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CONSTRUCT AND PREDICTIVE VALIDITY OF CRIMINAL THINKING SCALES

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Tools to assess the concept of criminal thinking have not often been tested in community corrections populations. This article examines the psychometric properties of the Texas Christian University Criminal Thinking Scales (CTS) in a sample of drug-using probationers ($n = 250$) participating in a randomized trial. A confirmatory factor analysis found that three of the subscales may not be measuring distinct concepts and that most of the subscales do not distinguish between male and female offenders despite large differences in offending histories in these populations. Concurrent and predictive validity results demonstrated a limited ability of the CTS to correlate with known predictors of recidivism or with follow-up data on criminal activity. The CTS scores did correlate with predictors of treatment processes, including treatment readiness and self-efficacy, indicating that those with higher levels of criminal thinking may be more difficult to engage in treatment and services. Measurement tools of criminal thinking are important to the field, and further work is needed to strengthen the existing tools.

Keywords: criminal thinking; probationers; treatment; substance abuse treatment; TCU Criminal Thinking Scales

Currently, 1 in 31 adults in the United States is under correctional supervision, with nearly 6 million on parole or probation and 2.3 million incarcerated in prison or jail (Pew Center on the States, 2009). The number of persons involved with the criminal justice system has increased by more than 230% since 1982. Recidivism rates have remained constant in the past three decades, with the frequent revocation of parole or probation, often for technical violations, contributing significantly to the rise in incarceration rates (Blumstein & Beck, 2005). This “revolving door” of corrections demonstrates the failure of the current system to adequately address the problems of offenders that lead to continued criminal activity.

Parole and probation agencies struggle to manage offenders in the community. For more than two decades, supervision agencies have been encouraged to use a risk tool that differentiates the level and type of correctional control on the basis of the public safety risk factors that an offender presents. Although this focus on risk may be useful for better managing resources, the notion is that offenders have varying service needs based on their criminogenic needs associated with criminal thinking. As discussed by Andrews and Bonta (2006), criminogenic needs define the attitudes, values, and/or behaviors of offenders that influence their involvement in criminal behavior. Criminal thinking has been conceptualized as distorted thought patterns that support offending behavior by rationalizing and justifying how an individual acts. The idea is that criminal thinking is separate from the person’s actuarial risk score because it defines attitudes and values that support criminal behavior, and

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therefore, cognitive interventions can be applied to bring the offender's thought patterns in alignment with those of noncriminal society (Walters, 2006).

Questions have arisen regarding the concepts of criminal thinking, particularly as they relate to a subset of antisocial behaviors that may or may not encompass typical self-interested defense mechanisms or behaviors. The major issue confronting the field is how to define the concept of criminal thinking, particularly when the goal is to find those characteristics that can be altered or treated as part of an overall scheme to reduce recidivism. Several instruments have been developed in the past two decades to assess criminal thinking, yet few have been fully validated. Much of the work has been done with prison or incarcerated samples, but little has been done with community corrections samples, which constitute the majority of the correctional population. Recent literature has shown how those on probation and/or parole have similar characteristics as those incarcerated (Petersilia, 2003). Although it is unknown whether probationers may demonstrate the same patterns of criminal thinking as those incarcerated, these patterns may increase their need for services and targeted interventions in the community. This article assesses the validity of one of the recently developed instruments, the Texas Christian University (TCU) Criminal Thinking Scales (CTS; Knight, Garner, Simpson, Morey, & Flynn, 2006), using a sample of drug-involved probationers. The purpose is to assess the validity of the tool to better understand how the concept of criminal thinking is a criminogenic need. We also outline a research agenda to examine the validity of measurements targeting criminal thinking in an understudied population.

CRIMINAL RISK AND CRIMINOGENIC NEEDS

For many years, an actuarial risk score for understanding offenders' propensity to offend has been recommended for classification. This actuarial risk score is defined as a measure of likelihood of reoffending and has been discussed as a tool to assist correctional agencies in making decisions such as release from prison or jail, amount of supervision in the community, and placement for treatment programs (Gottfredson & Gottfredson, 1986). A number of instruments for classifying individuals according to their criminal risk currently exist, such as the Lifetime Criminality Screening Form (Walters & Chlumsky, 1993), a 14-item scale that assesses four areas of criminal lifestyle: irresponsibility, self-indulgence, interpersonal intrusiveness, and social rule breaking. Another instrument is the Level of Service Inventory-Revised (LSI-R; Andrews and Bonta, 1995), an assessment of 54 risk and need factors that fall in 10 criminogenic domains. Still another is the Wisconsin Risk Need Tool (Van Voorhis & Brown, 1997). The LSI-R includes criminal history, education and employment, financial situation, family and marital relationships, accommodation, leisure and recreation, companions, alcohol or drug use, emotional and mental health, and attitudes and orientations (Andrews & Bonta, 2006). The instrument measures both the actuarial risk score and criminogenic needs. Substance use, especially, is often linked with criminal activity, as in 2002, 68% of inmates had documented substance abuse or dependence prior to incarceration (Bureau of Justice Statistics, 2005).

Although actuarial risk tools have been found to better predict future recidivism than pure clinical assessments (Andrews, Bonta, & Wormith, 2006), they reflect only the past behavior of the individual. The actuarial risk tends to rely on official records and/or a person's memory

to recall certain critical events (such as number of arrests, time incarcerated, and aggression toward others). They have also been criticized for being used more to “label” rather than to assist in targeting areas for interventions (Silver & Miller, 2002). That is, the focus is on merely scoring the person’s history instead of understanding why a person is at risk for criminal offense. Because the actuarial models rely on aggregate data to determine norms, some have argued that they are less useful at the individual level for addressing specific problems (Feeley & Simon, 1992).

In the field of instruments to measure criminal conduct, there are now four generations that are commonly referred to, including clinical assessment (first), actuarial risk tools (second), actuarial risk with psychosocial functioning that affects criminal behavior (third), and actuarial and clinical assessments (fourth) (see Andrews et al., 2006, for a discussion of the generations of instruments).

The evolution of methods to measure criminal risk has recognized that actuarial risk tools have limited utility. Although the main purpose of risk instruments is to provide information regarding decisions pertaining to incapacitation, resource allocation, and program evaluation (Simourd, 2004), they do not help understand the factors that affect an individual’s likelihood for further involvement in criminal behavior. As noted by Andrews and Bonta (2006), understanding criminogenic needs is equally important in making key decisions about how to reduce the likelihood of further recidivism. One area that has been defined as a criminogenic need is criminal thinking errors (Walters, 2003a). That is, offenders who tend to exhibit more criminal thinking errors are those who continue to make bad decisions and choices, and these thinking errors affect future criminal behavior (Walters, 2006). To assess the state of an offender’s need for criminal thinking intervention, valid instruments are needed to measure the domains of criminal thinking.

THE CONCEPT OF CRIMINAL THINKING

Criminal thinking posits that those who are involved in a criminal lifestyle engage in certain modes of thought that support their antisocial behavior. This idea of the “criminal personality” focuses on a range of behaviors that are generally typical, such as justification and rationalization, but proposes that they are distorted or concentrated in those who become offenders (Walters, 2003b). Yochelson and Samenow (1976) first proposed the idea of the criminal personality in their study involving interviews with 240 individuals who had been found not guilty by reason of insanity. They identified 36 potential criminal thinking patterns and 18 resulting behaviors (Yochelson & Samenow, 1976). The patterns were those that are considered wrong by society’s standards of responsibility and included the ideas of “zero state,” extremely low self-esteem when one’s self-image is not reinforced; “uniqueness,” the idea that one is better than others and deserves to be treated differently or that the rules do not apply to him or her; “fear of fear,” where being afraid is seen as a failure and there is a refusal to acknowledge any irrational fears; “power thrust,” the need to be in control and to use any means necessary to gain such control over others; and “concrete thinking,” viewing past behavior as unique rather than seeing a pattern, including the idea that change can occur without any effort on the part of the offender (Ortiz, 2006).

Yochelson and Samenow (1976) provided the theoretical basis for much of the instrumentation work done in the arena of psychopathy and criminal thinking. Despite the limitations of the original research, these ideas have been widely used to characterize the

criminal personality. An important part of their work was to identify both personality traits and decision-making characteristics that define the set of behaviors that support criminal activity.

Walters continued to refine the model of criminal thinking, maintaining that behavior is developed from cognitive patterns and that crime is a lifestyle based on rationalizations, justifications, and support for antisocial behavior. Although Walters noted some issues with the Yochelson and Samenow (1976) concepts, many criminal thinking components were included in the Psychological Inventory of Criminal Thinking Styles (PICTS; Walters, 1995). The PICTS Version 4 includes 80 items, with eight thinking-style scales, two validity scales, four factor scales, two composite scales, and a General Criminal Thinking scale (Walters, 2007a). The eight thinking patterns include Mollification (justification and rationalization of offending by focusing on social injustice), Cutoff (rapid elimination of fear and other unwanted emotions), Entitlement (attitude of privilege and misidentification of wants as needs), Power Orientation (displays of aggression to control or manipulate), Sentimentality (doing good deeds to make up for bad acts), Superoptimism (overestimation of one's chances of not being caught), Cognitive Indolence (shortcut problem solving, uncritical acceptance of one's plans), and Discontinuity (little follow-through because of low self-discipline). The four factor scales are Problem Avoidance, Interpersonal Hostility, Self-Assertion/Deception, and Denial of Harm. The two composite scales are Proactive and Reactive Criminal Thinking (Walters, 2007b). Studies have found moderate reliability for the PICTS scales in a variety of offender populations and good validity of the Cutoff and General Criminal Thinking scales in predicting future recidivism and dropout from psychological programs (Walters, 2002). The scales have been validated in both offender and nonoffender populations, and a meta-analysis found that they correlated well with past indicators of criminal activity (Walters, 2003b). The Entitlement and Cutoff scales were sensitive to changes achieved by interventions aimed at changing thinking patterns (Walters, Trgovac, Rychlec, DiFazio, & Olson, 2002).

The CTS, developed by Knight and colleagues (2006), builds on the PICTS. It is a 37-item instrument with six subscales that include Entitlement, Justification (mollification), Power Orientation, Personal Irresponsibility (blaming others for one's problems), Cold Heartedness (lack of emotional involvement in relationships with others), and Criminal Rationalization (negative attitude toward law and authority figures). The first three scales were adapted from the PICTS, and the other three were developed specifically for this instrument using the ideas of Yochelson and Samenow (1976). The initial test of this instrument was with more than 3,200 offenders in a variety of correctional settings and found moderate reliabilities for the scales, ranging from .68 to .82 when using the Cronbach's alpha measure (Knight et al., 2006). This study also did an exploratory factor analysis of the scales and found that a four-factor solution best fit the validation sample, but the authors decided to keep a six-factor solution for clinical and theoretical reasons, mainly to retain the separate PICTS scales. No relationships among the scales and past or future criminal justice measures were assessed at that time (Knight et al., 2006). The instrument is discussed in terms of using it for clinical reasons and for assessing progress over time.

Measuring the concept of criminal thinking is an important topic given the concerns about interrupting criminal behavior. Except for Walters's PICTS instrument that was developed using both a general population and prisoners, many instruments have not been tested on

community supervision populations. The literature illustrates that some of the scales underlying the available instruments may not have good psychometric properties. An examination of the criminal thinking scales on another offender population to assess the reliability and to determine the utility in measuring criminal thinking can advance the use and adaptation of these scales. This study accomplishes this by examining the psychometric properties of the CTS when administered to probationers and by conducting a predictive validity test.

METHOD

This article uses the baseline and 6-month follow-up data collected from a clinical trial to assess the efficacy of different treatment linkage procedures in probation settings. This study concerns the predictive validity test of the CTS with a sample of probationers to understand the factors that affect criminal thinking. This article draws on the instruments used in the original trial to measure criminal thinking and substance abuse disorders among probationers.

STUDY DESIGN

This study uses data from a clinical trial of 250 drug-involved offenders randomly assigned to two conditions: seamless services of probation–substance abuse treatment at the probation office or referral to treatment in the community (Taxman & Trotman, 2007). The participants were recruited from three probation offices in Maryland, one in an urban area (Baltimore) and two in suburban areas. Inclusion criteria included substance dependence as determined by a TCU Drug Screen II (Knight, Simpson, & Hiller, 2002), score of 1 or higher or a mandate to substance abuse treatment, at least 6 months left on the probation sentence, and mandated or recommended substance abuse treatment. Interviews were conducted at baseline and then at 3, 6, and 12 months postrandomization. Follow-up rates for the study were 97% at 3 months ($n = 243$), 94% at 6 months ($n = 236$), and 90% at 12 months ($n = 227$). Outcome data for this article used data from the 6-month follow-up period.

MEASURES

Several tools were used to measure criminal thinking, substance use disorders, criminogenic needs, and outcomes. The battery included the CTS, a comprehensive intake interview including the Addiction Severity Index and the TCU Client Assessment of Self at Intake (CESI; Garner, Knight, Flynn, Morey, & Simpson, 2007), and a criminal history inventory. The criminal history included number of arrests, different types of crimes, number of times committed during one's lifetime, and a risk score using risk items from the first 10 items of the LSI-R. The CESI examines the client's attitudes toward treatment and includes the scales Desire for Help, Treatment Readiness, Problem Recognition, Depression, Anxiety, Hostility, Self-Efficacy, Risk Taking, Social Consciousness, and Decision Making. A complete substance abuse history profile was also obtained.

The CTS was scored according to the TCU form directions, where each scale score is an average of the item scores multiplied by 10, and the total CTS score is the average of the six scale scores. The psychometric properties of the instrument were assessed through a number

of methods. The CTS data were examined descriptively, with means for the subscales for the overall sample and for groups within the sample, including by gender. Previous research has found that men and women differ in the types of criminal thinking errors that they make and in their risk factors for recidivism (Benda, 2005; Bonta, Pang, & Wallace-Capretta, 1995; Holtfreter & Cupp, 2007; Reisig, Holtfreter, & Morash, 2006). Studies using the CTS on offenders in prison-based treatment programs have found that prisons that house women average significantly lower scores than those that house men on most of the criminal thinking scales (Best, Day, Campbell, Flynn, & Simpson, 2009; Staton-Tindall et al., 2007). The reliability of the scales was assessed using the internal consistency as reported by the Cronbach's alpha. The reliability estimates of the CTS scales were as follows: Entitlement = .80, Justification = .72, Power Orientation = .75, Cold Heartedness = .66, Criminal Rationalization = .64, and Personal Irresponsibility = .63. These scores are similar in value to the original TCU validation study of the scales (Knight et al., 2006). Correlations among the subscales were also conducted.

ANALYSIS

To assess the construct validity of the CTS, we used an item-level confirmatory factor analysis (CFA) to determine whether the six-scale structure fits the data of this sample of offenders under community supervision. We also tested two other possible structures, a single-factor model and a two-factor model, with the three PICTS-adapted scales loading onto one factor and the other three Yochelson and Samenow-based scales loading onto a second factor. Because the item responses were a 5-point Likert-type scale, we ran the CFA with the maximum likelihood estimator assuming that the responses were continuous and an asymptotically distribution-free estimator (diagonally weighted least squares) assuming that the item responses were ordinal.

An assessment of the concurrent validity of the CTS was done by examining whether both the individual scales and the total CTS score could differentiate among groups of offenders according to gender, recidivism risk, and type of offense. Other validity checks were done to determine whether there was a relationship between the CTS and indicators of involvement with the criminal justice system, including the number of arrests, time incarcerated, and number of substance abuse treatment episodes. Correlations between the CTS and scales from the CESI were also run to determine whether there was a significant relationship between criminal thinking and treatment readiness and engagement, as reported in other studies (Best et al., 2009; Staton-Tindall et al., 2007). Predictive validity of the CTS was assessed using data from the 6-month follow-up interview on arrests and participation in substance abuse treatment. Six-month data are useful because they relate to treatment initiation and attendance; also, the follow-up period of time is sufficient to detect negative criminal justice outcomes, such as arrest. Data were available for 174 (72%) of the participants at the time of this analysis, as all 6-month interviews were not yet completed. There were no differences between study groups or on recidivism measures between responders and nonresponders. Arrests were self-reported as number of arrests between the randomization date and the date of the follow-up interview and were coded as arrested or not during the follow-up period. Substance abuse treatment was operationalized two ways: as a dichotomous variable, whether the offender attended any substance abuse treatment during the follow-up period, and as a continuous variable, as the number of group sessions

attended during the follow-up period. Path analysis was used to simultaneously estimate the models for these three outcomes controlling for both recidivism risk and study condition (intervention or control) to determine whether the baseline CTS scores had any independent effects on the outcomes. Correlations among the baseline CTS scores and the 6-month CTS scores were also run to determine how stable the scores were over time and whether there were changes in the scores by study condition, as the intervention conditions were aimed at reducing criminal thinking errors.

PILOT DATA

To understand the importance of using offender and nonoffender samples in studying the concept of criminal thinking, the research team conducted a pilot study using the CTS on a convenience sample of the general population. The pilot was conducted for several months in the same neighborhoods where the three probation offices were located, with approximately 120 persons between 18 and 65 years old completing the surveys. On four consecutive Saturdays, a team of two researchers went to different restaurants of a fast-food chain and asked potential respondents to complete a survey. The survey was a copy of the CTS instrument (with a generic title, "Thinking Events") along with questions about current involvement in the justice system (i.e., ever arrested, ever arrested for driving under the influence, ever on probation or parole, ever incarcerated), age, gender, ethnicity, and whether the person had anyone in his or her immediate family involved in the justice system. Respondents were given a \$2 coupon for food at the chain for their willingness to take the survey instrument. Approximately 20% of the respondents had prior or current involvement in the justice system; they were treated as justice involved. The survey results found that for non-justice-involved individuals, the mean responses were similar in all but one subscale to the results reported by Knight et al. (2006) for an incarcerated population, similar to the justice-involved citizens who completed the survey, and similar to the study probationers under supervision in the field. There were no statistically significant differences. Citizens tended to have lower scores on the Cold Heartedness subscale than did the justice-involved individuals. The results of this pilot contributed to an interest in further considering the concepts related to criminal thinking instruments.

RESULTS

Table 1 presents the demographic characteristics of the study sample by gender. A total of 250 persons were included in the intake data set for this analysis. The majority of the offenders were male ($n = 189$) and African American ($n = 161$) and had cocaine ($n = 61$) or heroin or opiate use ($n = 100$) as their main drug problem. A little less than half of the sample had completed high school ($n = 112$). Men were more likely to have committed violent, personal, and property crimes, whereas women were more likely to have drug-related arrests. The only CTS scale that had a significant difference by gender was Cold Heartedness, where males had a higher mean score.

The fit statistics for the CFA models (Table 2) show that the six-factor solution had the best fit of the three models tested according to a number of indices of global fit, including the root mean square error of approximation (which was lowest for the six-factor model),

TABLE 1: Sample Baseline Characteristics and Criminal Thinking Scale (CTS) Scores by Gender

<i>Characteristic</i>	<i>Men</i>	<i>Women</i>	<i>Total</i>
Number of offenders	189	61	250
African American	68.1%	60.7%**	64.4%
Average age	37.6 (11.9)	36.8 (9.4)	37.4 (11.3)
Divorced/separated	19.2%	23.0%	19.6%
Completed high school	45.6%	42.6%	44.8%
Persistent offenders (eight or more lifetime arrests)	45.5%	32.8%**	41.2%
Average time incarcerated (months)	42.7 (58.3)	14.9 (25.5)**	36.1 (53.7)
Average number of substance abuse treatment episodes	2.2 (7.0)	2.1 (2.6)	2.1 (6.2)
Committed violent crime lifetime	27.5%	13.1%**	24%
Committed property crime lifetime	46.7%	37.7%**	44%
Committed personal crime lifetime	50%	34.4%**	46%
Percentage arrests that were drug related	61.5%	79.6%**	66.3%
Cocaine/crack as primary drug	23.1%	27.9%	24.4%
Heroin/opiates as primary drug	40.1%	41.0%	40%
Average criminal risk score (1-7)	4.2 (1.4)	3.7 (1.5)	4.1 (1.4)
Entitlement scale	19.4 (5.8)	18.4 (5.2)	19.1 (5.7)
Justification scale	20.7 (5.7)	20.4 (5.9)	20.5 (5.8)
Power Orientation scale	25.4 (6.3)	25.1 (7.7)	25.2 (6.8)
Cold Heartedness scale	24.4 (6.4)	21.8 (6.9)*	23.7 (6.6)
Criminal Rationalization scale	29.5 (6.8)	29.4 (6.9)	29.5 (7.0)
Personal Irresponsibility scale	23.1 (6.3)	22.6 (5.9)	22.9 (6.2)
Total CTS score	23.5 (4.4)	22.7 (4.4)	23.3 (4.4)

Note. Standard deviations shown in parentheses.

* $p < .05$. ** $p < .01$.

TABLE 2: Confirmatory Factor Analysis of the Criminal Thinking Scales

<i>Model</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA</i>
Six factors	.873	.913	.107
One factor	.866	.907	.110
Two factors	.869	.909	.109

Note. CFI = comparative fit index; TLI = Tucker Lewis index; RMSEA = root mean square error of approximation.

the comparative fit index, and the Tucker Lewis index (which were both highest for the six-factor model). In addition, three of the factors—Justification, Entitlement, and Personal Irresponsibility—were very strongly correlated (factor correlations $> .9$), indicating that that these three factors do not represent separate constructs (i.e., weak discriminant validity), whereas the Cold Heartedness scale had a strong discriminant validity, as indicated by low correlations with the other scales.

Results from the CFA indicated that some individual items had relatively low loadings on their proposed factors. These items included one from the Power Orientation scale, “You like to be in control,” which had a loading of .20, whereas all other items in the scale loaded at .48 or higher. Also, a reverse-coded item on the Criminal Rationalization scale, “This country’s justice system was designed to treat everyone equally,” had a loading of .26, whereas all other items loaded at .41 or higher. And on the Entitlement scale, the item “You deserve special consideration” had a loading of .27, whereas all other items loaded at .62 or higher.

The concurrent validity results are given in Table 3, which shows how well the CTS distinguished between groups of offenders. The means for the scales are provided for those in

TABLE 3: Concurrent Validity: Baseline Criminal Thinking Scales (CTS) and Offending Characteristics

Characteristic	EN	JU	PO	CH	CR	PI	CTS
Persistent offender	19.8 (5.9)	21.1 (6.0)	25.2 (7.0)	24.2 (6.4)	29.4 (7.3)	22.7 (5.9)	23.5 (4.3)
Violent crimes	19.8 (5.0)	21.5 (4.8)	27.1 (7.3)*	24.0 (6.8)	31.5 (7.1)*	23.1 (6.5)	24.1 (4.0)
Property crimes	19.6 (5.2)	21.2 (5.1)	26.9 (6.8)*	23.5 (6.2)	30.3 (7.6)	23.6 (6.0)	23.9 (4.7)*
Personal crimes	19.4 (5.5)	20.7 (5.6)	26.8 (7.0)*	24.1 (6.3)	30.0 (7.2)	22.9 (5.9)	23.9 (4.2)
High recidivism risk	19.2 (6.2)	21.2 (6.3)	24.8 (7.1)	23.6 (6.8)	29.3 (7.6)	22.9 (6.8)	23.3 (4.9)
Incarcerated > 12 months lifetime	18.9 (5.4)	21.1 (5.8)	25.4 (7.2)	24.5 (6.6)	29.5 (7.5)	22.7 (6.3)	23.6 (4.5)
1 or more times in substance abuse treatment	18.7 (5.2)	20.6 (5.7)	25.1 (6.7)	23.6 (6.5)	29.2 (7.2)	22.3 (6.1)	23.1 (4.5)

Note. Means are shown with standard deviations in parentheses. EN = Entitlement scale; JU = Justification scale; PO = Power Orientation scale; CH = Cold Heartedness scale; CR = Criminal Rationalization scale; PI = Personal Irresponsibility scale.

* $p < .05$.

each category (violent offenders, high-risk offenders, etc.), and significance indicates whether the mean differed significantly between those with and without the offending characteristic (e.g., violent and nonviolent offenders). The Power Orientation scale means differed among types of offenders, with those committing property, violent, and/or personal offenses having higher scores than those who committed only drug offenses. Criminal Rationalization means were also higher for violent offenders, but no other differences were detected. The composite CTS score was significantly higher for those who committed property crimes.

The construct validity results are given in Table 4, with the means of the CESI scales according to different levels of the composite CTS score. The composite score was categorized into low (21 or lower), medium (21.1 to 25), and high (25.1 or higher). For the CESI domains of treatment readiness, self-efficacy, and social consciousness, there was a significant relationship, with the CESI scores decreasing as criminal thinking increased. For hostility and risk taking, the CESI scores increased as criminal thinking increased.

The predictive validity results are given in Table 5. Approximately 20% ($n = 35$) of the sample were arrested in the 6-month follow-up period, and approximately 52% ($n = 89$) attended some type of substance abuse treatment. The average number of treatment sessions attended was 9.7, with a range from 0 to 90. None of the CTS was significantly associated with being arrested at 6 months or with whether the offender attended substance abuse treatment or the number of substance abuse treatment sessions attended in the 6-month follow-up period.

The correlations between the baseline and follow-up CTS scores were moderate, ranging from a low of .37 between the two Entitlement scores to a high of .60 between the Criminal Rationalization scores. Differences in the mean scale scores at baseline and at the 6-month follow-up by study condition were examined, and no significant differences were found for any of the scales.

DISCUSSION

This study found that the CTS has moderate reliability and validity in a sample of drug using probationers. Three of the scales may not be measuring distinct attributes. These results are similar to those reported on a sample of prisoners in the original construction sample

TABLE 4: Construct Validity: Scores on Client Evaluation of Self and Treatment, Intake (CESI) by CTS Total Score in Categories

CESI Scale	CTS Total Score			F
	Low	Medium	High	
Problem Recognition	35.8	32.9	33.2	2.12
Desire for Help	40.1	37.7	37.0	2.89
Treatment Readiness	39.3	36.6	34.7	9.40**
Hostility	18.9	23.8	29.3	44.73**
Self Esteem	33.6	34.5	31.8	2.57
Risk Taking	25.5	27.9	31.4	17.51**
Self-Efficacy	39.6	36.4	33.3	24.78**
Social Consciousness	39.7	38.3	36.4	9.17**

Note. CESI = Client Assessment of Self at Intake (Garner, Knight, Flynn, Morey, & Simpson, 2007); CTS = Criminal Thinking Scales (Knight, Garner, Simpson, Morey, & Flynn, 2006).

** $p < .01$.

TABLE 5: Predictive Validity: Baseline Criminal Thinking Scale Scores and 6-Month Outcomes

Outcome	EN	JU	PO	CH	CR	PI
	OR [95% CI]					
Arrested in follow-up period	1.06 [-0.02, 2.13]	0.93 [-0.02, 2.13]	1.03 [-0.02, 2.08]	1.00 [-0.03, 2.04]	1.01 [-0.03, 2.06]	1.05 [0.01, 2.11]
Attended substance abuse treatment in follow-up period	0.68 [-1.45, 2.81]	1.17 [-0.97, 3.32]	1.20 [-0.56, 2.96]	0.98 [-0.61, 2.57]	0.61 [-1.10, 2.32]	1.95 [-0.18, 4.08]
Number of substance abuse treatment sessions in follow-up period	0.95 [-0.10, 2.01]	1.04 [-0.02, 2.10]	1.02 [-0.02, 2.06]	1.01 [-0.02, 2.04]	0.97 [-0.06, 2.01]	1.01 [-0.04, 2.06]

Note. All models adjusted for recidivism risk and study condition (intervention, control). EN = Entitlement scale; JU = Justification scale; PO = Power Orientation scale; CH = Cold Heartedness scale; CR = Criminal Rationalization scale; PI = Personal Irresponsibility scale; OR = odds ratio; CI = confidence interval.

* $p < .05$.

for the CTS. Although the authors chose to separate a total factor into three to be consistent with the PICTS instrument (Knight et al., 2006), the CFA raises questions about the utility of this approach. Given that this same four-factor structure was found in a sample of community correction clients, it may be useful to revisit the measurement structure for this instrument, especially as it applies to drug offenders. It should be noted that the three scales adapted from the PICTS were found by Walters to load onto a proactive criminal thinking factor (Walters, 2008). It might also be suggested to consider other constructs related to criminal thinking, given that three of the reported subscales have limited validity. Reactive criminal thinking may not be well represented in the CTS and may be an important factor in measuring criminogenic needs (Walters, 2008).

This study has a number of limitations, including reliance on self-report data for outcome measurements, incomplete follow-up data (we are using 6-month data with longer follow-up outcome data forthcoming), and a relatively small sample size. Although the original validation sample for the CTS was approximately 3,200, the findings in this article related to factor structure and reliability are very similar to that sample, indicating that these properties

are stable across different populations and settings. Although the primary intent of the data used in this article was not to conduct a psychometric analysis of the CTS, the sample of probationers provided a unique opportunity to examine the instrument properties for a community corrections sample, one that represents the largest segment of the criminal justice population.

Several differences related to criminal justice involvement were found between men and women in this sample. The men tended to have more arrests and a longer incarceration history and were more likely to commit violent crimes than women. Only one of the CTS scales (Cold Heartedness) differed significantly between the gender groups. The literature indicates that women offenders often engage in different types of criminal behaviors than their male counterparts (Benda, 2005; Lewis, 2006; Mooney et al., 2008; Staton-Tindall et al., 2007), with women more likely to be convicted of drug offenses and to have a drug abuse or dependence diagnosis. Walters, Elliott, and Miscoll (1998) also found that women scored higher than men on seven out of eight of the original PICTS domains (excluding Mollification; Walters et al., 1998), but the authors feel this is attributable more to increased honesty on the part of the women rather than higher levels of criminality.

Women offenders also differ considerably from males in a number of areas related to criminal risk, including mental health and family history, and they also have been found to score differently than men on measures of psychopathy (Holtfreter & Cupp, 2007; Reisig et al., 2006). A recent study on the design of criminal risk instruments points out that effective measures should be separately normed for males and females, given the disparate findings for women offenders, including their decreased propensity for violent crimes, lower rates of recidivism, and less involvement in traditional "criminal behaviors" (Austin, 2006). This literature suggests that current criminal thinking assessments may not be adequate for female offenders; and, in fact, interventionists have identified other domains of thinking errors that are more relevant to women, including fear of rejection, self-worth, and strategy and power. The work in this area is evolving, but the researchers note that the focus of many of these thinking issues relate to relationships with others, particularly, sexual partners (Havens et al., 2009; Staton-Tindall et al., 2007). It is, therefore, essential that the measurement invariance hypothesis be tested empirically to ensure that the same set of constructs is being measured in different groups.

None of the CTS scales were related to a number of the usual predictors of criminal risk, including persistent offending (eight or more lifetime arrests), time incarcerated during one's lifetime, and recidivism risk. Violent offenders did score higher on two of the scales, Power Orientation and Criminal Rationalization, indicating that the CTS may help to distinguish these types of offenders. These findings indicate that the CTS may not distinguish among those with higher risks for recidivism in community corrections populations; this may be the difference between testing the instrument on a community and incarceration population. As recidivism reduction is often the goal of correctional programming, this assessment may have limited use for service planning. It also suggests that the focus on criminal thinking is different from criminal risk, but these factors may not have content validity because they do not predict criminal risk.

There were significant correlations among the CTS and CESI scales, indicating that criminal thinking may be related to readiness for treatment and that readiness for treatment may be the most salient factor for use in practitioner settings. That is, knowledge of the offender's readiness for treatment has been shown to be important in clinical outcomes. It is

unclear what added value there is in having the CTS scores. Given the issues with the instrument, it may not be useful in treatment planning. Self-efficacy was negatively correlated with most of the CTS, indicating that offenders with higher levels of thinking errors may also have a lessened ability to manage their lives. Hostility and risk taking were positively correlated with criminal thinking, indicating that those with high levels of criminal thinking were also more likely to have a bad temper and enjoy being dangerous (Garner et al., 2007). These results demonstrate that those with high levels of criminal thinking may also be more difficult to engage in treatment and that the criminal thinking problems may need to be addressed prior to, or in concert with, substance use issues.

The CTS had limited predictive validity, with no scales demonstrating a relationship with future recidivism, as measured by arrests at 6 months or by attendance at substance abuse treatment, as measured both dichotomously and by number of sessions attended. Overall, the CTS is an important step toward developing a tool to measure criminal thinking that can be used to identify those who have higher levels of criminal thinking errors for the purpose of addressing this criminogenic trait. In theory, if such a scale can be developed, it might be useful to assess offenders' needs for specific cognitive-based treatments to address these criminogenic needs. There are, however, some current limitations in the construction of this sort of instrument that limit its usefulness, namely, that the scales are not completely differentiated and are not highly correlated with some main predictors of recidivism. Given the importance of criminal thinking as a criminogenic need and one that has been highly correlated with offending, further research is needed to develop a comprehensive theory of criminal thinking that not only specifies the domains that are specifically related to recidivism but also lays groundwork for developing effective cognitive interventions that can change thinking patterns in a way that reduces future offending.

Findings from this study, and the existing literature on criminal thinking, suggest that more attention should be based on developing tools that differentiate between various thought processes that contribute to criminal behavior. The original scales were developed only with a set of prisoners, and this study relied on probationers. As discussed, a small pilot of this tool was administered to adults in the communities where the probation study was conducted; the probationers had similar scale scores in all areas except for Cold Heartedness. The findings from this study and the pilot study should give the research community a call to ensure that the scales that are used to inform decisions typically made in criminal justice agencies (i.e., release, placement in various levels of supervision, placement in treatment programs, etc.) are reliable and valid. More work is needed in the field in this area of criminal thinking, given the renewed attention to addressing the criminogenic values, behaviors, and cognition of offenders. A critical step is to ensure that these scales differentiate offenders from the general population if we are going to be successful in advancing the recidivism reduction potential of correctional interventions.

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