that may influence estimates of efficacy. Specifically, with regard to probationers with mental illness, it would be beneficial to consider how psychotropic medication and pre-treatment

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severity in psychopathology impact responsiveness to the BA model. With regard to pre-treatment severity of psychopathology, several studies have indicated that pre-treatment severity influences the efficacy of CBT-derived interventions that are disorder-specific (Saxena et al., 2002; Manber et al., 2014; Haagen et al., 2015; Kampman et al., 2007; Katz et al., 2018; Otto et al., 2000). Analyses have also indicated a possible synergistic effect for medication when combined with CBT for both major depression and panic disorder (Furukawa et al., 2006; Cuijpers et al., 2009).

A Note on Psychotropic Medication: The Importance of Compliance in Cognitive Change
Research has documented that common medications for severe mental illness are associated with promoting changes in the brain related to cognitive abilities (Gallhofer et al., 2007; Rodefer et al., 2005; Anacker et al., 2011; Manji et al., 2000). Results have shown that some antipsychotics (e.g., sertindole) may reverse or slow the development of cognitive deficits associated with schizophrenia (Gallhofer et al., 2007; Rodefer et al., 2005). Antidepressants are also associated with neurogenesis in the hippocampus (an area essential for learning; Anacker et al., 2011). Similar results have been found for persons with mood disorders treated with mood stabilizers, with results indicating these medications prevent disease-related cell death (Manji et al., 2000). Considering alterations to cognitions are essential to CBT, regardless of the specific target of treatment, and that medication noncompliance and severe mental illness are important treatment targets for justice-involved populations with mental illness, the influence of medication adherence and pre-treatment symptom severity should be accounted for in the evaluation of interventions with dual diagnosis correctional populations.

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CHAPTER II – Purpose of the Present Study

At present, no known studies have examined HTE within correctional dual diagnosis populations exposed to the BA model. Therefore, the primary objective of this study is to examine HTE as it relates to changes in criminal thinking styles following exposure to CLCO—a program focused heavily on altering these cognitive errors. Considering the evidence for HTE in previous studies examining the efficacy of the BA model (Gaspar et al., 2019; Morgan et al., 2014; Batastini et al., 2020) and elevated rates of risk factors among probationers (Fearn, 2016; Lurigio et al., 2013; Swartz et al., 1998), the primary goal of this analysis is to incorporate a multivariate framework capable of simultaneously modeling both individual differences in responsiveness to treatment and predictors of responsivity. Latent profile analysis (LPA) provides such an approach, as LPA can provide a flexible framework for predicting responsiveness to treatment by classifying individuals into subgroups and identifying unique variables or a cluster of variables that contribute to their success or failure on desired outcomes (Saunders et al., 2020). Using an archival dataset of 206 probationers exposed to CLCO in a residential facility between 2014 and 2018 (see Gaspar et al., 2019 for details on the intervention), a latent profile analysis was conducted using change scores of reactive criminal thinking and proactive criminal thinking subscales as predictors of group membership. This analysis was intended to provide the first empirical explanation for variability in treatment efficacy for reducing criminal thinking patterns. This study will provide clarification on whether subsegments of the sample are either inflating or deflating estimates of treatment-driven longitudinal changes in criminal thinking patterns. In addition to modeling changes in criminal thinking styles, pre-treatment medication compliance and

pre-treatment severity of psychopathology will be included in the analysis as covariates to examine how early intervention with psychotropic medication and baseline severity of psychopathology influence the efficacy of CLCO and contribute to variability in treatment response.

In the context of the BA model, studies either did not account for variability due to individual differences (e.g., Batastini et al., 2020), did not fully integrate differences into the analyses (i.e., percent of reliable change; Morgan et al., 2014), or only considered variability due to gender using univariate approaches (Gaspar et al., 2019). As such, no analysis of the bi-adaptive model has directly examined previously established risk factors for poorer response to treatment (e.g., baseline severity of psychopathology; Saxena et al., 2002; Manber et al., 2014; Katz et al., 2018; Haagen et al., 2015; Kampman et al., 2007; Otto et al., 2000) or variability in responsiveness per change in criminal thinking styles (a core focus of bi-adaptive programs) using a multivariate analytic approach. Therefore, at present, the robustness of the treatment's effectiveness across individuals is unknown, and the extent to which individualized programming is needed to address criminal thinking errors remains unknown.

Further breaking down treatment effects with a sample of probationers with dual diagnoses by examining outcomes at the subgroup level is essential for the field to more accurately capture how well interventions produce their intended outcomes and whether certain types of probationers are more difficult to treat than others. As such, this secondary analysis of treatment efficacy was intended to counter the contemporary overemphasis on aggregate estimates of treatment outcomes and provide a succinct approximation of HTE by accounting for relevant criminogenic (i.e., pro-criminal

attitudes and criminal thinking) and mental health risk factors (i.e., pre-treatment

psychiatric severity and medication compliance).

This study advances the field by expanding contemporary understandings of both risk

factors and protective factors for responsiveness to treatment. Given that previous

estimates of treatment efficacy for RNR-informed interventions (including those that also

target psychiatric factors) focus almost exclusively on population-wide inferences, results

from these studies likely do not reflect an accurate gauge of treatment responsiveness, as

estimates are likely either inflated or underestimated. Therefore, this study addresses the

lack of research examining variability in responsiveness to treatment through the analysis

of subgroups.

CHAPTER III – Research Questions and Hypotheses

To examine heterogeneous treatment effects among dually diagnosed probationers participating in the CLCO program, the following research questions and hypotheses were proposed.

1. Do changes in criminal thinking (as measured by scores on the Psychological Inventory of Criminal Thinking Styles [PICTS] proactive criminal thinking scale [PCT] and reactive criminal thinking scale [RCT]) following exposure to CLCO reflect individual differences in changes in criminal thinking?

Hypothesis 1: Changes in PCT and RCT scores, as measured by post-treatment score minus pre-treatment scores, would be heterogeneous in nature, such that changes would significantly predict membership in two or more latent subgroups, with the least responsive group being characterized by higher levels of proactive criminal thinking per changes scores.

2. Does the severity of a client's pre-treatment psychopathology (as measured by DSM-5 Cross-Cutting total scores) predict post-treatment changes in criminal thinking?

Hypothesis 2: Participants who endorsed higher levels of symptom severity at the start of the intervention would exhibit significantly fewer improvements in criminal thinking, regardless of criminal thinking subtype (i.e., PCT, RCT).

3. Does pre-treatment medication compliance influence the effect of pre-treatment psychopathology on changes in post-treatment criminal thinking?

Hypothesis 3: Participants who endorsed higher levels of compliance regarding the use of prescribed medication and higher levels of pre-treatment psychopathology prior to beginning treatment would exhibit greater improvements in criminal thinking, such that

medication compliance moderates the relationship between pre-treatment severity of psychopathology and response to treatment.

4. Does pre-treatment medication compliance influence the effect of pre-treatment exposure to psychotropic medication on changes in post-treatment criminogenic thinking?

Hypothesis 4: Participants who endorsed more compliance regarding the use of prescribed medication and are exposed earlier to psychotropic medication would exhibit greater improvements in criminal thinking.

5. Does responsiveness to treatment, as assessed by changes in criminal thinking, influence changes in pro-criminal attitudes?

Hypothesis 5: Reductions in PCT and RCT criminal thinking scores would not influence changes in post-treatment pro-criminal attitudes using a multinomial logistic framework, with no comparisons greater than a Bonferroni's adjustment of .002.

CHAPTER IV – Method

Participants

This study represented a secondary analysis using data from 206 probationers who

completed the CLCO program and had 20% or less missing data across the variables of

interest. The sample consisted of individuals with dual diagnoses (i.e., a substance use

disorder and another serious mental disorder) who were mandated to complete a 60-bed

Dual Diagnosis Residential Program (DDRP) as part of the terms of their probation. Prior

to enrollment in the program, residents were assessed as moderate to high-risk by the

Texas Correctional Office on Offenders with Medical and Mental Impairments

(TCOMMI) and had Global Assessment of Functioning (GAF) scores below 50

(Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision, p.

34.).

Participants included in the secondary analysis had an average age of 35.12 years (SD =

10.42) with an average of 10.83 years of education (SD = 2.54), 66% of whom identified

as male (n = 136) and 34% as female (n = 70). Of those who reported their race or

ethnicity, a majority identified as African American (n = 84; 41.80%) or European

American/White (n = 72; 35.80%), with the remainder identifying as Latino/a or Hispanic

(n = 38; 18.90%); Asian American; (n = 5; 2.50%), or Native American; (n = 2; 1.00%).

Most probationers who participated in the CLCO program were charged with drug-

related offenses (n = 96; 51.30%), followed by violent offenses (n = 48; 25.70%) and

non-violent, non-drug offenses (n = 43; 23.00%). An analysis of psychiatric diagnoses as

reported by participants showed that the most common diagnoses were multiple non-

substance use psychiatric diagnoses (i.e., more than one disorder; n = 55; 34.60%) and

bipolar disorder (n = 48; 30.20%), with the remainder reporting depressive/mood

disorders (n = 31; 19.50%), psychotic spectrum disorders (n = 19; 11.90%), posttraumatic

stress disorder (n = 2; 1.00%); anxiety disorders (n = 2; 1.00%); borderline personality

disorder (n = 1; .50%); and impulse control disorder (n = 1; .50%). At time of entry to the

program, 160 participants (77.70%) were prescribed psychotropic medication. A more

comprehensive list of demographic data is included in Table E1.

Summary of Original Treatment Procedures

Program Description. All participants were exposed to approximately 150 hours of the

CLCO protocol, which is a comprehensive and manualized treatment program that

addresses the co-occurring needs of individuals with both mental health and criminogenic

risks (i.e., behaviors that violate social norms, laws, or the rights of others and are

predictive of a criminal lifestyle). Treatment consisted of 73 group-formatted sessions

organized by nine therapeutic modules: (1) Preparing for Change, (2) Mental Illness and

Criminalness Awareness, (3) Medication Adherence, (4) Coping with Mental Illness and

Criminalness Awareness, (5) Problematic Thoughts and Attitudes, (6) Antisocial

Associates, (7) Emotions Management, (8) Skill Development, and (9) Substance Abuse.

Each treatment group consisted of between 10 and 15 participants, and each session

lasted approximately 1 to 2 hours. Sessions were structured similarly, with the first 5 to 7

minutes being dedicated to socialization and an assessment of current functioning

followed by 10 to 15 minutes dedicated to reviewing the information covered in the

previous session, collecting homework, and discussing relevant concerns. The majority of

time in-session focused on acquiring and applying new information (i.e., applying newly

acquired skills to everyday life). Session-specific homework was assigned and reviewed

for completion, and all modules included content quizzes (pre- and post-session) to assess the retention and acquisition of new information. Treatment was delivered by primarily master's level clinicians trained by the program developer. The inclusion of bi-weekly consultation calls with the primary developer of the program ensured fidelity to the program.

Measures

Pre-Treatment Measures. The DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure—Adult (DSM-5 CC; Narrow et al., 2013) and Medication Adherence Rating Scale (MARS; Thompson et al., 2000) were administered to all participants in this study at both pre-and post-treatment. However, as scores on the DSM-5 CC and MARS were used to test hypotheses related to psychiatric severity and medication adherence and, as such, were included in the model as predictors, only participant's pre-treatment measures were included in this analysis. Descriptions of these measures, to include sample items and psychometrics, will be discussed next.

DSM-5 Cross-Cutting. The DSM-5 CC (Narrow et al., 2013; see Appendix A) is a 23-item measure of both the presence and severity of symptoms associated with psychopathology over the past two weeks, with higher scores indicating greater severity and occurrence. The measure assesses 13 mental health domains, including:

Depression (e.g., "Little interest or pleasure in doing things?");

Anger (e.g., "Feeling more irritated, grouchy, or angry than usual?");

Mania (e.g., "Starting lots more projects than usual or doing more risky things than usual?");

Anxiety (e.g., "Feeling panic or being frightened?");

Somatic issues (e.g., "Feeling that your illnesses are not being taken seriously enough?");

Suicidal ideation (e.g., "Thoughts of actually hurting yourself?");

Psychosis (e.g., "Hearing things other people couldn't hear, such as voices even when no one was around");

Sleep issues (e.g., "Problems with sleep that affected your sleep quality over all?");

Memory (e.g., "Problems with memory (e.g., learning new information) or with location (e.g., finding your way home)?");

Repetitive thoughts and behaviors (e.g., "Unpleasant thoughts, urges, or images that repeatedly enter your mind?");

Dissociation (e.g., "Feeling detached or distant from yourself, your body, your physical surroundings, or your memories?");

Personality (e.g., "Not knowing who you really are or what you want out of life?");

Substance use (e.g., "Drinking at least 4 drinks of any kind of alcohol in a single day?").

Estimates of test-retest reliability indicate scores on the DSM-5 CC are stable (Narrow et al., 2013). To date, no research has examined the factor structure of the DSM-5 CC or provided evidence for deriving a total score from the measure. Although previous research has indicated the measure and its subscales exhibit acceptable internal consistency across nationalities (Goel & Kataria, 2018), no research has provided empirical evidence for a general factor of psychopathology based on the DSM-5 CC. Therefore, a two-phase examination of the factor structure of the measure was conducted using a split-sample. A hierarchical confirmatory factor analysis was conducted with the primary sample per results from the exploratory factor analysis. Excluding the Substance use scale due to poor loadings (< .4 across factors; Stevens, 1992), results indicated that

all psychiatric subscales loaded onto a general psychiatric factor via two lower-order factors with standardized loadings of .90 and .89: CFI = .97; TLI = .96; RMSEA = .05, 90% CI [.03, .07]. Internal consistency for the general psychiatric factor in this sample was .92. Of note, these results are congruent with a previous study indicating mental disorders exist along a continuum that constitutes a general p factor (Caspi et al., 2014). Considering the primary objective for this analysis is pre-treatment psychiatric severity, observed scores (summed) from the general psychiatric factor were used in this analysis.

Medication Adherence Rating Scale. The MARS (Thompson et al., 2000; see Appendix B) is a 10-item measure with items covering three domains with dichotomous items: (1) medication adherence behavior (e.g., "Are you careless at times about taking your medicine?"); (2) attitudes toward taking medication (e.g., "It is unnatural for my mind and body to be controlled by medication"); and (3) attitudes toward psychotropic medication (e.g., "I feel weird, like a 'zombie', on medication;" Thompson et al., 2000). A large-scale validation study using a sample of 277 individuals with a psychotic spectrum disorder has shown that the MARS is a reliable measure and exhibits moderate internal consistency (Fialko et al., 2007). Results from Fialko et al. (2007) also confirmed the three-factor structure of the MARS identified in the original validation study by Thompson et al., 2000. Of note, results from Fialko et al. (2007) indicated that the medication adherence behavior factor correlated with staff ratings of adherence ($r = .18$, $p = .01$), had greater internal consistency relative to the overall scale (.67 vs. .60), and accounted for 50.50% of the total variance. Based on these results, Faialko et al. (2007) recommended that only the medication adherence behavior factor be used when the only concern is if medication is being taken. Considering those recommendations, only scores

from the medication adherence behavior factor were used in this analysis. Results from a

hierarchical confirmatory factor analysis indicated the three-factor solution identified by

Fialko et al. (2007) generalized to this sample with all items on the medication adherence

behavior factor having loadings above .60: $\chi^2 = 914.794$, $p = .96$. The internal

consistency for the medication adherence behavior factor was acceptable with a

Cronbach's α value of .78 in the present sample.

Pre-Post Treatment Measures. The Psychological Inventory of Criminal Thinking Styles

(PICTS; Walters, 1995) was administered to all participants in this study at pre- and post-

treatment. Scores at both timepoints were retained and used to calculate change scores.

This approach was chosen due to change scores producing "unbiased estimates of true

change" (Rogosa, 1988, p. 180). As such, these estimates provide an understanding of

how groups differ in terms of change via raw estimates of within-person effects. A

description of the PICTS, including sample items and psychometrics, are provided below.

Psychological Inventory of Criminal Thinking Styles. The PICTS (Walters, 1995; see

Appendix C) is a reliable and valid 80-item measure of criminal thinking styles that

captures cognitive distortions associated with engaging in criminal activities. Previous

research has provided evidence for the instrument's test-retest reliability, internal

consistency, and the predictive validity of factor scales (Walters, 2002; Walters, 2012).

Additionally, in regard to the composite scores for proactive (i.e., goal-directed) and

reactive (i.e., impulsive) criminal thinking, an analysis of construct validity indicated that

these subscales have convergent validity (Walters & Yurvati, 2017). For the current

study, the Psychological Inventory of Criminal Thinking Styles-Short Form (PICTS-SF;

Walters, 2006) was administered to program participants. The PICTS-SF is an

abbreviated 35-item measure using the same 4-point Likert type scale as the full 80-item measure. The PICT-SF does not contain any new or altered items, just fewer of them. Similar to the original version, the PICTS-SF generates two composite scores assessing both proactive and reactive criminal thinking (PCT and RCT, respectively). Details on how the composition of the PCT and RCT were obtained via personal contact with G. D. Walters (September 18, 2019). Total scores on these composite scales are calculated by summing associated subscales. Specifically, PCT scores are derived by summing the following subscales: Entitlement (e.g., "I won't allow anything to get in the way of getting what I want."), Self-Assertion/Deception (e.g., "Breaking the law is no big deal as long as you don't really hurt somebody"), and Historical Criminal Thinking (e.g., "I have helped out friends and family with money I got doing crime."). RCT scores are derived by summing the following subscales: Cutoff (e.g., "The way I look at it, I've paid my dues and have the right to take what I want."), Problem Avoidance (e.g., "Even though I start out with good plans, I can't stay focused and keep 'on track.'"), and Current Criminal Thinking (e.g., "I take the easy way out, even if I know it will get in the way of something bigger I may want later."). The internal consistency of the measure at pre-treatment (Cronbach's α = .94) and post-treatment (Cronbach's α = .94) were excellent.

Post-Treatment Measures. The Measures of Criminal Attitudes and Associates (MCAA; Mills et al., 2002) was administered to all participants at pre- and post-treatment; however, only post-treatment scores on Part B of the MCAA were used in the model as a dependent variable for the present analysis.

The Measures of Criminal Attitudes and Associates. The MCAA (Mills et al., 2002; see Appendix D) is a two-part measure of criminal associates (Part A) and pro-criminal

attitudes (Part B). Part A requires participants to think about the four people with whom they spend the most time and to indicate whether any of these individuals have criminal tendencies. Part B is a 44-item measure of attitudes associated with engaging in criminal behaviors measured with a yes/no response format and includes four scales: (1) Violence (12 items assessing attitudes associated with a willingness to use violence to achieve a desired goal; "It's understandable to hit someone who insults you."), (2) Entitlement (12 items assessing egocentric desires and feelings of entitlement; "Only I should decide what I deserve."), (3) Antisocial Intent (12 items assessing the propensity of an individual to engage in antisocial actions in the future; "I would be open to cheating certain people."), and (4) Associates (10 items assessing relationships with individuals engaged in criminal activities; "I have committed a crime with friends."; Mills et al., 2002). In the present study, only Part B of the MCAA was included in the analysis because these items more directly capture the construct of pro-criminal attitudes. Part B of the MCAA has shown adequate to good internal consistency across scales and criterion validity (Mills et al., 2002). Additionally, Part B has been shown to predict both general and violent recidivism (Mills, Kroner, & Hemmati, 2004). In this sample, the internal consistency of the measure was determined to be good: Cronbach's $\alpha = 84$.

Data Cleaning and Preliminary Analyses

Assessing Mechanisms of Missingness. Prior to removal due to missingness, pre- and post-treatment data were available for 343 of 731 program participants. All missingness was primarily due to not receiving documents from the institution (R. Morgan, personal communication, June 6, 2020). Using all participants with data at both timepoints, results from Little's MCAR test indicated the data were not missing systematically, $\chi^2 =$

1474.920, *df* = 1448, *p* = .31. Removal of participants with 20% or more missing values

(*n* = 137) resulted in a dataset of 206 participants. The elimination of individuals that did

not report their medication status (*n* = 16) resulted in a final sample of 190 participants.

To limit the influence of spurious variability on the estimation of latent profiles,

recipients' responses were analyzed using both person-total correlations and longstring

values to identify and remove careless responders (Curran, 2016; Meade & Craig, 2014).

Longstring values were determined to be appropriate for identifying careless responding

in this analysis due to the sample consisting exclusively of persons with a history of

engaging in criminal activities. As such, each participant would be expected to express

both some degree of criminal thinking as well as variability in criminal thinking patterns.

In the pre-treatment sample, each participant consecutively endorsed the same response

7.38 times on average (*SD* = 6.83) with a range of 2 to 35. After graphing these data, a

cut-off value of 10 was determined to be appropriate for this sample per the cut-off value

graph. Additionally, those with negative person-total correlations were removed. Post-

treatment responses to the PICTS-SF were assessed using only negative person-total

correlations. Given participants were exposed to an intervention, longstring values would

not differentiate persons who were highly responsive to treatment from those who

repeatedly chose the lowest possible values. Hence, only negative person-total

correlations were used for assessing post-treatment responses. After the removal of

problematic cases (n = 45), the final sample consisted of 145 participants.

Analyses were conducted to determine if individuals who were removed from analyses

differed from those who were retained with regard to primary outcomes of interest using

a Bonferroni-corrected p-value of .002. Due to significant deviations from normality,

independent-samples median tests were conducted for comparisons. Results indicated

that these two groups did not significantly differ with the exception of medication

adherence behavior, $\chi^2 = 11.04$, $df = 1$, $p = .001$. This comparison indicated that those

removed from the dataset reported greater levels of medication adherence relative to the

grand median. Using the MARS scale, the 44 careless responders had significantly higher

longstring values, $t(188) = 1.84$, $p = .03$. This indicates that these results are likely due to

response biases and not qualitative differences.

Imputation. After the removal of careless responders, the dataset (N = 145) was

reassessed using Little's MCAR test. Missing values were again found to not be missing

systematically, $\chi^2 = 379.97$, $df = 401$, $p = .84$. These results were confirmed via a non-

parametric test, $p = .61$. In regard to the number of missing values, the percentage of

missing values for each item ranged from 0% to 3.40%, with the majority of items

missing no values (36.42%). Given these findings, an item-level imputation using an

expectation-maximization algorithm was deemed feasible. This approach was used in lieu

of multiple imputation due to previous simulations showing this method produces

estimates comparable to multiple imputation without some of the difficulties associated

with implementing multiple imputation (e.g., scattered values) (Gómez-Carracedo et al.,

2014). To assess the feasibility of results, Kolmogorov–Smirnov tests were used to

compare the distribution of cases with and without missing values with regard tober the

primary variables of interest. These tests found the distributions to be similar, with p-

values ranging from .44 to .99.

CHAPTER V – Analytical Plan and Procedures

To test hypothesis 1, a latent profile analysis was conducted. Given that heterogeneity

was modeled using LPA, the classification of participants uses a probabilistic model to

identify latent differences in responsiveness to treatment using observed change scores.

This approach is superior to classic clustering methods, as previous approaches to

classification neither provided estimates of classification error nor allow for the

relationship between indices of profile membership to be specified (Berlin et al., 2014;

Madhulatha, 2012). The inclusion of classification error is a significant advantage, as

alternative approaches to examining heterogeneity in treatment effects are not capable of

incorporating uncertainty into the model and therefore erroneously treat groups as

observed. Furthermore, the use of latent class mixture models for examining

heterogeneity in treatment effects is well established in the literature, with previous

studies using this analytic framework to test the presence of subgroups with no-response

to treatment and estimate treatment effects per latent group (Sobel & Muthen, 2012; Shen

& He, 2015). To properly classify unobserved groups, after selecting appropriate

indicators for membership, the analysis requires an enumeration phase with model

selection determined per the results of enumeration indices (Peugh, 2013).

Indicators of Profile Membership

To assess heterogeneity in treatment effects, a latent profile analysis (LPA) was

conducted using change scores (time 2 minus time 1) for subscales capturing proactive

and reactive criminal thinking patterns. Therefore, change scores were derived from the

following subscales of the PICTS-SF and used as predictors of profile membership: (1)

Entitlement; (2) Self-Assertion/Deception; (3) Cutoff; (4) Problem Avoidance; (5)

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Current Criminal Thinking; and (6) Historical Criminal Thinking. Due to some model indices being derived from the same subscale, the assumption of conditional dependence was relaxed with associated indices allowed to covary. Change scores were used as predictors in this analysis because these values are mathematically indistinguishable from analyses used in previous studies examining the bi-adaptive model's effectiveness: repeated measures ANOVA and, therefore, paired t-tests (Anderson et al., 1980).

CHAPTER VI – Results

Primary Analyses

Enumeration Phase. During the enumeration phase of the analysis, initial models with 1

to 6 profiles were estimated using both fixed and freely estimated error variances and

covariances (to determine the best possible fit for the data). The enumeration phase was

conducted due to the absence of empirical evidence for a specific number of profiles.

Rather than employing maximum likelihood estimation, model estimation was conducted

using a Bayesian approach: posterior mode (i.e., parameters were normalized through the

inclusion of an evenly distributed number of artificial observations (Vermunt &

Magidson, 2005). This approach was chosen as the inclusion of information derived from

the observed distribution prevents extreme parameter estimates in the model (e.g., zero

error variance). In the analysis, a Bayes constant of 1 was chosen for the analysis. With

moderate sample sizes, the inclusion of a Bayes constant of 1 has a negligible influence

on the estimation of parameters and will not likely result in the convergence of

underidentified models (Vermunt & Magidson, 2005).

Enumeration Indices and Estimates of Effectiveness. The appropriateness of model fit to

the observed data was assessed with multiple indices of relative fit, including but not

limited to Akaike Information Criterion (AIC), Bayesian information criterion (BIC), and

bivariate residuals. Results (see Table E2) showed that the 4-profile model provided the

optimal fit per the Akaike information criterion (AIC) and Akaike Information Criteria 3

(AIC3). While shifts in bivariate residuals provided evidence for the 6-profile solution, it

is important to consider that residuals will decrease as a function of increasing the

number of profiles. Moreover, the BIC and consistent Akaike information criterion

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indicated that the sample was homogenous (i.e., a 1-profile solution). However, this is likely due to these estimates incorporating larger penalties for the addition of parameters and is therefore likely an artifact of relaxing the assumption of local independence (Lukočienė et al., 2016). Comparisons of fixed versus freely estimated models indicated that the freely estimated model provided a superior fit given observed data per bivariate residuals, entropy, and estimates of both AICs and SABICs. Beyond quantitative evidence, the freely estimated model (i.e., the model with class-specific variances and covariances) is more theoretically consistent, as treatment recipients are unlikely to exhibit identical degrees of change after exposure to treatment. Thus, this model likely better captures individual differences in response to treatment (Table E3).

Mean change scores were used to label each profile. Profile 1 ($n = 15.82$) exhibited large decreases across dimensions of proactive and reactive criminal thinking. As such, it was labeled the high-response profile (High-Response). In contrast, Profile 2 ($n = 14.08$) was characterized by large increases across dimensions of criminal thinking and was labeled the iatrogenic profile (Iatrogenic). Profile 3 ($n = 69.38$) was characterized by gains in dimensions of reactive criminal thinking but minimal change across dimensions of proactive criminal thinking. Given this pattern of change typifies patterns found in previous analyses, this profile is labeled the prototypical profile (Prototypical). Profile 4 ($n = 45.72$) exhibited significant increases on the Historical Content scale and the Self-Assertion/Deception factor. Additionally, these individuals showed minimal gains across all other dimensions of criminal thinking. This combination of elevations is interpreted to indicate an increase in one's awareness of criminal thinking patterns. Given these results, this profile was labeled the insight profile (Insight). See Table E4 for these results.

Secondary Analyses

Given an entropy of .83, it was determined that profiles were differentiated enough to conduct secondary analyses, as values of .80 and above indicate an adequate distinction between profiles (Celeux & Soromenho, 1996). Moreover, the average posterior was high across profiles, Prototypical (.88), Insight (.84), Iatrogenic (.94), and High-Response (.91). To test hypothesis 2, the predictor (DSM-5 psychopathology [p] factor scores) were regressed onto the profiles using a three-step approach with effect coding. Therefore, the analyses used classification weights generated from the latent profile model to generate bias-adjusted estimates using a multinomial logistic framework (Bolck et al., 2004; Vermunt, 2010). This approach was chosen due to simulations conducted by Nylund-Gibson & Masyn (2016) indicating covariate effects result in overextraction during the enumeration phase of the analysis or alter parameters via introducing unspecified relationships between covariates and indicators of profile membership (Petras & Masyn, 2010).

Pre-treatment Severity of Psychopathology and Medication Compliance. To test hypothesis 2, the profiles were regressed onto the predictor (DSM-5 psychopathology [p] factor scores) using a three-step approach with effect coding and maximum likelihood estimation. Results indicated that pre-treatment severity of psychopathology did not differentiate the groups, $p = .23$ (Table E5). To assess hypothesis 3, using the Prototypical profile as a reference group and proportional maximum likelihood, a second regression was conducted with an interaction term for pre-treatment medication compliance and pre-treatment severity of psychopathology (Heron et al., 2015). These results showed that medication compliance did not moderate the effects of pre-treatment

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severity of psychopathology, $p = .36$. To assess hypothesis 4, using the same framework, a second regression with an interaction term for pre-treatment medication compliance and pre-treatment exposure to psychotropic medication was conducted. These results showed that medication compliance did not moderate the effects of pre-treatment exposure to psychotropic medication, $p = .09$. Therefore, neither hypothesis 3 nor 4 were supported by the analyses (Table 5).

Post-Treatment Pro-Criminal Attitudes. To assess hypothesis 5 (i.e., the stability of change in pro-criminal attitudes per changes in criminal thinking patterns), the four subscales of the MCAA Part B were included as dependent variables; each profile was compared in terms of post-treatment pro-criminal attitudes using effect coding and the Bolck, Croon, and Hagenaars approach (Bolck et al., 2004). Results suggested that profiles differed significantly per pro-criminal attitudes following treatment, with p-values ranging from $p < .001$ to .49 (Table 5). Paired comparisons found significant differences below the adjusted alpha of .002 only within the domain of attitudes supportive of violence. Within this domain, the Iatrogenic group exhibited significantly higher levels of attitudes supportive of violence ($p < .002$ for all comparisons to the Iatrogenic profile). No other comparisons between profiles were found to be below the adjusted alpha. As such, hypothesis 5 was partially supported by these results.

Post Hoc Analyses

Profile Membership and Attitudes toward Treatment and Offense Type. To assess if results were influenced by attitudes toward treatment, profiles were modeled as predictors of satisfaction with services, as measured by the Client Satisfaction Questionnaire-8 (CSQ-8; Larsen et al., 1979) at post-treatment. With a score range of 8 to 32, the CSQ-8

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assesses general satisfaction with care services and has been validated with samples of persons seeking services for substance use in a residential setting (Kelly et al., 2018). Results indicated that profiles did not differ in terms of satisfaction with the CLCO program, $p = .24$. The role of offense type was examined by comparing persons with a violent offense to those with other types of offenses; results found that a previous violent offense was not predictive of profile membership: $p = .15$.

Profile Membership and Diagnostic Group. As noted, results of the primary analyses indicated that pre-treatment severity of psychopathology did not differentiate the profiles (i.e., responsiveness to treatment). These results are surprising given the diversity of disorders included in this study, which are typically associated with a range of symptom severity levels. For example, research has indicated that depressive symptoms are more severe in persons with bipolar disorder compared to persons with unipolar depression (Mitchell et al., 2011). Similarly, persons with schizoaffective disorders have been shown to exhibit a greater number of cognitive symptoms (e.g., difficulties with verbal memory) in comparison to persons with non-psychotic bipolar disorder (Torrent et al., 2007). An additional post-hoc analysis indicated that diagnostic category did predict group membership ($p < .001$). Specifically, a pattern emerged for those reporting a previous diagnosis of a psychotic spectrum disorder. Those individuals were significantly more likely to belong in the Iatrogenic profile ($p < .001$) and significantly less likely to belong in the High-Response profile ($p < .001$). Results also indicated that those reporting a previous diagnosis of bipolar disorder were more likely to belong to the High-Response group ($p = .003$). No other relationships were found to be significant.

CHAPTER VII – Discussion

The primary objective of this study was to examine differences in response to treatment in a sample of justice-involved persons with a dual-diagnosis receiving services in a residential correctional setting. Secondly, this study sought to identify factors contributing to differential outcomes for program participants (i.e., pre-treatment severity of psychopathology and medication compliance). This study represents the first attempt to examine how individual differences influence the effectiveness of *CLCO* per changes in criminal thinking.

Indicating notable variability in responsiveness, results from a latent profile analysis found a four-profile solution, with each profile exhibiting a distinct pattern of change over the course of treatment. These results were congruent with the *a priori* hypothesis that responsiveness to the *CLCO* program would be heterogeneous in nature. The most common profile (approximately 45% of the sample) consisted of participants exhibiting notable reductions in reactive (or more impulsive styles of) criminal thinking and marginal changes in proactive (or more planful styles of) criminal thinking. This pattern of change is consistent with previous estimates of *CLCO*'s effectiveness (e.g., Morgan et al., 2014). The second most common profile (approximately 32% of the sample) was characterized by notable increases in historical (or past instances of) criminal thinking. For these individuals, with the exception of a measure that captures a more planful form of criminal thinking (i.e., the Self-Assertion/Deception factor), no other indicators of criminal thinking showed appreciable changes. Of note, this 10-item subscale shares eight items with the Historical scale. These results were conceptualized as an increase in awareness for these participants, as they exhibited an increase in their awareness of past

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instances of criminal thinking but showed no indication of change in criminal thinking patterns. The two smallest profiles consisted of those expressing notable decreases across all dimensions of criminal thinking (i.e., a high response group, ~11% of the sample), and a cluster of individuals exhibiting a notable increase across measures of criminal thinking styles (i.e., Self-Assertion/Deception factor) an iatrogenic group; ~9% of the sample). Results suggested that individuals in the iatrogenic group likely have a psychotic spectrum disorder.

While results indicated that a majority of program participants exhibited a pattern of change similar to those observed in previous analyses of the bi-adaptive model's effectiveness (i.e., notable change in reactive criminal thinking and marginal change in proactive criminal thinking), findings suggested that previous estimates of change in reactive criminal thinking may have been underestimated. After modeling heterogeneity in treatment response, results estimated that approximately 58.710% of participants showed large drops in reactive criminal thinking with an average Cohen's d of -1.53 for the dimensions of reactive criminal thinking. These estimates are notably larger than previous approximations of effectiveness: Cohen's d's of .54 and .84 (Gaspar et al., 2019; Morgan et al., 2014, respectively). As such, previous estimates likely provide an attenuated representation of change for the majority of persons exposed to *CLCO* when examining reactive criminal thinking. These discrepancies in effect size estimates highlight the need to consider individual differences in response, as smaller segments of this sample appeared to drive reductions in estimates of effectiveness.

With regard to proactive criminal thinking, the results of the present study indicated that aggregate estimates of change are largely accurate and not necessarily influenced by

different participant characteristics. There are two possible explanations worth considering for the lack of change in proactive styles that may be occurring separately or simultaneously. First, it is possible that proactive criminal thinking is a more engrained style of cognitive processing that takes more time to see meaningful reductions. Second, and perhaps because of the first, there are deficiencies in the *CLCO* program, i.e., *CLCO*, in its current iteration, is less effective at addressing this dimension of criminal thinking. These deficits may include dosage (i.e., 150 hours of treatment is not enough) or the content of programming. Of note, this pattern of change has been found in other studies of CBT-informed interventions and is therefore unlikely unique to *CLCO* (Walters, 2009). Using a sample of 47 medium security, male, federal inmates exposed to a brief skills-based intervention for anger management, Walters (2009) found that skills-based interventions are generally ineffective at modifying proactive criminal thinking (i.e., Cohen's *d* of .06 vs. .31 for reactive criminal thinking). As such, CBT-informed interventions, which often focus primarily on the acquisition of skills and altering thought processes, may not sufficiently address the proactive dimension regardless of name brand. Taken together, results confirm that *CLCO* is more effective (even beyond previous estimates) at altering reactive criminal thinking styles, but it appears modifications are needed to better address proactive criminal thinking styles.

Of the factors explored as possible explanations for differences in responsiveness, none were found to predict response to treatment. Contrary to initial hypotheses, medication adherence did not influence other predictors (i.e., pre-treatment severity of psychopathology or psychotropic medication) of responsiveness to treatment. These findings suggest that the inclusion of psychotropic medication may not produce a

synergistic effect for persons with mental illness receiving services for co-occurring criminogenic needs. However, these results may be the result of the indirect effects of medication: a meta-analysis found evidence supporting positive outcomes for combined treatment approaches, but also that psychopharmacological interventions and psychosocial interventions work largely independently of each other (Cuijpers et al., 2014). Similarly, these findings may indicate that the maintenance of criminal thinking is largely independent from psychopathology.

Also unexpected, results suggested that changes in pro-criminal attitudes were influenced by changes in criminal thinking styles, particularly for the ~9% of participants who regressed during treatment. These results suggest criminal thinking and pro-criminal attitudes are not exclusive, and that the relationship between pro-criminal attitudes (particularly attitudes towards violence) and pro-criminal thinking may not be attenuated during treatment. These results may be related to *CLCO*'s approach to addressing these domains of antisocial cognitions, with programming largely treating these concepts similarly and thus addressing both simultaneously. However, these areas may require interventions that more explicitly focus on pro-criminal attitudes and cognitions as separate constructs to ensure the appropriate degree of intensity of programming.

Lastly, the hypothesis that pre-treatment severity of psychopathology would differentiate the profiles was also not supported. Furthermore, results of post hoc analyses showed that only a previous self-reported diagnosis of a psychotic spectrum disorder predicted signs of iatrogenesis. One possible explanation may have to do with the unique learning processes for those with psychotic disorders. Research has shown that those with psychotic spectrum disorders show deficits in sensitivity to reinforcement, which is

central to shaping new behaviors (Barch et al., 2017). Thus, they may have more

difficulty retaining and acquiring information that is often reinforced through feedback

and therapeutic activities (e.g., homework). Outcomes for these participants could also be

influenced by cognitive deficits; that is, persons with psychotic spectrum disorders have

been shown to have relatively poor cognitive abilities (i.e., working memory, verbal

memory, and visual memory; Vargas et al., 2018). Given these difficulties, the lack of

response in comparison to the other diagnostic groups is not surprising. However, it is

important to note that not all individuals with a psychotic spectrum disorder regressed

during treatment. As such, results indicate the need for individual monitoring and

individualized treatment planning for these individuals.

Clinical Implications

In general, these results suggest that *CLCO* can be a first-line treatment for persons with

co-occurring psychiatric risks and impulsive criminal cognitions, as the majority of

participants exhibited a notable change in reactive criminal thinking and neither pre-

treatment severity of psychopathology nor most diagnostic categories predicted failure to

respond to treatment. Clinicians are encouraged to assess for the presence of psychiatric

needs among justice-involved persons and, when possible, divert these individuals to

programming using the bi-adaptive model. Of mention, regarding persons with a previous

diagnosis of a psychotic spectrum disorder, results suggested these individuals are at risk

for poorer treatment outcomes and may need additional care to accommodate disease-

related cognitive deficits (i.e., increased hours of treatment, an increased focus on

motivation to change, easier to comprehend materials, and greater repetition of concepts),

and closer monitoring of progress in treatment. These individuals may also benefit from

supplemental treatments as well. This consideration highlights the need for a thorough assessment upon entering the justice system and the importance of strategically linking assessment and treatment planning.

Further, and as noted earlier, results suggested aggregate estimates of change in proactive criminal thinking are likely accurate, with a majority of the sample showing a marginal change in proactive criminal thinking. Therefore, it appears that to achieve changes in proactive criminal thinking, additional attention and clinical considerations are needed. First, these results indicated that additional screening for relatively elevated levels of proactive criminal thinking might be beneficial as a means for identifying participants needing more intensive and individualized program modifications. Second, and related to the first point, established programming may need to include other components or structural changes to better address this dimension of criminal thinking. Proactive criminal thinking is more strongly associated with characterological problems such as emotional callousness (Walters, 2016) that are not directly addressed by *CLCO*. Therefore, one consideration for clinicians implementing *CLCO* is the use of techniques from interventions designed to address both characterological problems and associated distortions in information processing (e.g., mentalization-based therapy; Bateman & Fonagy, 2016). The inclusion of exercises that simultaneously address contingencies and mental states associated with engaging in problematic behaviors (e.g., a chain analysis exercise from dialectical behavior therapy; Linehan, 2014) may also be useful. Clinicians may also consider addressing criminal thinking styles and pro-criminal attitudes separately while also acknowledging the relationship between these constructs. Relatedly more explicit focus on addressing and altering attitudes towards violence as well as

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directly challenging the desire to engage in criminal behaviors may be needed to see more significant changes across both constructs. That is, programming may need to directly challenge justifications for engaging in criminal activities and explicitly address attitudes supportive of violence. Beyond program modifications, results also indicate the need for clinicians to further evaluate changes in proactive criminal thinking over the course of treatment and identify factors impacting this change. Of course, if modifications are made to protocols, clinicians are strongly encouraged to monitor areas of concern (i.e., proactive criminal thinking) to ensure such changes are beneficial and result in clinically significant change.

Limitations and Future Directions

There are several limitations that must be taken into consideration to understand the extent of these findings. First, despite sufficient power, the sample size used in this study was relatively small for the analysis conducted, which may have resulted in a limited range of profiles. As such, future studies examining individual differences in response to treatment would likely benefit from larger samples to ensure the optimal extraction and identification of differences in treatment response. Second, this analysis was not able to account for measurement error. With access to larger samples, researchers are encouraged to examine differences in responsiveness using latent change scores, which provide more accurate estimates of change while accommodating errors in measurement. Third, while post-hoc assessments of careless responding were included in this study, research has indicated that estimates of completion time and psychometric synonyms/antonyms (i.e., indices of consistent responding) are more effective at identifying careless responding (Goldammer et al., 2020). Fourth, all measures of pre-

and post-treatment functioning were based on participants' self-report. For example, participants may have misremembered their psychiatric diagnosis or incorrectly believed they had been given a certain diagnosis. It is also possible participants were misdiagnosed by a previous provider/s or may no longer meet criteria for their reported disorder. If participants did not accurately report their diagnoses, it is possible that profiles were not as diverse in terms of clinical presentation as they may have seemed. Similarly, while random responding was assessed, participants may have misrepresented their compliance with medication.

Future studies would benefit from thoroughly assessing participants for psychological symptoms and disorders at pre-, post-, and follow-up treatment timepoints to ensure comparisons are more valid and reliable when contrasting different diagnostic categories' responses to treatment. Similarly, participants may have been poor informants regarding their medication status and pre-treatment compliance. Future studies would also benefit from the inclusion of staff observations or medical records to better determine which medications clients are being prescribed and whether they are perceived as compliant by those administering medications. Perhaps more importantly, the effectiveness of treatment was evaluated using self-reported changes in criminal thinking, not equivalent to behavioral change (e.g., recidivism reduction, obtaining employment, fewer positive urine analyses). Likewise, this study did not account for maintenance of treatment gains due to a lack of follow-up assessment; thus, it is unclear if reductions in criminal thinking (particularly reactive) were maintained over time. Future studies are encouraged to include behavioral data and follow-up periods to determine if changes in cognitions following exposure to *CLCO* translates to long-term reductions in criminal activity or

other criminogenic risk factors. While clinicians were supervised by the developer of *CLCO*, standardized assessments of fidelity were not integrated into the protocol. As such, variability due to lack of fidelity or differences in therapeutic approach cannot be ruled out in this study. Similarly, this study did not directly include factors associated with the therapeutic process (e.g., working alliance). Therefore, future research should examine how common therapeutic factors interact with risk factors in terms of response to treatment per compliance and engagement. Finally, future studies should focus on other individual characteristics (e.g., gender, age, race, offense type, offense history) associated with non-responsiveness to treatment in conjunction with predictors of poorer outcomes to better inform screening and treatment planning.

CHAPTER VIII – Conclusion

Results from these analyses indicated that CLCO is effective at addressing reactive criminal thinking with previous estimates likely suppressed by smaller segments of the sample. However, in its current form, CLCO appears less equipped to address changes in proactive criminal thinking. Furthermore, results were not dependent on pre-treatment severity of psychopathology or medication adherence. Although some individuals showed a negative response to treatment, the totality of these findings suggest that CLCO produces comparable results across the majority of diagnostic categories, with increased variability in responsiveness for those with a psychotic spectrum disorder. Results highlight the need to examine individual differences when determining program effectiveness, to assess individuals on their most predominant style of criminal thinking pre-treatment, and to consider modifications that may better target proactive criminal thinking and prevent iatrogenic effects for those with psychotic presentations.

– Psychological Inventory of Criminal Thinking Styles-Short Form

(Adapted Format)

1) I won't allow anything to get in the way of getting what I want.	o Strongly Agree o Agree o Uncertain o Disagree
2) Even though I start out with good plans, I can't stay focused and keep "on track."	o Strongly Agree o Agree o Uncertain o Disagree
3) When problems build up, I say "the hell with it" and use drugs or commit a crime.	o Strongly Agree o Agree o Uncertain o Disagree
4) The way I look at it, I've paid my dues and have the right to take what I want.	o Strongly Agree o Agree o Uncertain o Disagree
5) The more I got away with crime, the more I thought there was no way the police would ever catch me.	o Strongly Agree o Agree o Uncertain o Disagree
6) Breaking the law is no big deal as long as you don't really hurt somebody.	o Strongly Agree o Agree o Uncertain o Disagree
7) I have helped out friends and family with money I got doing crime.	o Strongly Agree o Agree o Uncertain o Disagree
8) I don't stop and think about the problems I cause until it's too late.	o Strongly Agree o Agree o Uncertain o Disagree

9) When I get fed up I say "fuck it" and then do something careless, wild, or just plain stupid.	o Strongly Agree o Agree o Uncertain o Disagree
10) I take the easy way out, even if I know it will get in the way of something bigger I may want later.	o Strongly Agree o Agree o Uncertain o Disagree
11) Many times, I start something but never finish it.	o Strongly Agree o Agree o Uncertain o Disagree
12) When it's all said and done, society owes me	o Strongly Agree o Agree o Uncertain o Disagree
13) I don't have to work so hard, things will work themselves out.	o Strongly Agree o Agree o Uncertain o Disagree
14) I have used alcohol or drugs to calm my nerves before committing a crime.	o Strongly Agree o Agree o Uncertain o Disagree
15) On the streets I told myself I needed to rob or steal in order to continue living the way I deserve to live.	o Strongly Agree o Agree o Uncertain o Disagree
16) When people ask me why I did my crime, I point out how hard my life has been.	o Strongly Agree o Agree o Uncertain o Disagree
17) I want to do the right thing, but I have trouble making it happen.	o Strongly Agree o Agree o Uncertain o Disagree

18) There have been times in my life when I felt the law didn't apply to me.	o Strongly Agree o Agree o Uncertain o Disagree
19) I tend to act without thinking when I'm under stress.	o Strongly Agree o Agree o Uncertain o Disagree
20) I tend to put off until tomorrow what I should do today.	o Strongly Agree o Agree o Uncertain o Disagree
21) Although I always knew that I might get caught, I told myself that there was "no way they would catch me this time."	o Strongly Agree o Agree o Uncertain o Disagree
22) I have a hard time thinking through the good and bad things that could come from my plans.	o Strongly Agree o Agree o Uncertain o Disagree
23) I say to myself, "the hell with working a regular job, I'll just take what I want."	o Strongly Agree o Agree o Uncertain o Disagree
24) On the streets, I thought I could use drugs and not get addicted.	o Strongly Agree o Agree o Uncertain o Disagree
25) I am easily sidetracked so that I almost never finish what I start.	o Strongly Agree o Agree o Uncertain o Disagree
26) I have trouble controlling my angry feelings.	o Strongly Agree o Agree o Uncertain o Disagree

27) I am a special person, so my situation usually needs special attention	o Strongly Agree o Agree o Uncertain o Disagree
28) When I set goals I often do not reach them because I am sidetracked by things going on around me.	o Strongly Agree o Agree o Uncertain o Disagree
29) When I get fed up, I say "fuck it" or "the hell with it."	o Strongly Agree o Agree o Uncertain o Disagree
30) There have been times when I felt I had the right to break the law so I could pay for something I wanted.	o Strongly Agree o Agree o Uncertain o Disagree
31) I never thought about the end result of what I did before I got locked up.	o Strongly Agree o Agree o Uncertain o Disagree
32) When I first started breaking the law I was very careful, but after I didn't get caught, I believed that I could do just about anything and get away with it.	o Strongly Agree o Agree o Uncertain o Disagree
33) I broke plans with my family so that I could hang out with my friends, use drugs or do crimes.	o Strongly Agree o Agree o Uncertain o Disagree
34) I tend to push problems to the side rather than deal with them.	o Strongly Agree o Agree o Uncertain o Disagree
35) I have used good behavior (like not doing crime for a while) or bad situations (like a fight with a girlfriend) as an excuse to commit a crime or use drugs.	o Strongly Agree o Agree o Uncertain o Disagree

– Measures of Criminal Attitudes and Associates(Adapted Format)

(Adapted Format)

Part A	
Consider the 4 adults you spend the most time with in the community, when you answer Part A. No names please of the people you are referring to. Then answer the questions to the best of your knowledge.	
1) How much of your free time do you spend with person #1?	o Less than 25% o 25%-50% o 50%-75% o 75%-100%
2) Has person #1 ever committed a crime?	o Yes o No
3) Does person #1 have a criminal record?	o Yes o No
4) Has person #1 ever been to jail?	o Yes o No
5) Has person #1 tried to involve you in a crime?	o Yes o No
6) How much of your free time do you spend with person #1?	o Less than 25% o 25%-50% o 50%-75% o 75%-100%
7) Has person #2 ever committed a crime?	o Yes o No
8) Does person #2 have a criminal record?	o Yes o No
9) Has person #2 ever been to jail?	o Yes o No
10) Has person #2 tried to involve you in a crime?	o Yes o No
11) How much of your free time do you spend with person #3?	o Less than 25% o 25%-50% o 50%-75% o 75%-100%
12) Has person #3 ever committed a crime?	o Yes o No
13) Does person #3 have a criminal record?	o Yes o No
14) Has person #3 ever been to jail?	o Yes o No
15) Has person #3 tried to involve you in a crime?	o Yes o No

16) How much of your free time do you spend with person #4?	o Less than 25% o 25%-50% o 50%-75% o 75%-100%
17) Has person #4 ever committed a crime?	o Yes o No
18) Does person #4 have a criminal record?	o Yes o No
19) Has person #4 ever been to jail?	o Yes o No
20) Has person #4 tried to involve you in a crime?	o Yes o No
PART B	
Please answer all the questions.	
21) It's understandable to hit someone who insults you.	o Disagree o Agree
22) Stealing to survive is understandable.	o Disagree o Agree
23) I am not likely to commit a crime in the future.	o Disagree o Agree
24) I have a lot in common with people who break the law.	o Disagree o Agree
25) There is nothing wrong with beating up a child.	o Disagree o Agree
26) A person is right to take what is owed them, even if they have to steal it.	o Disagree o Agree
27) I would keep any amount of money I found.	o Disagree o Agree
28) None of my friends have committed crimes.	o Disagree o Agree
29) Sometimes you have to fight to keep your self-respect.	o Disagree o Agree
30) I should be allowed to decide what is right wrong.	o Disagree o Agree
31) I could see myself lying to the police.	o Disagree o Agree
32) I know several people who have committed crimes.	o Disagree o Agree
33) Someone who makes you very angry deserves to be hit.	o Disagree o Agree
34) Only I should decide what I deserve.	o Disagree o Agree
35) In certain situations, I would try to outrun the police.	o Disagree o Agree

36) I would not steal, and I would hold it against anyone who does.	o Disagree o Agree
37) People who get beat up usually had it coming.	o Disagree o Agree
38) I should be treated like anyone else no matter what I've done.	o Disagree o Agree
39) I would be open to cheating certain people.	o Disagree o Agree
40) I always feel welcomed around criminal friends.	o Disagree o Agree
41) It's alright to fight someone if they stole from you.	o Disagree o Agree
42) It's wrong for a lack of money to stop you from getting things.	o Disagree o Agree
43) I could easily tell a convincing lie.	o Disagree o Agree
44) Most of my friends don't have criminal records.	o Disagree o Agree
45) It's not wrong to hit someone who puts you down.	o Disagree o Agree
46) A hungry man has the right to steal.	o Disagree o Agree
47) Rules will not stop me from doing what I want.	o Disagree o Agree
48) I have friends who have been to jail.	o Disagree o Agree
49) Child molesters get what they have coming.	o Disagree o Agree
50) Taking what is owed you is not really stealing.	o Disagree o Agree
51) I would not enjoy getting away with something wrong.	o Disagree o Agree
52) None of my friends has ever wanted to commit a crime.	o Disagree o Agree
53) It's not wrong to fight to save face.	o Disagree o Agree
54) Only I can decide what is right and wrong.	o Disagree o Agree
55) I would run a scam if I could get away with it.	o Disagree o Agree
56) I have committed a crime with friends.	o Disagree o Agree
57) Someone who makes you really angry shouldn't complain if they get hit.	o Disagree o Agree

58) A person should decide what they deserve out of life.	○ Disagree ○ Agree
59) For good reason, I would commit a crime.	○ Disagree ○ Agree
60) I have friends who are well known to the police.	○ Disagree ○ Agree
61) There is nothing wrong with beating up someone who asks for it.	○ Disagree ○ Agree
62) No matter what I've done, it's only right to treat me like everyone else.	○ Disagree ○ Agree
63) I will not break the law again.	○ Disagree ○ Agree
64) It is reasonable to fight someone who cheated you.	○ Disagree ○ Agree
65) A lack of money should not stop you from getting what you want.	○ Disagree ○ Agree
66) I would be happy to fool the police.	○ Disagree ○ Agree

– Medication Adherence Rating Scale

No.	Questionnaire	Question Answer
1.	Do you ever forget to take your medication?	Yes/No
2.	Are you careless at times about taking your medication?	Yes/No
3.	When you feel better, do you sometimes stop taking your medication?	Yes/No
4.	Sometimes if you feel worse when you take the medication, do you stop taking it?	Yes/No
5.	I take my medication only when I am sick	Yes/No
6.	It is unnatural for my mind and body to be controlled by medication	Yes/No
7.	My thoughts are clearer on medication	Yes/No
8.	By staying on medication, I can prevent getting sick.	Yes/No
9.	I feel weird, like a "zombie" on medication	Yes/No
10.	Medication makes me feel tired and sluggish	Yes/No

DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure—Adult

Name: _____   Age: _____   Sex: ☐ Male ☐ Female   Date:_____

If this questionnaire is completed by an informant, **what is your relationship with the individual?** _____
In a typical week, approximately how much time do you spend with the individual? _____ hours/week

Instructions: The questions below ask about things that might have bothered you. For each question, circle the number that best describes how much (or how often) you have been bothered by each problem during the **past TWO (2) WEEKS**.

	During the past **TWO (2) WEEKS**, how much (or how often) have you been bothered by the following problems?	None Not at all	Slight Rare, less than a day or two	Mild Several days	Moderate More than half the days	Severe Nearly every day	Highest Domain Score (clinician)
I.	1. Little interest or pleasure in doing things?	0	1	2	3	4	
	2. Feeling down, depressed, or hopeless?	0	1	2	3	4	
II.	3. Feeling more irritated, grouchy, or angry than usual?	0	1	2	3	4	
III.	4. Sleeping less than usual, but still have a lot of energy?	0	1	2	3	4	
	5. Starting lots more projects than usual or doing more risky things than usual?	0	1	2	3	4	
IV.	6. Feeling nervous, anxious, frightened, worried, or on edge?	0	1	2	3	4	
	7. Feeling panic or being frightened?	0	1	2	3	4	
	8. Avoiding situations that make you anxious?	0	1	2	3	4	
V.	9. Unexplained aches and pains (e.g., head, back, joints, abdomen, legs)?	0	1	2	3	4	
	10. Feeling that your illnesses are not being taken seriously enough?	0	1	2	3	4	
VI.	11. Thoughts of actually hurting yourself?	0	1	2	3	4	
VII.	12. Hearing things other people couldn't hear, such as voices even when no one was around?	0	1	2	3	4	
	13. Feeling that someone could hear your thoughts, or that you could hear what another person was thinking?	0	1	2	3	4	
VIII.	14. Problems with sleep that affected your sleep quality over all?	0	1	2	3	4	
IX.	15. Problems with memory (e.g., learning new information) or with location (e.g., finding your way home)?	0	1	2	3	4	
X.	16. Unpleasant thoughts, urges, or images that repeatedly enter your mind?	0	1	2	3	4	
	17. Feeling driven to perform certain behaviors or mental acts over and over again?	0	1	2	3	4	
XI.	18. Feeling detached or distant from yourself, your body, your physical surroundings, or your memories?	0	1	2	3	4	
XII.	19. Not knowing who you really are or what you want out of life?	0	1	2	3	4	
	20. Not feeling close to other people or enjoying your relationships with them?	0	1	2	3	4	
XIII.	21. Drinking at least 4 drinks of any kind of alcohol in a single day?	0	1	2	3	4	
	22. Smoking any cigarettes, a cigar, or pipe, or using snuff or chewing tobacco?	0	1	2	3	4	
	23. Using any of the following medicines ON YOUR OWN, that is, without a doctor's prescription, in greater amounts or longer than prescribed [e.g., painkillers (like Vicodin), stimulants (like Ritalin or Adderall), sedatives or tranquilizers (like sleeping pills or Valium), or drugs like marijuana, cocaine or crack, club drugs (like ecstasy), hallucinogens (like LSD), heroin, inhalants or solvents (like glue), or methamphetamine (like speed)]?	0	1	2	3	4	

– Tables

Table E1. – Participant Demographics

Participant Demographics (N = 206)

	M	*(SD)*
Age	35.12	10.42
Years of Education	10.83	2.54

	n	*%*
Race/Ethnicity		
African American	84	41.80
Asian American	5	2.50
European American	72	35.80
Latino/a or Hispanic	38	18.90
Native American	2	1.00
Gender		
Female	70	34.00
Male	136	66.00
Relationship Status		
Divorced	17	9.00
Married	18	9.50
Not partnered/Single	113	59.80
Partnered/Common Law	23	12.20
Separated	14	7.40
Widowed	4	2.10
Psychotropic Medication(s)		
Prescribed	160	77.70
Mental Health Diagnosis		
Anxiety Disorder	2	1.00
Bipolar	48	30.20
Borderline Personality Disorder	1	.50
Impulse Control Disorder	1	.50
Multiple Diagnoses	55	34.60
Posttraumatic Stress Disorder	2	1.00
Psychotic Spectrum Disorder	19	11.90
Index Offense		

Table E1. Participant Demographics, continued

Drug-related	96	51.30
Non-violent, non-drug	43	23.00
Violent	48	25.70

Note. Only available data reported.

Table E2. – Fit Statistics for Latent Profile Analysis

Solution	BIC	AIC	AIC3	CAIC	SABIC	BR	Entropy
1-Profile	5056.74	5003.16	5021.16	5074.74	4999.79	6.62	1.00
2-Profile	5067.35	4957.21	4994.21	5104.35	4950.27	4.17	0.56
3-Profile	5076.77	4910.07	4966.07	5132.77	4899.57	2.34	0.81
4-Profile	5112.25	4888.19	4963.99	5187.25	4874.92	2.11	0.83
5-Profile	5169.98	4890.17	4984.17	5263.98	4872.53	2.09	0.83
6-Profile	5233.59	4897.22	5010.22	5346.59	4876.02	1.15	0.84

Note. BIC = Bayesian information criterion; AIC = Akaike's information criteria, AIC3 = Akaike's information criteria 3, CAIC = consistent Akaike's information criteria, SABIC = sample-size adjusted Bayesian information criterion, and BR= largest bivariate residual.

Table E3. – Fit Statistics

Estimates of Fit	Freely Estimated	Fixed	Freely Estimated Covariance	Freely Estimated Variance
BIC	5112.25	5008.43	5063.01	5063.01
AIC	4888.19	4892.33	4893.34	4893.34
AIC3	4963.99	4931.33	4950.34	4950.34
CAIC	5187.25	5047.83	5120.01	5125.19
SABIC	4874.92	4885.02	4882.64	4882.64
Entropy	0.83	0.81	0.76	0.76
BR	2.01	7.12	2.58	4.50

Note. BIC = Bayesian information criterion; AIC = Akaike's information criteria, AIC3 = Akaike's information criteria 3, CAIC = consistent Akaike's information criteria , SABIC = sample-size adjusted Bayesian information criterion, and BR= largest bivariate residual.

Table E4. – Profile Characteristics

Indicators	High-Response Profile n = 15.82			Iatrogenic Profile n = 14.08			Prototypical Profile n = 69.38			Insight Profile n = 45.72		
	M	*S.E.*	*ES*	*M*	*S.E.*	*ES*	*M*	*S.E.*	*ES*	*M*	*S.E.*	*ES*
Entitlement Thinking Style CS	-9.06	1.42	-2.02	8.64	0.74	3.13	1.04	0.43	0.33	1.21	0.55	0.46
Self-Assertion/Deception Factor CS	12.61	1.79	-2.24	9.35	1.21	2.31	0.99	0.60	0.25	3.39	0.72	0.86
Historical Content CS	16.63	2.33	-2.36	10.71	1.93	1.60	2.11	0.74	0.48	4.83	0.80	1.20
Cutoff Thinking Style CS	12.29	1.68	-2.06	8.56	1.49	1.80	3.88	0.56	1.02	0.41	0.82	0.10
Problem Avoidance factor Scale CS	14.68	2.19	-1.87	7.78	2.48	0.93	7.84	1.06	1.38	1.36	0.66	0.44
Current Content Scale CS	17.89	3.15	-1.58	10.99	2.66	1.25	9.42	1.27	1.29	0.92	0.83	0.22

Note. Negative values indicate a decrease on those measures; CS = Change Score; E.S. = Cohen's *d.*

Table E5. – Discriminate Function of Predictors

Continuous Predictors	Discriminate Function	
	Wald	*Sig.*
Pre-treatment Psychopathology		
DSM-5 p Factor	4.23	.24
Medication Compliance Interactions		
Medication*Medication Adherence Behavior Factor	6.41	.09
DSM-5 p Factor*Medication Adherence Behavior Factor	3.18	.36
Continuous Dependent Variables	Discriminate Function	
	Wald	*Sig.*
Pro-Criminal Attitudes		
Violence	41.37	< .001
Antisocial Intent	12.61	.006
Entitlement	3.98	.26
Criminal Associates	2.40	.49
Continuous Dependent Variables	Paired Comparisons	
	Wald	Sig.
Violence		
Prototypical Profile vs. Iatrogenic Profile	16.38	< .001

Table E5 – Discriminate Function of Predictors, continued.

Insight Profile vs. Iatrogenic Profile	10.06	.0015
High-Response Profile vs. Iatrogenic Profile	32.40	< .001

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