THE DEVELOPMENT AND EXAMINATION OF A SELF-CONTROL SCALE DERIVED FROM A STANDARD ADDICTION RESEARCH ASSESSMENT

by

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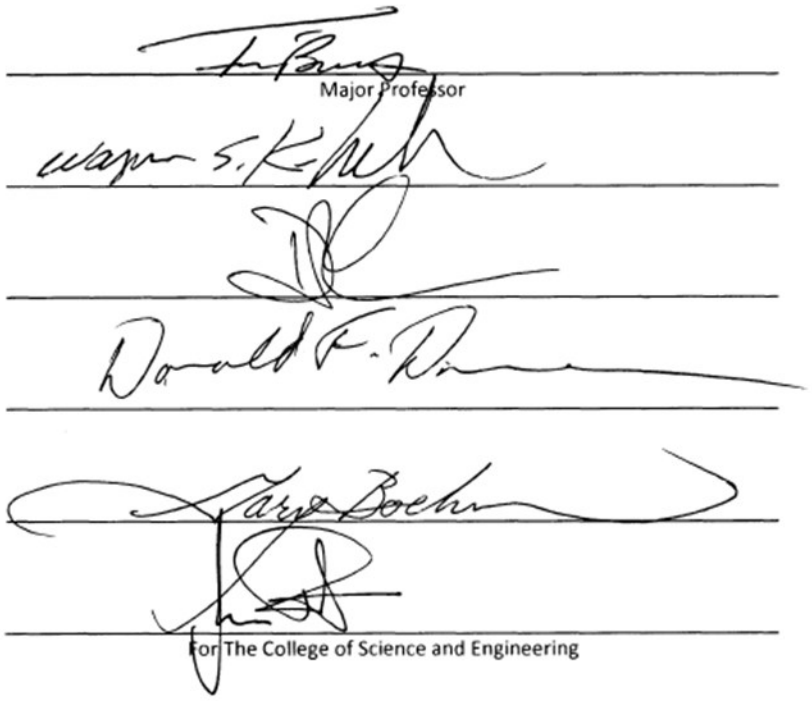

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High self-control is often extolled as a feature strongly related to success (Mischel, Cantor, & Feldman, 1996; Rothbaum, Weisz, & Snyder, 1982; Tangney, Baumeister, & Boone, 2004; Vohs & Baumeister, 2004). Indeed, researchers have found that having high self-control is an advantage for goal achievement such as weight loss (Baumiester, Gailliot, DeWall, & Oaten, 2006), smoking cessation (Muraven, 2010), and academic success (Tangney et al., 2004). High self-control seems to predict better psychosocial functioning as evidenced by lower anxiety and less depression (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Tangney et al., 2004). People with high self-control tend to modify their behavior to fit social norms and to match the expectations they hold for themselves **(**Baumeister & Tierney, 2011). This capacity to modify their behavior can move an individual closer to the best fit between themselves and the world around them (Rothbaum, Weisz, & Snyder, 1982). Indeed, self-control has been called a hallmark of human attributes (Baumeister & Tierney, 2011; de Ridder et al., 2012; Pinker, 2011; Tangney et al., 2004).

The pattern of self-control's association with better life outcomes was tested by Walter Mischel's delayed-gratification experiments and the follow-ups he conducted years later (Mischel, Shoda, & Peake, 1988). The researchers presented pre-school children with a tray of small rewards to choose from (e.g., a marshmallow treat) and told them that they could have one marshmallow now, or two marshmallows a little later. Some children chose the immediate reward of a single treat, but some waited for more. The act of waiting for 2 marshmallows suggested that some of the children exerted self-control to wait for a larger reward, whereas the children who settled for the smaller but immediate reward did not exert self-control in this particular instance. Later, when Mischel re-contacted those who participated as preschoolers (now adults) for the follow-up, he found that the participants who as children waited for two marshmallows had better overall adjustment to life in terms of higher self-

esteem, higher success in school and at work, higher satisfaction with family and other interpersonal relationships, and they adapted to stressful events better.

Indeed, individuals differ in their capacity to exercise self-control. The specific aim of the developers of the Self-Control Scale (SCS; Tangney et al., 2004) was to produce an assessment tool to measure differences in self-control. Tangney and colleagues found that their scale led to predictions congruent with the Mischel et al., (1988) longitudinal study. Higher SCS scores were associated with less depression, less anxiety, less hostility, and higher self-esteem. In addition, those reporting higher self-control also reported greater closeness with family and friends, greater academic success, and less self-regulation failures such as alcohol abuse.

Conversely, poor self-control may be responsible for detrimental attitudes and behaviors evident among some adolescents. Impulsive decision-making and risk-taking behaviors can characterize a substantial portion of the adolescent population (Glover, 1999; Shaw, Amsel, & Schillo, 2011; Tice, Bratslavsky, & Baumeister, 2001). Further, alcohol and illicit drug use is a growing problem for a portion of adolescents in the United States (Mason, Pate, Drapkin, & Sozinho, 2011). It is estimated that over 11% of the population of 13 million American adolescents meet criteria for substance use disorder (Winters, Leitten, Wagner, & Tevyaw, 2007), yet reports reveal that fewer than 10% of these individuals receive treatment (Substance Abuse and Mental Health Services Administration [SAMHSA], 2007). In addition, many of those receiving treatment continue to exhibit problem behaviors.

The purpose of the present project was develop a self-control scale by using items contained within a standard substance abuse treatment assessment and to examine how perceived self-control impacts adolescent substance abuse treatment outcomes. The new scale was modeled after the SCS and was developed by using items that were contained within the Client Evaluation of Self and Treatment (CEST). The CEST is an established assessment used by the addiction treatment community. By developing a "treatment-friendly" scale within the CEST, an additional measure will not need to be

added to the intake protocol of many treatment agencies. The section that follows describes the self-control construct, its conceptual relationship to psychosocial functioning, and the utility of measuring self-control. Later sections focus on the client assessments during treatment and the development of the CEST-Self-Control (CEST-SC) scale as a specific aim of this project.

Background and Rationale for the Development of a "Treatment Friendly" Self-Control Scale

Self-control problems are not limited to adolescents. The self-control struggle challenges people throughout their lives. Struggles with doing too much of some things (e.g., eating, drinking, partying, gambling, smoking, spending) or too little of others (e.g., exercising, saving, planning, reading, meditating) are difficult to overcome.

Conceptual Basis for Self-Control

Rothbaum and colleagues (1982) approached self-control as a two-part process. Process one is the self's outward attempt to change the environment to best meet personal needs. Process two is initiated when the attempts to change the environment are not possible or unsuccessful. In process two, attempts are refocused to an inward direction, to adapt the self to "go with the flow" and fit into the environmental setting. For example, the first recommendation for an individual who is starting a weight-loss program often includes going shopping for foods that meet diet requirements and clearing the kitchen of foods that do not. This is followed by a second recommendation consisting of a list of suggested menu choices for the individual to select when eating out. The purpose of the list is to help the individual's efforts to control eating, reduce weight, and yet to not disrupt social obligations to eat with others. This two-process model helps define self-control.

Common themes in the literature refer to self-control as a capacity to modify, alter, or adjust internal impulses and response tendencies, and to regulate thoughts, emotions, and behavior (Baumiester, 2012; Carver & Scheier, 1981; de Ridder et al., 2012; Tangney et al., 2004; Vohs & Baumeister, 2004). Rothbart labeled this capacity "effortful control". Effortful control involves a sense

of planning and deliberate behavior to inhibit one action in order to carry out another (Rothbart, Ellis, & Posner, 2011). These themes incorporate both processes from Rothbaum's model of self-control. That is, an individual either changes the environment (process one) or initiates internal changes to adapt to that environment (process two). Indeed, Tangney et al., (2004) refers to self-control as a powerful adaptive mechanism of the human personality, especially for obtaining successful life outcomes.

Self-control studies have shown that the construct is both dynamic and static. A limited resource model of self-control sees the construct as dynamic because situations and events seem to cause significant variance (Baumeister, Bratslavsky, Muraven, & Tice, 1998). Static models have also shown that individual differences in self-control are consistent across time, and thus trait-like or dispositional (Mischel et al., 1988; Rothbart et al., 2011).

Dynamic Self-Control: A Limited Resource Model

Baumeister and colleagues (1998) suggest that self-control is like a muscle that can be pushed to a point of fatigue. Their lab found that when participants engage in self-control tasks repeatedly, it seems to impair the participant's capacity to complete self-control tasks that occur afterwards. They call the effect "ego depletion" (Baumeister et al., 1998; Muraven & Baumeister, 2000; Moller, Deci, & Ryan 2006; Schmeichel, Vohs, & Baumeister, 2003). Meta-analyses (Hagger, Wood, Stiff, & Chatzisarantis, 2010; de Ridder et al., 2012) documented the findings from "ego-depletion" studies that showed that capacity for self-control can be depleted by successive and extended tasks, and participants so impaired do poorly on subsequent simular tasks. They provide evidence, in both behavioral and physiological accounts, of the self-control depletion effect on later performance of self-control tasks (Baumeister et al., 1998; Gailliot, Baumeister, DeWall, Maner, Plant, Tice, D, … Schmeichel, 2007; Gailliot, Plant, Butz, & Baumeister, 2009; Muraven & Baumeister, 2000; Moller et al., 2006; Schmeichel et al., 2003).

Behavioral account of self-control depletion. Not unlike Walter Michel's marshmallow experiments in delayed gratification, Baumeister and colleagues put university students through difficult

self-control tasks such as asking participants to skip a meal and then exercise their self-control by sitting in a room with instructions to not consume any of the freshly baked chocolate chip treats on a table in the room (Baumeister et al., 1998, Study 1). In another experiment, participants were asked to watch a movie intended to arouse emotion, but exercise their self-control and restrain their display of any emotional response to the film (Baumeister et al., 1998, Study 3). The experimental paradigm was designed to cause participants to exercise impulse control, suppress emotion, thoughts or behavior and deplete resources for self-control. After these experimental manipulations which required self-control, participants were presented with physical tests (e.g., squeezing a hand grip device) and cognitive tasks (e.g., logic puzzles). Participants in the experimental condition, who presumably exerted self-control, gave up on the timed tasks more quickly than control participants who were allowed to consume the cookies or freely display their emotional response to the emotionally arousing film. The exertion of self-control (e.g., making repeated choices to regulate impulses, thoughts, and emotions) has costly consequences (Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice, 2008). Vohs and colleagues (2008) found that the effort expended in exercising self-control during the experiment resulted in a reduction in self-control resources for the tasks that followed. Vohs et al., (2008) called this effect of depleted self-control that resulted from repeated choices "decision-fatigue." This suggested that there were limited resources available for executive functions such as those involved in self-regulation. The self-control literature also links limited resources to brain chemistry.

Physiological account of self-control impairment. The brain relies on glucose and oxygen for fuel. Unlike muscle or fat tissue, the brain does not store its fuel (Berg, Tymoczko, Stryer, 2002). It arrives via the bloodstream and is processed as energy source upon delivery. For the brain to perform, it must have available glucose (e.g., about 120g per day; Berg et al., 2002). In studies of blood glucose in the brain, Gailliot and Baumeister (2007) noted that exercising self-control reduces large amounts of glucose in the pre-frontal cortex area, and self-control failures tend to follow when glucose is depleted.

Self-control failures are less likely to occur when glucose is available, and more likely to occur when the glucose supply is low. Experiments linked reduced glucose levels and high impulsivity with prior attention control, emotional regulation, and thought suppression tasks (Gailliot et al., 2007a). Indeed, one experiment suggested that impairment of self-control (e.g., "decision fatigue" effects) could be reversed by consuming glucose in between the manipulations. To test this hypothesis, one group of participants was given a drink sweetened with glucose after completing the first stage of the experimental self-control tasks to deplete self-control. A second group completed the same tasks but received a drink without glucose. To measure self-control tenacity, both groups then completed additional timed physical or cognitive tasks. The results showed a significant decision-fatigue effect for the participants who consumed the non-glucose drink as expected, but the group that received the glucose-sweetened drink did not show significant decision-fatigue effects (Gailliot et al., 2007b). Further studies examining this linkage between the availability of glucose (or the lack of it) and self-control success (or failure) continue to expand these findings (Gailliot, Peruche, Plant, & Baumeister, 2009). Given that (1) the pre-frontal cortex is involved in executive functioning (e.g., self-control; Banfield, Wyland, McCrae, Munte, & Heatherton, 2004), (2) the pre-frontal cortex has increased glucose needs when performing self-control tasks (Gailliot et al., 2007b), and (3) public interest in self-control has increased in order to find ways to maintain health-related goals (e.g., exercise and dietary changes to achieve weight loss), the importance of understanding the limits of self-control capacity has increased (Schmeichel & Zell, 2007).

Dispositional Self-control

In contrast to the limited resource model of self-control, the literature describes other research showing that dispositional self-control tended to be reliably stable across time despite changes in context (Mischel, Shoda, & Peake, 1988). Poorer academic performance in subsequent years was predicted by pre-school children's lack of impulse control to delay gratification for a sweet reward.

Those low in self-control tend to not control their internal impulses or their temperament as well as those with higher self-control (Gottfredson & Hirschi, 1990). Problems with alcohol abuse, eating disorders, and psychosocial functioning (higher depression, higher anxiety, higher shame, lower guilt) significantly differed by an individual's self-reported levels of self-control; individuals with low self-control reported these problems more than those with high self-control (Tangney et al., 2004). In adolescent studies, risky health behaviors (e.g., alcohol abuse, consuming a high-fat diet) were more numerous among those with low self-control (Wills, Isasi, Mendoza, & Ainette, 2007) and less numerous for those with high self-control. Behaviorally, as compared with people with high self-control, there are higher instances of reckless driving and criminal activity among those with low self-control (Pratt & Cullen, 2000). Studies have shown that characteristics such as gender show differences in self-control. Higher self-control has been associated with women as compared with men (Gibson, Ward, Wright, Beaver, & DeLisi, 2010).

DeLisi and Berg (2006) explored the linkages between self-control theory and offenders in the criminal justice system and describe an array of negative traits that offenders have in common with persons with low self-control, including preference for instant gratification, lack of perseverance with complex tasks, and desire for easy rewards (e.g., without large costs). Indeed, according to Gottfredson and Hirschi (1990) low self-control is the standard variable to use in predicting criminal behavior. The potential of future research examining recidivism rates using self-control as a predictor was suggested by Wilson, Gallagher, and MacKenzie (2000) because in their meta-analysis low self-control was a consistent attribute of offenders.

Discussion thus far points to self-control models that describe the construct both as a dynamic resource that can be impaired by behavioral or physiological demands and as a stable dispositional asset. In the next section, measures that have been used to assess self-control will be discussed.

Existing Measurement of Self-control

Researchers have primarily measured dynamic self-control behaviors based on task performance (Baumeister et al., 1998; Muraven & Baumeister, 2000; Moller et al., 2006; Schmeichel et al., 2003). Before the development of the SCS by Tangney, Baumeister, and Boone (2004), existing scales to measure dispositional self-control were either dated or measured specific behaviors (e.g., health behaviors related to improving fitness, eating habits, losing weight, or quitting smoking). Tangney et al.'s (2004) specific aim was to develop a tool to measure the overall dispositional self-control construct. In that sense, it is important to note that the SCS score is reported as a single factor composite score even though factor analysis indicated a multi-factor structure was present. Although not included in their published work, they found a five-factor structure that included self-discipline, deliberate/non-impulsive, healthy habits, work ethic, and reliability (personal correspondence, J. Tangney) with significant correlation between the factors. The primary aim of their study was to look for evidence that high composite self-control predicts positive outcomes. The SCS revealed that self-control is correlated with outcomes such as interpersonal satisfaction (willingness to make adjustments with others), academic success (achievements such as high grades and standardized test scores), and other positive personal attributes such as high self-esteem, high impulse control, and better psychosocial functioning (less anxiety and depression).

Further testing of the SCS by Schmeichel and Zell (2007) examined whether individual differences in self-control predicted differential ego-depletion effects. They used a standard Baumeister lab paradigm of depleting self-control with tasks involving impulse, thought, or emotional suppression, followed by testing the persistence of the participants to complete a task requiring self-control. Indeed, they found support for their hypothesis that self-control is both a stable attribute and a dynamic resource that can be depleted. All the participants showed depletion effects. However, compared to

their low dispositional self-control counterparts, individuals with high self-control scores on the SCS showed less self-control impairment on the behavioral tasks.

The psychometrics of the SCS have been examined in the literature. Hasford & Bradley (2011) used item response theory to examine the internal consistency of the SCS scale. They supported the single construct of the SCS using Rasch analysis, finding that the items in the scale fit together reasonably. Further, in a meta-analytic study that reviewed the relationship of self-control to behavior, de Ridder et al., (2012) reported on 50 studies that used the SCS, of which 32 were university samples, 16 were described as community samples, and 2 were study samples from a clinical setting. In addition to confirming the psychometrics of the SCS, the authors reported on studies that used the SCS to identify the beneficial effects of high levels of self-control including domains such as behavior at school and work, health-related topics such as eating and weight, interpersonal functioning, and well-being/adjustment (e.g., high self-esteem and low depression). For the publications in their meta-analytic study, high self-control was significantly related to desirable traits and behaviors. They noted that the SCS performed well in detecting moderators of the relationship between self-control and behavior.

Rationale for Developing a New Scale

The evidence suggests that high self-control predicts beneficial outcomes, and that the SCS scale has been sensitive to the differential effects of dispositional self-control. Understanding the impact of different levels of self-control in a population such as adolescents in drug treatment could add an important construct to models that describe the drug abuse treatment and recovery process. Assessment tools to inform the treatment process have been identified as an element to help to improve positive treatment outcomes (Knight, Flynn, & Simpson, 2008). Adding the SCS to the battery of assessments that are administered at intake into treatment is one avenue to understanding the role of self-control in the treatment and recovery process, however, additional assessments increase the

logistical burden and expense of treatment. Items that address self-control characteristics currently exist in instruments used in drug treatment intake assessments and can be used to produce a scale comparable to the SCS.

The Client Evaluation of Self and Treatment (CEST) assessment is already used extensively within both criminal justice and community treatment to measure psychosocial attributes. While the CEST does not contain a specific self-control scale, a few of the CEST constructs contain items that match the items in the SCS (e.g., close in wording or item meaningfulness). The present project has attempted to identify items that match between the 2 instruments to create a CEST self-control scale. Having a reliable and valid scale from existing CEST items to measure self-control would enable researchers to use existing samples for retrospective studies of self-control's relationship to factors that predict treatment outcomes. The CEST Self-Control scale (CEST-SC) would provide a measure of self-control along with the other current measures of psychosocial functioning without adding another assessment. In addition, the self-control scale would enhance the utility of the CEST for clinical treatment planning. It would save treatment providers the cost, training, as well as the time and effort of adding an additional self-control assessment tool.

Client Assessments and Treatment Research

Assessments to study substance abuse treatment have been used for the past forty years to evaluate, plan, and inform adult treatment programming (Simpson, 2002, 2004). Simpson suggests their use across the span of the treatment process. Assessments begin at intake into the treatment program to provide background information, to evaluate treatment needs and to develop a master treatment plan for the clinical staff to follow. During treatment, assessments monitor client needs and progress as treatment continues, allowing clinical staff to adapt treatment to the needs of the individual. As with adults, the need for information and evaluation also exists in adolescent drug treatment settings. One

of the assessments widely used with adults in treatment for substance abuse disorder and currently used with adolescents is the Client Evaluation of Self in Treatment (CEST).

The extensive use of the CEST has allowed researchers to record, examine, and study client characteristics as they receive drug abuse treatment (Simpson, Joe, Dansereau, & Flynn, 2011). The CEST is currently used both domestically and internationally in settings such as community treatment (public and private), criminal justice treatment (prisons, jails, and boot camps), drug court and other similar diversion programs (domestic violence court), as well as in post-release parole and probation settings. Corrections departments in many states (e.g., Connecticut, Illinois, and Texas) mandate the use of the CEST instrument in whole or in part to evaluate their programs.

Measuring characteristics of clients over the course of treatment using the CEST has helped researchers understand some of the practices that facilitate treatment effectiveness. The four primary domains covered in the CEST assessment are psychological functioning, social functioning, treatment needs and motivation, and treatment engagement (Garner, Knight, Flynn, Morey, & Simpson, 2007; Joe, Broome, Rowan-Szal, & Simpson, 2002; Pankow, Simpson, Joe, Rowan-Szal, & Meason, 2012). The findings from these studies suggest that there is a need for initial assessments at intake to measure motivational readiness for treatment because treatment readiness has a strong positive relationship with staying in treatment for longer periods of time. If evidence of low motivation is found at intake (e.g., low treatment readiness), the curriculum can be adapted to include behavioral and cognitive activities for those individuals who might need an intervention to address the deficit. For example, Prochaska and DiClemente (1986) describe how motivational change begins with the contemplation and recognition of the problem and progresses to readiness to change. Evidence shows that when motivation is high, individuals are more likely to stay in treatment longer (Simpson & Joe, 1993) and actively participate in treatment (Simpson, 2004). According to these authors, longer treatment periods are better. Indeed, Simpson, Joe, Rowan-Szal, and Greener (1997) reported a significant increase in the

odds ratio of a patient obtaining a successful outcome ($\psi=4$.6: 1) when a methadone patient remained in treatment for at least one year. For that reason, CEST assessments are repeated during treatment to gauge early engagement in treatment and to allow adaptation of treatment curriculum activities. Addressing low therapeutic involvement at this stage is important because the evidence points to poor outcomes for that subgroup (Joe, Simpson, & Broome, 1999). According to the authors, the first 30 days in treatment are the most essential for motivating and engaging clients in the recovery process. In studies with adolescents, those individuals with high treatment readiness are more involved in treatment and tend to have better after-treatment outcomes (Broome, Joe, & Simpson, 2001).

The CEST is formatted as a self-report assessment to measure a client's perception of their psychosocial functioning during treatment. It consists of a modular set of four "TCU Short Forms" that each fit on one page. Each of the four primary domains listed above are self-contained on one of 4 forms in the set. They are titled with the acronyms: PSYForm, SOCForm, MOTForm, and ENGForm, as complete descriptive titles (e.g., "Psychological Functioning" instead of PSYForm") might reduce a respondent's willingness to answer honestly if he thinks it might portray him in a negative light.

The PSYForm contains 33 items distributed over five scales to assess psychological functioning that include Anxiety (AX), Decision-making (DM), Depression (DP), Expectancy to refrain (EX; e.g., the perceived likelihood of refraining drugs or drinking alcohol in the next several months) and Self-Esteem (SE). These scales are appropriate for clinical uses in the field. Gender differences are often found in the PSY scales within samples (see Rao, Czuchry, & Dansereau, 2009; Rowan-Szal, Joe, Bartholomew, Pankow, & Simpson, 2012). Based on previous findings in the self-control literature, positive relationships would be expected between high self-control and three of these scales: decision-making, self-esteem, and expectancy. However, negative correlations between high self-control and both anxiety and depression would be expected (Bauer & Baumeister, 2011; Tangney et al., 2004).

The SOCForm measures social functioning from client responses to 36 items that encompass four scales, three of which are standard social functioning domains: Hostility (HS), Risk-taking (RT), and Social Support (SS). The fourth, Social Desirability (SD) is conceived as a scale to detect whether responses are a true reflection of self or if they reflect a desire to present themselves in a more favorable light (e.g., whether or not a respondent is lying). The SD scale (Crowne & Marlowe, 1960) was modified from its original format as a True or False questionnaire to fit the response stem in the CEST (with appropriately weighted scoring). Conceptually, the literature suggests high self-control to be positively related to social support, but negatively related to both hostility and risk taking (Bauer & Baumeister, 2011; Tangney et al., 2004).

The MOTForm consists of scales that describe the client's self-reported treatment needs and readiness to participate in the program. It is used primarily at intake as an early treatment assessment. The 36-item form includes five scales: Desire for Help (DH), Pressures for Treatment Index (PT), Problem Recognition (PR), Treatment Needs Index (TN), and Treatment Readiness (TR). The motivation scale scores indicate the degree to which a client is interested and is ready to receive help in recovering from addiction. In the literature from the Drug Abuse Treatment Outcome Study (DATOS), the motivation scales appear to predict client engagement in treatment for adults (Hiller, Knight, Leukefeld, & Simpson, 2002) and adolescents (Broome, Joe, & Simpson, 2001). In the literature from self-control studies, when researchers increased the meaningfulness of the experimental tasks they found that altruistic motivation (desire to help others) moderated the strength of self-control when behavioral tests of self-control were repeated (Muraven & Slessareva, 2003; Vohs, Baumeister, & Schmeichel, 2012). Specifically, this type of motivation appeared to strengthen or increase the resiliency of self-control. Recovery from substance abuse includes repeated tests of their self-control (e.g., inhibiting behavioral choices to misuse drugs and alcohol). For that reason, the relationship between self-control and motivation is of particular interest in this project.

The last of the 4 CEST domains, treatment engagement, is measured using the 36 items on the ENGForm. The items on the ENGForm pertain to the client's perceptions of the relationship that was built with their counselor, with other participants, how well the treatment program is run, and how relevant it was to their needs. It serves as a survey of the treatment experience and measures Counselor Rapport (CR), Peer Support (PS), Treatment Participation (TP), and Treatment Satisfaction (TS). It is frequently used as an outcome measure in research studies (e.g., Broome et al., 2001; Joe et al., 1999; Hiller et al., 2002; Pankow et al., 2012).

Developers of the CEST added a non-question to several of the one-page modules (e.g., "Please mark 'Agree' as your response to this question"). This item assesses whether the respondent read the question and followed directions (e.g., or instead of reading, simply marked answers in patterns on the answer key to complete the assessment more quickly). The SOCForm, the PSYForm, and the MOTForm each include a non-question for this purpose.

Consistent with previous findings, a recent study confirmed the reliabilities of the CEST scales for a large adult, in-prison drug treatment sample (Simpson, Joe, Knight, Rowan-Szal, & Gray, 2012). The authors noted that the assessment of a client's perception of self during treatment presents a snapshot of psycho-social functioning, reports motivational attributes, and presents clinicians with a therapeutically useful tool. The current project built on these findings and developed a self- control scale from items already contained within the CEST.

Specific Aim of the Project

The specific aim of the project was to develop a self-control scale using existing items from the CEST and then to use it to examine in the relationship between self-control and treatment needs and motivation in adolescent drug treatment. The aim was accomplished in 2 phases. The first phase involved scale development and testing. The second phase looked at the relationship between self-control and treatment outcomes.

Phase 1 - Develop the CEST Self-Control scale (Studies 1 and 2). In Phase 1 of the project, two studies were conducted to examine the psychometrics of the CEST-SC scale. Study 1 tested the reliability and construct validity of the new scale. Study 2 examined reliability, construct validity, and cross-validity between the SCS and the CEST-SC.

Phase 2 - Test the impact of self-control on treatment outcomes (Study 3). In Phase 2 of the project, the CEST-SC was used to examine the hypotheses regarding the relationship between self-control and treatment outcome. Study 3 extended the confirmation of reliability and validity in a sample of adolescents in substance abuse treatment and then examined the association of self-control with substance abuse treatment outcome. It was a retrospective study that looked at the responses to the CEST at intake in relationship to the length of stay in treatment as a treatment outcome.

Project Hypotheses

Hypotheses will be tested in both phases of the project. Hypotheses associated with the development and psychometric evaluation of the CEST self-control scale will be the focus in Phase 1. Next, hypotheses for Phase 2 of the project will center on the relationships between self-control and treatment outcomes.

Phase 1 - Hypotheses related to the development of the CEST Self-Control scale. The CEST self-control scale (CEST-SC) is predicted to be reliable and to show good internal consistency. The factor analyses are expected to show the multi-dimensionality of the self-control construct (Tangney et al., 2004). However, with only 10 items in the scale, the number of factors is expected to be less than the 5 factor solution present in the SCS. CEST-SC scores and their relationships with other CEST variables are expected to conform to theory and findings from the literature. That is, in terms of convergent validity, the constructs that are expected to be related, should be related. CEST-SC scores are predicted to correlate negatively with negative psychosocial functioning on items representing depression, hostility, and risk-taking (Baumeister et al., 1998; Vohs & Faber, 2007). Further, the CEST-SC scores are predicted

to correlate positively with positive psychosocial functioning items from the CEST representing self-esteem, social support and decision-making (Mischel, Shoda & Peake, 1988; Shoda, Mischel, & Peake, 1990; Tangney et al., 2004). These hypotheses will be tested in Studies 1 and 2.

It is further predicted that the CEST-SC scale scores will be comparable to the SCS scores. This hypothesis will be tested in the cross-validation design for Study 2. The two scales will be compared within a sample that responded to all the items on both. It is expected that the CEST-SC and the SCS scores will be significantly correlated with the SCS scores and that the correlation will be positive.

Phase 2 - Hypotheses related to self-control and treatment outcome. The literature asserts that high self-control is associated positively with goal-achievement behaviors. Given that high treatment readiness is related to therapeutic engagement and staying in treatment longer, the initial hypothesis for the second phase of the project predicts that self-control will act as a moderator and positively impact the relationship between length of stay and treatment readiness. Specifically, higher levels of self-control are expected to be associated with longer stays in treatment and higher treatment readiness (e.g., an indication of higher motivation for treatment). The adolescent sample includes two types of treatment programs, residential (REST) and intensive out-patient (IOP). Separate analyses were conducted for each program type because the criteria for the length of stay in treatment are different between REST and IOP.

The final hypothesis of the project explored the impact of self-control on predictors of positive outcomes. The relationship between treatment readiness and self-control was explored further. It was hypothesized that the relationship between treatment readiness and self-control differed by type of program. Participation in the structured (e.g., around-the-clock) REST type of programs may be of benefit to those with low self-control, as compared with participation in the IOP type programs. This hypothesis speculates that IOP participants will have higher self-control but are more likely to

experience negative outcomes due to the lack of structure and situational "ego depletion" effects during evening hours at home.

The next section describes the development of the CEST-SC scale. The scale development section is presented as Phase 1 of the project. Analyses to confirm the reliability and validity of the CEST-SC are described for each of the three studies. Phase 2 of the project follows with analyses in Study 3 that use the CEST-SC as a substitute for the SCS to examine the impact of self-control on adolescents in treatment for substance abuse problems.

Phase 1 - Development of the CEST Self-Control Scale

In the three studies reported here, the CEST-SC was developed and tested. The selection of the initial items on for the CEST-SC scale was based on a review of the self-control literature, a review of the SCS (Tangney et al., 2004) and a review of the CEST (Garner et al., 2007; Joe et al., 2002; Simpson et al., 2012). Items from the CEST were matched with items in the SCS based on the item meaningfulness and a set of ten items were culled from the CEST to form the CEST-SC. The items selected for the CEST-SC included CEST items such as "You get mad at other people easily", "You have trouble concentrating or remembering things", and" You plan ahead", which came from the hostility, anxiety, and decision making scales, respectively. Table 2 lists the ten items that comprise the CEST-SC scale.

Two samples were used in the initial development phase of the CEST-SC. The first study examined data from an incarcerated population from a larger research study to test the culled items from the CEST that form the CEST-SC. The second study examined data from a separate sample as a cross-validation study between the CEST-SC and the SCS (Tangney et al., 2004) with university students. Psychometric tests were repeated for the third study of adolescent drug treatment clients in which the hypotheses for the second phase of the project were tested. The primary assessment instruments included the CEST, the CEST-SC, and the SCS described earlier in this document.

Psychometric evaluation of the scale included exploratory factor analysis to detect the expected multi-dimensionality of the multi-faceted (Steinberg, 2004; Tangney et al., 2004) self-control construct. Cronbach's alpha coefficient of reliability was used to measure internal consistency. Validity was examined using bivariate comparisons (Pearson's correlational coefficient) of the CEST-SC with the SCS established by Tangney, Baumeister and Boone (2004). Finally, convergent validity was tested by examining the bivariate correlations between the self-control as measured by the CEST-SC and the CEST scales, this time focused on the relationships between CEST-SC and psychosocial functioning scales (e.g., anxiety and decision-making). The purpose of this step was to assess the agreement between self-control and psychosocial functioning relationships previously reported in the literature.

Study 1 - Reliability of the CEST Self-Control Scale and Convergent Validity with the CEST

After item selection, an analysis of secondary CEST data served as an initial validation step for the CEST-SC scale. These data were collected as part of a larger research project. The research aim for this experiment specifically addressed the question of whether the items selected for the CEST-SC had good internal consistency. It was hypothesized that there would be a high correlation between items and the CEST-SC would have reasonable reliability. Because self-control construct is multi-faceted (Steinberg, 2004; Tangney et al., 2004), the factor analysis CEST-SC was expected to reveal a multi-dimensional structure. In terms of convergent validity, it was hypothesized that the CEST-SC scores would be related to the CEST psychosocial functioning scales as predicted by the literature on self-control theory.

Method

Participants. The sample consisted of 1327 incarcerated adults from an in-prison substance abuse treatment program. The average age was 29.6 years old, and 68.5% were male. The ethnicity for sample was 30.5% Hispanic, 39.2% White, 28% Black, and 4.2% were more than one race.

Procedure and measures. The CEST was completed at intake into a substance abuse program as part of "treatment as usual". The secondary data was collected as part of a larger research project. A 5-point Likert response set is used on the CEST. Respondents indicated the extent to which each statement describes them accurately. The answers range from strongly disagree (corresponding to a value of 1) to strongly agree (a value of 5). The CEST-SC items that were used had both positively-constructed and negatively-constructed items (e.g., "You analyze problems by looking at all the choices" is positively constructed, whereas "I often act without thinking through all the alternatives" is phrased in the negative). To make the high scores indicate more self-control and the low scores indicate less self-control, the negatively-constructed items were reversed. The responses for the CEST-SC and CEST were each summed and an average computed to obtain a scale score. The CEST-SC and CEST scores ranged from 1 - 5 with high scores indicating high self-control.

Results

Factor analysis. An initial process of testing dimensionality was conducted. The responses to the items on the CEST-SC scale for this sample were subjected to an exploratory factor analysis, followed by varimax rotation. Criteria for acceptable factors generally include: 1) an eigenvalue greater than 1 (Nunnally & Bernstein, 1994), 2) the amount of variance accounted for by the factor, and 3) interpretability criteria such as a minimum of 3 items with significant factor loadings, shared meaning among the items loading on a factor, and distinct meanings for the separate factors. As expected, the factor analyses found three factors with eigenvalues greater than one (2.46, 1.63, and 1.52). The factor loadings were acceptable and ranged from 0.52 - 0.82. One of the CEST-SC factors contained only 2 items. This violated one of the criteria for acceptable factors. Specifically, solutions with less than 3 items do not generally provide a satisfactory measurement of a construct (Hatcher, 1994). Given that the CEST-SC was multi-dimensional as expected, the scale was not divided into factors. Indeed, the SCS

(Tangney et al., 2004) is scored as a composite with a multi-dimensional structure of 5 factors: self-discipline, deliberate/non-impulsive tendencies, healthy habits, work ethic, and reliability.

Reliability. Next, the scale reliability for the CEST-SC was assessed by calculating coefficient alpha (Cronbach, 1951). High values of coefficient alpha are an indication that the items have internal consistency, that is, they are correlated with one another. It is used as a measure of whether the items in a scale fit together reasonably. Values of Cronbach's alpha greater than .70 are considered above the acceptable lower bound for internal consistency (Nunnally & Bernstein, 1994). The value of coefficient alpha for the CEST-SC's 10 items for this sample was acceptable (α = 0.78).

Convergent validity. Relationships between self-control and psychosocial functioning have been tested in the literature. Therefore, in the third step, correlational analyses were used to test convergent validity, that is, how well the CEST-SC conforms to relationships predicted by self-control theory. The CEST measures psychosocial functioning domains such as hostility, depression, decision making, anxiety, risk taking, self-esteem and social support. It also measures the expectancy of refraining from drug use when treatment is over, where a high score indicates more restraint from substance abuse.

The CEST-SC consists of items that are embedded in the CEST scales, so there are items that overlap between the CEST-SC and four of the scales from the CEST (hostility, depression, decision making, and anxiety). A solution was needed to assess convergent validity because the overlapping items caused problems in assessing the correlation between scales. High correlations that were the result of including common items could not be interpreted as a relationship between self-control and the construct being compared. As a remedy for those CEST scales which contained items in the CEST-SC, instead of using the entire CEST scale, sample items from the affected scale were used. The basis for selecting a sample item was to examine the factor loadings for each CEST scale and choose several of the highest loadings from the available items that did not overlap.

As expected, high self-control was positively related with desirable attributes such as self-esteem (r = .64, p < .001), social support (r = .29, p < .001), and items from the CEST decision making scale that represent sound decision making behaviors (r = .34 to .48, p < .001). Additionally as expected, high risk taking (r = -.43, p < .01) was negatively associated with high self-control. Further corresponding to predictions, high self-control was negatively related with attributes that signal problems with psychosocial functioning such as high scores on items representing depression (r = -.50 to -.51, p <.001), hostility (r = -.43 to -.47, p <.001), and anxiety (r = -.39 to -.52, p< .001).

According to the literature, high self-control is positively related to lower substance abuse (Tangney et al., 2004) and lower substance abuse is related with high expectancies to refrain from substance abuse (Joe et al.,2007). Therefore, high expectancy to refrain from use of drugs was predicted to correlate positively with high self-control. Indeed, a positive relationship between expectancy to refrain and self-control was confirmed (r = .38, p < .001). For these data, the analyses of the CEST-SC scale support reliability and convergent validity reported in the literature between self-control and relationships with psychosocial functioning (see Table 1).

Table 1

Correlations between CEST-SC and TCU CEST for Adults in Treatment

	r	*P*	Mean (SD)
CEST-SC with:			
Hostility			
"you have a lot of anger inside you"	-0.47	***	2.50 (1.2)
"you have a hot temper"	-0.43	***	2.55 (1.3)
"your temper gets you into trouble"	-0.44	***	2.40 (1.3)
Depression			
"you feel sad or depressed"	-0.51	***	2.36 (1.3)
"you feel extra tired or run down"	-0.50	***	2.23 (1.1)
Decision making			
"you make good decisions"	0.48	***	3.29 (1.0)
"you consider how your actions will affect others"	0.34	***	3.79 (0.7)
Anxiety			
"you have trouble sleeping"	-0.39	***	2.69 (1.4)
"you feel anxious or nervous"	-0.52	***	2.59 (1.3)
Risk Taking	-0.43	**	2.97 (0.8)
Self-esteem	0.64	***	3.79 (0.8)
Social Support	0.29	***	4.12 (0.6)
Expectancy- high scores = high likelihood of refraining from substance abuse	0.38	***	4.33 (0.8)

*p < .05 **p <.01 ***p <.001

Note: for the CEST scales where the CEST-SC contains items that overlap both scales, the correlations of the CEST-SC with single items on the CEST target scale were used instead. Selection of the single items was based on highest factor loading in the literature and several items are presented to assure that the assumption of correlation was not based on a single item.

Discussion

These preliminary analyses showed the multi-faceted nature of the self-control construct and acceptable reliability for the CEST-SC. Convergent validity for the scale was consistent with the self-control literature. In addition, convergent validity was consistent for literature from addiction research. This study demonstrated that the CEST-SC provides a reliable self-reported self-control profile embedded within the CEST.

Study 2 - Cross-validation of the CEST-SC with the SCS

After item development and the initial reliability testing, a second study was conducted to further test the new scale. A cross-validation design was used to test the correlation between the SCS and the CEST-SC scores for the same population. Each participant in the study was asked to respond to the items from both of the scales. The research aim for this experiment specifically addressed the question of whether self-control scores on the two scales (CEST-SC and the SCS) are related and comparable. It was hypothesized that there would be a high correlation between the SCS and CEST-SC scores. In terms of reliability and convergent validity, it was again hypothesized that the CEST-SC items would show an acceptable fit and scores would be predictably related to the CEST psychosocial functioning scales. Further, it was expected that the SCS would be related to the CEST psychosocial functioning scales in the pattern predicted by theory.

Method

Participants. The individuals in the final sample (*n* = 297) averaged 19.2 years of age. All were college students at a private university in the Southwestern United States. Forty-two percent of the participants were male. This percentage is consistent with the number of male and female students who attend the university.

Procedure and measures. Students enrolled in university psychology courses were recruited to participate in exchange for course credit. After completing a consent document, the participants (*n* = 315) entered their responses to items from both the 36-item SCS (Tangney et al., 2004) and a shortened CEST instrument (46 psychosocial items) using an online survey format. CEST items that pertained to criminal justice settings (e.g., “You are at this treatment program only because it is required”) or drug treatment (e.g., “You have stopped or greatly reduced your drug use while in this treatment program”) were not included in the university student survey. These items were omitted because they were presumably less relevant to the students in the university population. Two static non-questions (e.g.,

"Please mark AGREE as your answer to this question") were included to assess response accuracy (e.g., those who might mark their responses without reading the question). Participants were asked to answer all the questions, but given the freedom to skip any question(s) that made them feel uncomfortable. Participant's responses were retained for the final dataset if they answered all the items that were targeted for comparison from both scales and correctly answered the accuracy questions.

Results

Analyses were conducted in several steps. Exploratory factor analysis and Cronbach's alpha were conducted first. Cross-validation analyses included bivariate correlations for the matching items, followed by bivariate correlation between the 2 scales.

Factor analysis. Exploratory factor analyses were repeated to confirm expectations from Tangney et al., (2004) and Study 1. Consistent with the previous findings, factor analysis (varimax rotation) for the CEST-SC revealed multi-dimensionality. There were 3 eigenvalues with values greater than 1 (2.57, 1.49, and 1.09). Each item had a primary factor loading greater than .43 (range .43 to .81).

Reliability. Next, the CEST-SC and SCS scales were evaluated for internal consistency. Coefficient alpha values for the 36-item SCS and the 10-item CEST-SC were computed (SCS α = .86; CEST-SC α = .67). For these data, the reliability for the SCS was above the acceptable lower bound for alpha, and the CEST-SC was close to it (Nunnally & Bernstein, 1994).

Bivariate correlations. The cross validation data was evaluated next. First, a bivariate correlational analysis was conducted for all of the items on both scales (see Table 2). This step helped confirm the relationship between the items that were selected during the scale development and initial analyses in Study 1.

Table 2

Matching Items from the 2 Self-Control Scales

Proposed CEST-SC items	Corresponding items from SCS	r
You get mad at other people easily. ®	I lose my temper too easily. ®	.62***
You have trouble concentrating or remembering things. ®	I have trouble concentrating. ®	.59***
You have trouble making decisions. ®	I change my mind fairly often. ®	.44***
You think about the probable results of your actions.	I do many things at the spur of the moment. ®	.43***
You plan ahead.	I am reliable.	.37***
Your drug use is causing problems in thinking or doing your work. ®	Pleasure and fun sometimes keep me from getting work done. ®	.32***
You have felt like rebelling against people in authority even if you knew they were right. ®	Sometimes I can't stop myself from doing something, even if I know it is wrong. ®	.31***
You analyze problems by looking at all the choices.	I often act without thinking through all the alternatives. ®	.25***
You have trouble sitting still for long. ®	I am impulsive. ®	.20***
You feel hopeless about the future. ®	I am not easily discouraged.	.17**

*$p < .05$ **$p < .01$ *** $p < .001$

Next, SCS and CEST-SC scores were calculated for each participant using the same methodology that was used in Study 1. The CEST and the SCS both use an analogous 5-point Likert response set for individuals to indicate the extent to which each statement describes them accurately. The responses for the CEST-SC and SCS were each summed and an average computed to obtain a scale score. The SCS and the CEST-SC scores ranged from 1 - 5, with higher values indicating more self-control. Bivariate correlation results revealed a significant positive relationship between university student scores on the two measures ($r = .64$, $p < .001$).

Convergent validity. The next step of testing for the CEST-SC examined the convergent validity. The relationships between the CEST-SC and the CEST scales (e.g., hostility, depression, decision making,

anxiety, risk taking, and self-esteem) were expected to demonstrate convergent validity by conforming to the literature that high self-control is positively related with better psychosocial functioning. Table 3 presents the correlations between the CEST-SC with the CEST scales. As noted in Study1, there are items that overlap between the CEST-SC and the CEST and for those scales, sample items were used instead of using the entire CEST scale. For these data, the relationships matched the expected precedents from the self-control literature. Significantly, the CEST-SC scores were negatively correlated with the sample items relating to hostility (r = -.37 to -.42, p < .001; e.g., "you have a hot temper"), the sample items relating to depression (r = -.36 to -.38, p < .001; e.g., "you feel sad or depressed"), the sample items relating to anxiety (r = -.34 to -.67, p < .001, e.g., "you feel anxious or nervous"), and the risk taking scale (r = -.27, p < .001). Further, as predicted, high self-control was positively related to self-esteem, an indicator of higher psychosocial functioning (r = .34, p < .001), as well as the items related to sound decision making (r = .34 to .35, p < .001; e.g., "you make good decisions").

Convergent validity was also examined between the CEST and the SCS and the same patterns were found (see Table 3). High self-control was related to positive CEST psychosocial functioning indicators (decision making and self-esteem). Further, high self-control was negatively related to CEST indicators of lower psychosocial functioning (e.g., hostility, depression, anxiety, and risk taking).

Table 3

Correlations of the CEST-SC and SCS with CEST Psychosocial Functioning Items for University Students

	r		Mean (SD)
CEST scales	CEST-SC	SCS	
Hostility			
"you have a lot of anger inside you"	-0.37***	-0.25***	2.07 (1.0)
"you have a hot temper"	-0.42***	-0.33***	2.22 (1.1)
"your temper gets you into trouble"	-0.42***	-0.33***	2.18 (1.1)
Depression			
"you feel sad or depressed"	-0.38***	-0.39***	2.31 (1.0)
"you feel extra tired or run down"	-0.36***	-0.33***	2.94 (1.1)
Decision making			
"you make good decisions"	0.35***	0.37***	3.94 (0.6)
"you consider how your actions will affect others"	0.34***	0.22***	3.83 (0.8)
Anxiety			
"you have trouble sleeping"	-0.34***	-0.32***	2.72 (1.2)
"you feel anxious or nervous"	-0.67***	-0.44***	2.89 (0.8)
Risk Taking	-0.27**	-0.39***	3.78 (0.8)
Self-esteem	0.34***	0.26***	4.01 (0.7)

*p < .05 **p <.01 ***p <.001

Note: for the CEST scales where the CEST-SC contains items that overlap both scales, the correlations of the CEST-SC with single items on the CEST target scale are presented. Selection of the sample items was based on highest factor loading in the literature and several items are presented to assure that the assumption of correlation was not based on a single item.

Discussion

These analyses show support for the reliability and validity of the CEST-SC. Significantly the cross-validation results showed that the matching items on SCS and the CEST-SC were positively related. Further, the cross validation analyses between the 2 scale scores were significant and positively related. These results suggest that the CEST-SC is comparable to the SCS in the measurement of self-control.

The CEST-SC value for coefficient alpha suggests that reliability for the CEST-SC is at the lower boundary. Taken together, Studies 1 and 2 (α = .77, α = .67) found that the items fit together reasonably. Convergent validity was demonstrated between the CEST-SC and the CEST as expected

from the literature. High self-control was positively associated with indicators of high psychosocial functioning and negatively associated with indicators of poor psychosocial functioning.

In addition, this study uniquely provides CEST scores from a non-addiction treatment sample. These data provide an important comparison sample between individuals in drug abuse treatment and "normal" individuals living in a non-prison setting. Further, this study uniquely examined the relationships between the SCS and the CEST. Results were similar to the relationships between the CEST-SC and the CEST, as expected.

In conclusion, the SCS has been found psychometrically sound and consistent with self-control theory in the literature. Given that the cross-validation results between the SCS and CEST-SC are significant, these findings suggest that the CEST-SC scale scores are consistent with the SCS. It seemed to perform as a suitable substitute for the SCS. These findings suggest that the CEST-SC is sufficient to substitute for the SCS in future research studies. In the next section that begins the second phase of this project, the CEST-SC will be substituted for the SCS to examine the impact of self-control during substance abuse treatment.

Phase 2 - Exploring the Relationship between Self-Control and Treatment Outcomes

The following phase of the project supports the scale development of the CEST-SC, while exploring treatment outcomes. Models that describe the drug abuse treatment process have identified a number of indicators that suggest positive treatment outcomes, including high treatment readiness, which is part of the motivation construct. In addition, evidence from the self-control literature has suggested that high self-control predicts beneficial outcomes. Analyses from the first two studies supported the reliability and convergent validity for the CEST-SC, as well as agreement (e.g., cross-validation) between CEST-SC with the SCS. The specific aim of this phase of the project is to confirm the psychometrics of the CEST-SC with adolescents in treatment and then to measure self-control among

adolescents in substance abuse treatment to test hypotheses related to the impact of self-control on treatment outcomes.

Study 3 - Using the CEST-SC to Explore Self-Control among Adolescents in Treatment

It was hypothesized that reliability and validity for the scale would be confirmed with the adolescent sample. Consistent with theory and evidence that posits that self-control is associated with a pattern of beneficial outcomes, it was hypothesized that high self-control will be a feature associated with beneficial treatment outcomes such as longer lengths of stay and higher treatment readiness.

Method

Participants. The sample contained 301 adolescent clients in substance abuse treatment programs in the northeast region of the United States, specifically in Maine, Massachusetts, New Hampshire, and Rhode Island between 2010 and 2012. The programs consisted of two types of treatment. One was a residential treatment (REST) setting and the other was an intensive outpatient (IOP) setting. Six programs, 4 REST and 2 IOP comprised the sample. The clients ranged from 14 – 18 years of age. Table 4 presents demographics that characterize these youth. The clients tended to be male, White, not Hispanic, and the mean age was 16.94 years old. IOP participants tended to be a little younger than REST participants. The overall split between genders reflected national averages (SAMSHA, 2007); there are more adolescent males in treatment than females. Eighty-two percent reported that they were not of Hispanic origin, and the remaining 18% indicated Dominican, Puerto Rican, South American, or other Hispanic descent. For 34 clients (11% of the sample), the Hispanic origin question was left blank. The ethnic distribution of participants was 75% Caucasian, 9% African American, 1% Native American, 8% multi-racial, and 12% indicated “other”. This distribution was consistent with data from the 2010 Census (see County Business and Demographics Table, U. S. Census Bureau, U. S. Department of Commerce) that indicates 85% of the population in the region is not Hispanic or Latino and 82% are White.

Table 4

Demographics of the Adolescent Sample

	Total sample	REST	IOP
Variables	% (n)	% (n)	% (n)
Treatment modality	100.0 (301)	60.1 (181)	39.8 (120)
Gender			
Male	78.4 (236)	86.2 (156)	66.7 (80)
Female	21.6 (65)	13.8 (25)	33.3 (40)
	Mean (n)	Mean (n)	Mean (n)
Age	16.9 (301)	17.1 (181)	16.8 (120)
Race			
American Indian	0.7 (2)	0.6 (1)	0.8 (1)
Black	9.3 (28)	8.3 (15)	10.8 (13)
White	75.4 (227)	84.0 (152)	62.5 (75)
Other	12.3 (37)	3.9 (7)	25.0 (30)
Multi-racial	2.3 (7)	3.3 (6)	0.8 (1)
Hispanic origin	†(34)	† (32)	† (2)
No - not of Hispanic origin	82.4 (220)	88.6 (132)	74.6 (88)
Yes - Dominican	1.2 (3)	0.7 (1)	1.7 (2)
Yes - Puerto Rican	10.5 (28)	6.0 (9)	16.1 (19)
Yes - South American	0.4 (1)	0.0 (0)	0.9 (1)
Yes - Other Hispanic	5.6 (15)	4.7 (7)	6.8 (8)

Procedure. This third study examined responses to the CEST assessment that were collected from adolescents. The data set included six substance abuse treatment programs operated by a private treatment provider. After consent to participate was obtained by the treatment agency, the clients' completed an array of assessments at intake into treatment as approved and directed by the agency's Institutional Review Board (IRB). The CEST was one part of this agency's group of assessments that were administered as part of ongoing clinical practice at intake into treatment. Agency staff also recorded program completion data during the last week of treatment. The agency provided descriptive demographics (age, race, gender), individual differences (e.g., DSM Abuse and Dependence criteria

severity score), along with treatment start and end dates, discharge reason, and discharge status. Conforming to their internal IBR policy and TCU's IRB protocol, the agency shared these data in de-identified digital format, with the participant's responses coded with a linking number, not by name, which ensured confidentiality. Program names were similarly coded by the researcher. The use of an aggregated format reported the results without individuals or program identifiers. All data was kept on a password-protected computer in a locked office at TCU. The IRBs from TCU and the agency reviewed and approved all research methods and procedures.

Measures. The current study used the CEST and the CEST-SC scales. Scoring the CEST was conducted in the same way as Studies 1 and 2, a Likert-type rating scale was used with responses ranging from 1 – 5 (1 = disagree strongly, 2= disagree, 3 = uncertain, 4 = agree, and 5 = agree strongly). Similarly, the reversed scoring calculation for reflected items was used (see Study 1). High scores indicate a greater amount of the construct being measured for the CEST-SC and the CEST scales.

The CEST scales. The treatment agency administered the CEST at intake. They used the PSYForm, SOCForm, and MOTForm (Simpson et al., 2012) that was described earlier. The de-identified client responses to these items allowed the CEST-SC and CEST scale scores to be tabulated and analyzed. The treatment readiness (TR) scale from the MOTForm was of particular interest for this study. It was used to examine the relationship between motivation for treatment and self-control in this adolescent drug treatment setting. The literature suggested that altruistic motivation strengthens self-control (Muraven & Slessareva, 2003). Motivation for treatment in this setting may operate differently.

The CEST-SC scale. Items from the SCS (Tangney, Baumeister, and Boone, 2004) were matched in the PSYForm, SOCForm, and the MOTForm from the CEST, as described in Studies 1 and 2. These matched items were used to form the CEST-SC scale. The CEST-SC score was used to assess self-reported self-control at intake to substance abuse treatment for this sample of adolescents in both residential and intensive out-patient treatment programs.

Outcome variables and discharge information. The discharge information provided by the treatment agency contained up to four variables: the date of a client's intake into treatment, the date of the client's discharge from treatment, the reason for a client's discharge from treatment (DCH), and for some clients, the status of the discharge (STATUS). The first outcome variable for this study was the number of days in treatment or length of stay (LOS). LOS was calculated as the difference between the date of intake and date of discharge for each client. DCH contained the reason for a client's discharge from treatment. These reasons for discharge ranged from successful program completion to unsuccessful program completion. The unsuccessful completion categories distinguished between reasons that were outside the client's control (e.g., client relocated, parent withdrawal, re-assessment indicated that a different level of care was required, other medical problems) and reasons that were within the participant's control (e.g., leaving against clinical advice, chronic non-compliance, and bringing/using substances in the facility; J. Butler, personal communication, January 26, 2012). DCH represented 4 categories of reasons for discharge (program completion, discharged - incomplete but outside the client's control, discharged - incomplete but within the client's control, or discharged - other). Last, the STATUS variable represented the percentage of treatment goals the client completed prior to discharge (e.g., no goals met, completed less than 50% of goals, completed 50 to 75% of goals, completed more than 75% of goals). The STATUS variable provided some interesting preliminary findings but because the data was incomplete, further study is needed.

Analyses

Preliminary analyses. Power analyses were conducted to ensure that sample size was adequate to run regression analyses and detect significant results. Cohen (1992) indicates that for multiple regression analyses using 2 independent variables (IV), each group needs 67 participants for detecting a medium effect size for α = .05,. Further, groups need 76 participants when using 3 IVs (assuming the use

of one IV to control for severity of problems). Following Cohen's guidelines, the present study used a sufficient sample to detect medium effects using the predictors of interest.

Primary analyses. The primary analyses repeated the psychometric analyses described in Studies 1 and 2 for this target sample from adolescent drug treatment programs. Next, the means and standard deviations of the CEST-SC and CEST scales were used to assess the characteristics of the adolescent sample. T tests determined significant program differences. Hypothesis testing followed with the CEST-SC separated by program type. For the first hypothesis, multiple regression analyses examined the relationship between the dependent variable (DV; LOS), and the independent variables (IV; treatment readiness/motivation and self-control). Further, the regression analyses included the 2-way interaction term (the product of the predictors) to detect whether self-control had a moderating effect on the relationship between LOS and treatment readiness. The analyses were conducted separately by program type due to differences in program length and criteria for completion. For the second hypothesis, multiple regression analyses looked for main effects between self-control (IV) and treatment readiness (DV). The analyses were conducted separately by program type.

Results

Psychometric Results. The reliability and validity of the CEST-SC scale was assessed for this adolescent sample. The analyses consisted of factor analysis, a test of reliability (internal consistency), and validity (e.g., construct and predictive).

Factor analysis. Results from exploratory factor analyses were similar to that of the other 2 samples. The rotated factor pattern for these data contained 3 factors with eigenvalues greater than one (2.22, 1.83, and 1.49). The factors shared meaning as described in the previous two studies.

Reliability. Next, the SCS-SC scale was evaluated for internal consistency using the Cronbach's alpha coefficient (α = .76). This value indicates acceptable reliability for the items in the CEST-SC.

Validity. Convergent validity for the adolescent study sample was assessed by observing the relationships of the CEST-SC with items from the CEST to look for the agreement with the self-control literature and consistency with the patterns that this project has demonstrated in the samples from Studies 1 and 2. In particular, it was hypothesized that high self-control would be positively related to indicators of high psychosocial functioning such as self-esteem, social support, and decision-making. Likewise, high self-control was expected to be negatively related to indicators of low psychosocial functioning such as hostility, risk taking, and anxiety. In addition, a positive relationship between a high expectancy to refrain from future substance abuse and high self-control was predicted. As expected (see Table 5), high scores for the CEST-SC were positively to scales on the CEST indicating high psychosocial functioning (e.g., self-esteem, $r = 0.67$, $p < .001$) and negatively related to scales on the CEST representing low psychosocial functioning (e.g., risk taking, $r = -0.45$, $p < .001$).

Table5

Correlations between CEST-SC and CEST for Adolescents

CEST-SC with:	*r*	*P*	Mean (SD)
Hostility			
"you have a lot of anger inside you"	-0.60	***	3.21 (1.2)
"you have a hot temper"	-0.47	***	3.21 (1.3)
"your temper gets you into trouble"	-0.45	***	3.08 (1.3)
Depression			
"you feel sad or depressed"	-0.50	***	2.76 (1.3)
"you feel extra tired or run down"	-0.46	***	2.76 (1.2)
Decision making			
"you consider how your actions will affect others"	0.33	***	3.44 (1.0)
"you make good decisions"	0.44	***	3.04 (0.9)
Anxiety			
"you have trouble sleeping"	-0.44	***	2.98 (1.4)
"you feel anxious or nervous"	-0.55	***	2.87 (1.3)
Risk Taking	-0.45	***	3.78 (0.7)
Self-esteem	0.67	***	3.56 (0.8)
Social Support	0.21	***	3.88 (0.6)
Expectancy to refrain from future use of illegal substances	0.46	***	3.62 (1.0)

*$p < .05$ **$p < .01$ ***$p < .001$

Note: for the CEST scales where the CEST-SC contains items that overlap both scales, the correlations of the CEST-SC with single items on the CEST target scale are presented. Selection of the sample items was based on highest factor loading in the literature and several items are presented to assure that the assumption of correlation was not based on a single item.

Characteristics of the adolescent sample. The next step in this project involved using the CEST-SC and the CEST scales to measure client characteristics. Means and standard deviations were calculated for the CEST-SC and CEST scales for the adolescent sample (*n* = 301). The client groupings were based on type of treatment program, REST (*n* = 181) and IOP (*n* = 120). The means of the 2 groups were compared using t-tests to determine statistically significant differences. The groups were significantly different in their self-reported self-control scores. This difference indicated that IOP clients had a tendency for higher self-control than REST clients (see Table 6). Treatment needs and motivation scales (from the TCU MOTForm) also differed significantly between the groups. As compared with IOP clients,

REST clients reported significantly more treatment readiness, more desire for help, and more problem recognition than IOP. Further, for both of the motivation indices (treatment needs and pressures for treatment), the REST clients reported higher needs for treatment services and higher external pressures to be in treatment than the IOP clients reported. The programs differed significantly on the psychological functioning scales (e.g., anxiety, self-esteem, depression, and decision making). REST clients reported more anxiety, lower self-esteem, more depression, and less confidence in decision making than IOP clients. The differences were apparent in social functioning between the 2 programs. Both self-reported hostility and risk-taking were higher for REST clients when compared with IOP clients.

Table 6

Comparing adolescent clients by Program Using the CEST

Variables		REST Mean(SD)	IOP Mean(SD)	t test	P
CEST Self-control	CEST-SC	2.89 (.61)	3.27 (.66)	5.12	***
Hostility	HS	2.99 (.79)	2.70 (.81)	-3.07	**
Risk Taking	RT	3.72 (.59)	3.35 (.69)	-4.92	***
Self-esteem	SE	3.31 (.81)	3.65 (.80)	3.62	**
Depression	DP	2.66 (.80)	2.34 (.76)	-3.51	**
Decision Making	DM	3.17 (.57)	3.37 (.63)	2.90	*
Anxiety	AX	2.96 (.83)	2.65 (.83)	-3.17	*
Problem Recognition	PR	3.40 (.78)	2.39 (.82)	-10.20	***
Desire for Help	DH	3.60 (.78)	2.80 (.82)	-8.49	***
Treatment Readiness	TR	3.49 (.84)	2.79 (.80)	-7.19	***
Treatment Needs	TN	2.95 (.68)	2.20 (.77)	-8.87	***
Pressures for Treatmt	PT	3.27 (.62)	2.61 (.67)	-8.57	***
Expectancy	EX	3.48 (.98)	3.84 (.98)	3.11	*

* $p < .01$ ** $p < .001$ *** $p < .0001$

Length of stay and other outcome variables. As expected, the two types of treatment programs also differed in both the range and the average length of stay (LOS). LOS was the outcome variable of interest. In REST programs, the length of stay is often dictated by the legal status of the client (mandated court orders) whereas in IOP programs, funding considerations (availability and type of insurance) are more relevant (personal communication L Scott, 6/19/2012). Comparisons of the

treatment duration in days and the length of stay in months between programs highlight these differences (see Table 7). Additional information includes completion rates, discharges reason (DCH), and an indication by the counselor of the percentage of the treatment goals attained during the current substance abuse treatment episode (STATUS). Completion differed significantly between programs (X^2 = 23.4, p < .001). In IOP programs only a third completed as compared with those who did not, but in REST the number of clients who did and did not complete the program was comparable.

Table 7

Three Outcome Variables by Treatment Program Type

	All *N* =301	REST *n*=181	IOP *n* =120
	Mean(SD)	Mean(SD)	Mean(SD)
Duration in days	116.3 (75)	103.8 (59)	135.2 (92)
Range	0 -506	0 - 227	0 -506
Length of Stay (LOS) months	% (n)	% (n)	% (n)
1 month or less (0 - 30 days)	11.3 (34)	14.9 (27)	5.8 (7)
2 months (31 - 60 days)	11.0 (33)	10.5 (19)	11.7 (14)
3 months (61 - 90 days)	17.6 (53)	19.3 (35)	15.0 (18)
4 months (91 - 120 days)	18.3 (55)	14.9 (27)	23.3 (28)
5 months (121 - 150 days)	12.6 (38)	11.1 (20)	15.0 (18)
6 months (151 - 180 days)	13.3 (40)	16.6 (30)	8.3 (7)
7 months (181 - 210 days)	9.3 (28)	11.6 (21)	5.8 (7)
8 months (211 - 240 days)	1.7 (5)	1.0 (2)	2.5 (3)
9 months or more (> 240)	5.0 (15)	0.0 (0)	12.5 (15)
Discharge reason (DCH)	% (n)	% (n)	% (n)
Completion	39.2 (118)	50.3 (91)	22.5 (27)
Discharged - incomplete outside client's control	8.0 (24)	1.1 (2)	18.3 (22)
Discharged - incomplete within client's control	48.5 (146)	47.5 (86)	50.0 (60)
Discharged - other	4.3 (13)	1.1 (2)	9.2 (11)
Discharge Status (STATUS)	% (n)	% (n)	% (n)
	† (205)	†(123)	†(82)
Completed > 75% of goals	43.8 (42)	58.6 (34)	21.1 (8)
Completed 50 - 75% of goals	22.9 (22)	24.1 (14)	21.1 (8)
Completed < 50% of goals	9.4 (9)	12.1 (7)	5.3 (2)
No goals met	24.0 (23)	5.2 (3)	52.6 (20)

† indicates # missing

Testing effects of self-control and treatment readiness on LOS. This project proposed that the length of stay in treatment is influenced by treatment readiness and that the relationship between them is moderated by self-control. This relationship was tested by regressing the 2 predictors, treatment readiness (TR) and CEST-SC, simultaneously on the criterion, length of stay (LOS). Separate analyses were conducted by program type (IOP and REST). The regression analyses revealed a significant main effect for IOP but not for REST. The regression model was significant for IOP, $r = .25$, $R^2 = .06$, $F(2,117) = 3.9$, $p = .02$, and together the 2 factors accounted for 6% of the variance in LOS. For REST, the regression model was not significant, $r = .03$, $R^2 = .001$, $F(2, 178) = .07$, $p = .93$. Significant increases in treatment readiness were associated with increases in LOS for IOP, but not REST clients. For each 1 point increase in treatment readiness, overall LOS in treatment (measured in months) increased by half a month, $b = .52$ ($SE = .27$). On the other hand, the relationship between LOS and self-ratings of self-control with LOS decreased by half a month, $b = -.44$ ($SE = .33$). Self-control was tested as a moderator of the relationship between LOS and TR for the IOP group using simultaneous multiple regression of the 2 predictors and their 2-way interaction term on the criterion variable LOS. The result of the test for moderation was not significant ($p = .59$). Overall, these results suggest that the relationship between treatment readiness and self-control serves as a significant predictor for LOS in treatment for adolescents in the IOP programs, but not for REST.

For testing the next hypothesis, multiple regression analyses were used to examine whether adolescent self- reported treatment readiness (TR) varied as a function of self-control. For this analysis, treatment readiness was entered as the criterion (DV). Self-control significantly accounted for 8.3% of the variance in TR for the IOP clients, $r = .29$, $R^2 = .083$, $F(2,117) = 10.68$, $p = .001$. In IOP programs, significant decreases in TR were associated with increases in self-control, $b = -.34$ ($SE = .35$), $t = 11.19$, $p < .001$. The relationship between treatment readiness and self-control was not significant for REST program clients ($p = .47$).

Discussion

The psychometric properties of the CEST-SC for Study 3 were consistent with the findings from Studies 1 and 2. The scale had acceptable internal consistency and good convergent validity. The predicted relationships were confirmed for the CEST-SC with adolescents in substance abuse treatment.

The clients in the two programs were significantly different in many ways. The IOP clients were significantly higher in self-control but lower in all the indicators of motivation compared to the REST clients. The two types of programs also significantly differed by length of stay in that longer stays in treatment were associated with the IOP clients, compared with REST. Significantly, the number of clients who were discharged as completing the program was higher for the REST clients as compared to the IOP clients.

Regression analyses suggested that levels of self-control and treatment readiness were associated with a difference in the length of stay in treatment for adolescents in IOP treatment programs but not for REST. Shorter treatment stays were associated with IOP clients with higher levels of self-control and lower treatment readiness, compared with IOP clients with lower levels of self-control. This result was contrary to the self-control literature findings that high self-control is related to positive goal achievement (Tangney et al., 2004). In addition, the self-control literature reported a negative association between high depression and high self-control (Tangney et al., 2004). However, the results from this study support addiction research literature that has consistently found that those with psychosocial problems (e.g., high depression) tend to remain in treatment and tend to be engaged therapeutically in treatment at higher levels than those with higher psychosocial functioning (Joe, Brown, & Simpson, 1995, Rao et al., 2009). The transtheoretical model of change (Prochaska, DiClemente, & Norcross, 1992) supports the notion that with high perceived self-control, the individual may remain in the early stages of change (e.g., pre-contemplation and contemplation) and not move to the later stages (e.g., preparation, action and maintenance) to initiate changes aimed at recovery. The

results of this study suggest that IOP clients with high self-control are related with greater risks for leaving treatment early than those with lower self-control. In REST programs, self-control was not significantly related to length of stay in treatment or treatment readiness. In fact, compared with IOP clients, the REST clients reported higher motivation for treatment. This result may be an indication of greater severity of drug dependence among REST clients.

This project planned to examine the relationship between treatment readiness and self-control and posited that the type of program would be a potential moderator of self-control based on the Limited-Resource Model. Because the groups were very different, any moderation effects of between them could not be presumed to be related to only to self-control and motivation. Analyses were conducted separately for that reason. The results suggest that high self-control scores from IOP clients were associated with less motivation for treatment. According to the responses on the self-report, for IOP clients, high self-control was related to a lack of readiness to engage in treatment.

Concluding Discussion and Summary

The specific aim for this project was to examine self-control in a population of adolescent clients in residential and intensive out-patient substance abuse treatment programs. In order to achieve that aim, a self-control scale was developed from within a standard addiction research assessment, the CEST. The project demonstrated that the new scale, the CEST-SC provides a reliable self-control assessment.

The CEST-SC Scale

The SCS, a trait self-control measure used extensively in the literature, guided the development of the CEST-SC. The new self-control scale was tested with three populations and found to have good psychometric properties. The 10-item scale maintained acceptable reliability coefficients. Similar to the SCS, the aim of development of the CEST-SC was to focus on the self-control construct as a composite, not on the internal structure of self-control. Nevertheless, factor analyses were examined and found to be consistent in detecting multidimensionality across the three samples for the SCS factors, self-

discipline, deliberate/non-impulsive, and reliability. Likewise, the scale had convergent validity consistent with the literature across the samples. High self-control was related with positive psychosocial functioning behaviors (e.g., better decision making). Further, low self-control was significantly related to undesirable dispositional tendencies (e.g., depression, anxiety, risk taking, and hostility). Although the SCS had 26 more items than the CEST-SC, cross-validity analyses produced a Pearson's *r* of .65 for the CEST-SC with the SCS, a significant correlation result between the two scales.

The CEST in a Non-addictions Sample

This project uniquely collected responses to the CEST from a sample of convenience, the university students in Study 2. These data represent the only known study of the CEST in a non-addiction setting (e.g., with a presumably "normal functioning" sample – students enrolled in the university). The CEST showed accurate convergent validity. Expected relationships between scales were significant for the university students (e.g., high self-esteem was positively related to better decision-making and negatively related to depression). Future studies that use the CEST assessment could include these CEST data from the college sample to evaluate differences between incarcerated individuals receiving substance abuse treatment and non-incarcerated individuals in a non-addiction setting. The comparisons could build upon the literature regarding the utility of the CEST.

Self-Control and Adolescent Substance Abuse Treatment Outcomes

The current project found that self-control levels and motivation were related to treatment outcomes differentially for adolescent clients in varied settings for substance abuse treatment. There was a significant relationship in IOP but not REST programs. In IOP programs there was a significant relationship between the length of stay in treatment and levels of self-control and treatment readiness. High levels of treatment readiness were related with longer LOS, but high levels of self-control were related with shorter LOS. In REST programs, LOS is typically predicated on treatment mandated by the legal system with little impact from other factors.

Treatment readiness. These data confirm previous studies that indicate the positive effect of treatment readiness on treatment outcomes. Several studies found that clients with higher treatment readiness stay in treatment longer (Broome, Simpson, & Joe, 1999; Knight, Hiller, Broome, & Simpson, 2000; Grella & Hser, 2001; Joe, Simpson, & Broome, 1999). The results of this project revealed a significant effect of treatment readiness on LOS with adolescents in IOP, but not with the REST program clients.

Self-Control. This project found that high self-control was related to a shorter length of stay in treatment for IOP clients. While having high levels of self-control in non-addiction and non-incarcerated populations indicated high psychosocial functioning and motivation for attaining goals like good grades and interpersonal success (e. g., Tangney et al., 2004), in the IOP setting its association with shorter treatment stays suggested a different, less beneficial role. Tangney found no evidence that high self-control was harmful. It was therefore surprising that for clients in IOP, high self-control was related with shorter lengths of stay as compared with the IOP clients with low self-control. However, while low levels of depression (higher psychosocial functioning) was associated with increased goal attainment in normal population samples (see Tangney et al., 2004), lower depression (lower psychosocial functioning) has been associated with decreased treatment engagement and poorer outcomes (e.g., goal attainment) for individuals in substance abuse treatment programs (see Joe et.al, 1999; Rao et.al, 2009). These authors have posited that high depression helps clients engage in treatment. Indeed, the likelihood of attendance for the recommended treatment sessions increased two-fold for clients with two or more psychological problems (Joe, Brown, Simpson, 1995).

The findings from Phase 2 of this project were the opposite of predictions and the self-control literature, but consistent with addiction research findings. Lower levels of self-control among IOP clients was associated with staying in treatment longer; high self-control was not associated with goal achievement such as treatment completion; it was related to predictors of unsuccessful treatment such

as less treatment readiness and shorter treatment stays. The moderation effect for self-control on treatment readiness was not supported. Overall, results suggest a relationship of decreased treatment duration when self-control is high.

Motivation and Self-Control

Analyses from Phase 2 found that high self-control was associated with lower treatment readiness with IOP clients**,** but there were no associations found between high self-control and treatment readiness with REST clients. The hypothesized relationship between the two was based on self-control studies which examined the impact of motivation on the limited-resource model of self-control (Muraven & Slessareva, 2003). Muraven found that altruistically-motivated participants experienced less self-control impairment than a control group without the motivational component. However, motivations that reduced decision-fatigue for the individuals who participated in self-control studies were in vastly different circumstances than the motivations for treatment that adolescent clients in this project expressed on the CEST, (e.g., experiencing harsh consequences from substance abuse such as health problems, loss of family support, or legal issues). Further, motivation as measured by the CEST differs from self-control's experimental paradigm in several ways. In this case, the terms motivation and treatment readiness refer to a construct based in part on the transtheoretical model of behavioral change (Prochaska et al., 1992). High motivation for treatment on the CEST generally denotes that a client has realized that drug abuse is a problem that they need help to solve and that they need to take action to get help from others. The high self-control participants may perceive their need for outside help to solve problems to a lesser degree, compared with individuals with lower self-control. A high score suggests a desire for help, not an altruistic or empathetic response to the needs of others (Muraven & Slessareva, 2003). Instead of an "other-centered" response, on the CEST desire for help and treatment readiness suggested a "self-focused" response. For the adolescent sample in IOP

settings, motivation for treatment was negatively associated with self-control. High self-control was related to a less favorable outcome for IOP clients.

Limitations

One limitation of the current project relates to the outcome variable. Length of stay in treatment may not provide an accurate picture of client involvement in the recovery process. For the IOP clients, how often they attend treatment sessions (e.g., attendance frequency and compliance) would be more informative in terms of how much treatment has been received. The intensity of client involvement in treatment would inform the outcome for REST clients who are living at the treatment facility. In that sense, the STATUS variable might serve a very important function. It related the percentage of goals attained and may elucidate the role of perceived self-control in attaining treatment goals. However, only a third of the cases in the adolescent sample included this information. Evaluating the intensity of client involvement using the STATUS variable is potentially useful for future studies.

A second limitation relates to the availability information about the severity of drug dependence. Indicators of dependence were unavailable for more than half of the sample. The scores that were provided were however, evenly split between the 2 groups. The drug dependence scores differed significantly by program, $t(151) = -5.58$, $p < .001$. Lower drug dependence scores were associated with the IOP clients, compared with the clients in REST. The literature suggests that lower pre-treatment drug severity predicts successful treatment attendance outcomes (Zelmore, 2012). Controlling for drug dependence in the REST and IOP sample may shed light on differential role of self-control in future studies using the CEST-SC.

Summary

This project developed a self-control scale from items within an assessment that has become a standard addictions treatment instrument. The CEST-SC conceptually followed expected relationships between self-control and psychosocial functioning across three separate samples and appeared to be an

adequate substitute for the SCS. These findings suggest that the CEST-SC deserves continued application and exploration. It also exhibits promise in predicting treatment outcomes. The CEST-SC scale once fully implemented shows potential as a "treatment-friendly" measure of self-control.

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Appendices

1. Self-Control Scale

2. Client Evaluation of Self and Treatment

Self-Control Scale (SCS)

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits.
3. I am lazy.
4. I say inappropriate things.
5. I never allow myself to lose control.
6. I do certain things that are bad for me, if they are fun.
7. People can count on me to keep on schedule.
8. Getting up in the morning is hard for me.
9. I have trouble saying no.
10. I change my mind fairly often.
11. I blurt out whatever is on my mind.
12. People would describe me as impulsive.
13. I refuse things that are bad for me.
14. I spend too much money.
15. I keep everything neat.
16. I am self-indulgent at times.
17. I wish I had more self-discipline.
18. I am reliable.
19. I get carried away by my feelings.
20. I do many things on the spur of the moment.
21. I don't keep secrets very well.
22. People would say that I have iron self-discipline.
23. I have worked or studied all night at the last minute.
24. I am not easily discouraged.
25. I'd be better off if I stopped to think before acting.
26. I engage in healthy practices.
27. I eat healthy foods.
28. Pleasure and fun sometimes keep me from getting work done.
29. I have trouble concentrating.
30. I am able to work effectively toward long-term goals.
31. Sometimes I can't stop myself from doing something, even if I know it is wrong.
32. I often act without thinking through all the alternatives.
33. I lose my temper too easily.
34. I often interrupt people.
35. I sometimes drink or use drugs to excess.
36. I am always on time.

Tangney, Baumeister, & Boone, 2004

Client Evaluation of Self and Treatment

TCU PSYFORM

Please indicate how much you AGREE or DISAGREE with each statement.	Disagree Strongly	Disagree	Uncertain	Agree	Agree Strongly
1. You have trouble sleeping.	☐	☐	☐	☐	☐
2. You have much to be proud of.	☐	☐	☐	☐	☐
3. You consider how your actions will affect others.	☐	☐	☐	☐	☐
4. You plan ahead.	☐	☐	☐	☐	☐
5. You feel interested in life.	☐	☐	☐	☐	☐
6. You feel like a failure.	☐	☐	☐	☐	☐
7. You have trouble concentrating or remembering things.	☐	☐	☐	☐	☐
8. You feel afraid of certain things, like elevators, crowds, or going out alone.	☐	☐	☐	☐	☐
9. You feel anxious or nervous.	☐	☐	☐	☐	☐
10. You wish you had more respect for yourself.	☐	☐	☐	☐	☐
11. You are likely to feel the need to use drugs in the next few months.	☐	☐	☐	☐	☐
12. You feel sad or depressed.	☐	☐	☐	☐	☐
13. You think about probable results of your actions.	☐	☐	☐	☐	☐
14. You feel extra tired or run down.	☐	☐	☐	☐	☐
15. You have trouble sitting still for long.	☐	☐	☐	☐	☐
16. You think about what causes your current problems.	☐	☐	☐	☐	☐
17. You are likely to drink alcohol in the next few months.	☐	☐	☐	☐	☐
18. You think of several different ways to solve a problem.	☐	☐	☐	☐	☐
19. You feel you are basically no good.	☐	☐	☐	☐	☐
20. You worry or brood a lot.	☐	☐	☐	☐	☐
21. You have trouble making decisions.	☐	☐	☐	☐	☐
22. You feel hopeless about the future.	☐	☐	☐	☐	☐
23. You make good decisions.	☐	☐	☐	☐	☐
24. You are likely to relapse in the next few months.	☐	☐	☐	☐	☐
25. In general, you are satisfied with yourself.	☐	☐	☐	☐	☐
26. You make decisions without thinking about consequences.	☐	☐	☐	☐	☐
27. Please fill in the "Disagree" box as your response for this question.	☐	☐	☐	☐	☐
28. You feel tense or keyed up.	☐	☐	☐	☐	☐
29. You feel you are unimportant to others.	☐	☐	☐	☐	☐
30. You feel tightness or tension in your muscles.	☐	☐	☐	☐	☐
31. You are likely to have problems in quitting drug use.	☐	☐	☐	☐	☐
32. You feel lonely.	☐	☐	☐	☐	☐
33. You analyze problems by looking at all the choices.	☐	☐	☐	☐	☐

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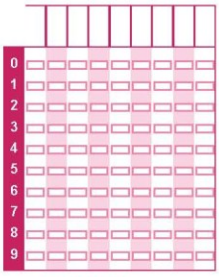

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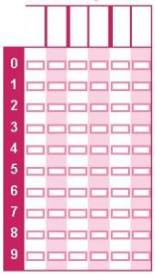

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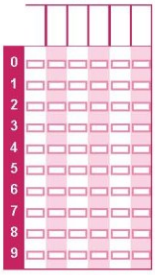

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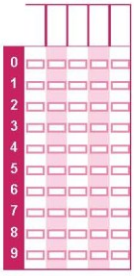

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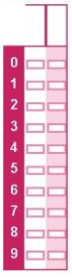

TCU SOCFORM

Please indicate how much you AGREE or DISAGREE with each statement.	Disagree Strongly	Disagree	Uncertain	Agree	Agree Strongly
1. You have people close to you who motivate and encourage your recovery.	☐	☐	☐	☐	☐
2. You have never deliberately said something that hurt someone's feelings.	☐	☐	☐	☐	☐
3. You only do things that feel safe.	☐	☐	☐	☐	☐
4. You are sometimes irritated by people who ask favors of you.	☐	☐	☐	☐	☐
5. You have close family members who want to help you stay away from drugs.	☐	☐	☐	☐	☐
6. You have good friends who do not use drugs.	☐	☐	☐	☐	☐
7. When you do not know something, you do not at all mind admitting it.	☐	☐	☐	☐	☐
8. You have carried weapons, like knives or guns.	☐	☐	☐	☐	☐
9. You have people close to you who can always be trusted.	☐	☐	☐	☐	☐
10. You feel a lot of anger inside you.	☐	☐	☐	☐	☐
11. You sometimes try to get even rather than forgive and forget.	☐	☐	☐	☐	☐
12. You have a hot temper.	☐	☐	☐	☐	☐
13. You like others to feel afraid of you.	☐	☐	☐	☐	☐
14. You are always willing to admit it when you make a mistake.	☐	☐	☐	☐	☐
15. You feel mistreated by other people.	☐	☐	☐	☐	☐
16. You avoid anything dangerous.	☐	☐	☐	☐	☐
17. You have people close to you who understand your situation and problems.	☐	☐	☐	☐	☐
18. You are very careful and cautious.	☐	☐	☐	☐	☐
19. There have been occasions when you took advantage of someone.	☐	☐	☐	☐	☐
20. You work in situations where drug use is common.	☐	☐	☐	☐	☐
21. You have people close to you who expect you to make positive changes in your life.	☐	☐	☐	☐	☐
22. You can remember "playing sick" to get out of something.	☐	☐	☐	☐	☐
23. No matter who you are talking to, you are always a good listener.	☐	☐	☐	☐	☐
24. You get mad at other people easily.	☐	☐	☐	☐	☐
25. You have people close to you who help you develop confidence in yourself.	☐	☐	☐	☐	☐
26. You like to do things that are strange or exciting.	☐	☐	☐	☐	☐
27. You have felt like rebelling against people in authority even when they were right.	☐	☐	☐	☐	☐
28. You have urges to fight or hurt others.	☐	☐	☐	☐	☐
29. Please fill in the "Agree" box as your response for this question.	☐	☐	☐	☐	☐
30. You like to take chances.	☐	☐	☐	☐	☐
31. You have people close to you who respect you and your efforts.	☐	☐	☐	☐	☐
32. Occasionally, you gave up doing something because you thought too little of your ability.	☐	☐	☐	☐	☐
33. You like the "fast" life.	☐	☐	☐	☐	☐
34. You like friends who are wild.	☐	☐	☐	☐	☐
35. You sometimes feel resentful when you do not get your way.	☐	☐	☐	☐	☐
36. Your temper gets you into fights or other trouble.	☐	☐	☐	☐	☐

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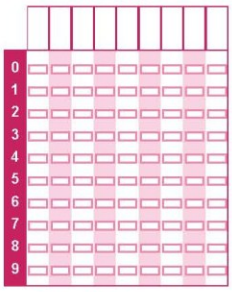

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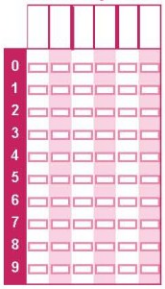

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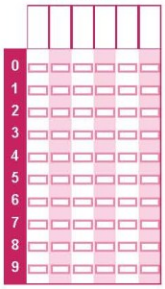

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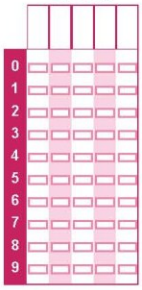

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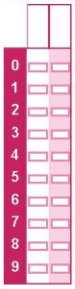

TCU MOTFORM

Please indicate how much you AGREE or DISAGREE with each statement.	Disagree Strongly	Disagree	Uncertain	Agree	Agree Strongly
1. You need help dealing with your drug use.	☐	☐	☐	☐	☐
2. You need to be in treatment now.	☐	☐	☐	☐	☐
3. You have family members who want you to be in treatment.	☐	☐	☐	☐	☐
4. This treatment gives you a chance to solve your drug problems.	☐	☐	☐	☐	☐
5. Your drug use is a problem for you.	☐	☐	☐	☐	☐
6. This kind of treatment program is not helpful to you.	☐	☐	☐	☐	☐
7. You need help with your emotional troubles.	☐	☐	☐	☐	☐
8. Your drug use is more trouble than it's worth.	☐	☐	☐	☐	☐
9. You are concerned about legal problems.	☐	☐	☐	☐	☐
10. Your drug use is causing problems with the law.	☐	☐	☐	☐	☐
11. Your drug use is causing problems in thinking or doing your work.	☐	☐	☐	☐	☐
12. It is urgent that you find help immediately for your drug use.	☐	☐	☐	☐	☐
13. You will give up your friends and hangouts to solve your drug problems.	☐	☐	☐	☐	☐
14. You feel a lot of pressure to be in treatment.	☐	☐	☐	☐	☐
15. You need individual counseling sessions.	☐	☐	☐	☐	☐
16. Your drug use is causing problems with your family or friends.	☐	☐	☐	☐	☐
17. You expect to be sent to jail or prison if you are not in treatment.	☐	☐	☐	☐	☐
18. This treatment program gives you hope for recovery.	☐	☐	☐	☐	☐
19. You need educational or vocational training services.	☐	☐	☐	☐	☐
20. Your drug use is causing problems in finding or keeping a job.	☐	☐	☐	☐	☐
21. You want to be in drug treatment.	☐	☐	☐	☐	☐
22. Your life has gone out of control.	☐	☐	☐	☐	☐
23. You need group counseling sessions.	☐	☐	☐	☐	☐
24. Your drug use is causing problems with your health.	☐	☐	☐	☐	☐
25. You are ready to leave this treatment program.	☐	☐	☐	☐	☐
26. You are tired of the problems caused by drugs.	☐	☐	☐	☐	☐
27. You are at this treatment program only because it is required.	☐	☐	☐	☐	☐
28. Your drug use is making your life become worse and worse.	☐	☐	☐	☐	☐
29. You have serious drug-related health problems.	☐	☐	☐	☐	☐
30. You want to get your life straightened out.	☐	☐	☐	☐	☐
31. You need medical care and services.	☐	☐	☐	☐	☐
32. Several people close to you have serious drug problems.	☐	☐	☐	☐	☐
33. Your drug use is going to cause your death if you do not quit soon.	☐	☐	☐	☐	☐
34. You have legal problems that require you to be in treatment.	☐	☐	☐	☐	☐
35. You are not ready for this kind of treatment program.	☐	☐	☐	☐	☐
36. Please fill in the "Uncertain" box as your response for this question.	☐	☐	☐	☐	☐

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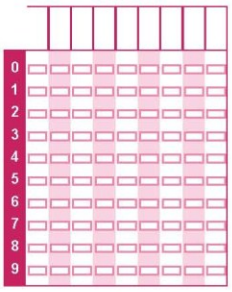

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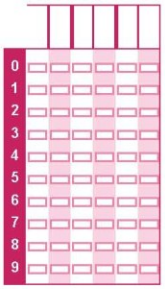

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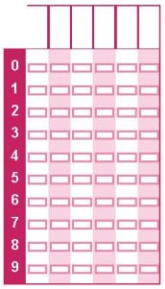

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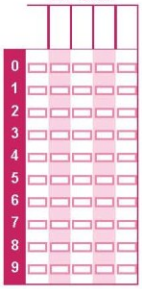

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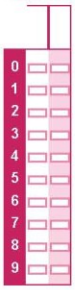
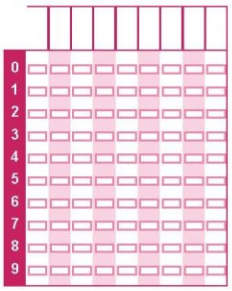


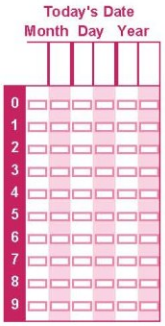
TCU ENGFORM

Please indicate how much you AGREE or DISAGREE with each statement.	Disagree Strongly	Disagree	Uncertain	Agree	Agree Strongly
1. You trust your counselor.	☐	☐	☐	☐	☐
2. Time schedules for counseling sessions at this program are convenient for you.	☐	☐	☐	☐	☐
3. It's always easy to follow or understand what your counselor is trying to tell you.	☐	☐	☐	☐	☐
4. This program expects you to learn responsibility and self-discipline.	☐	☐	☐	☐	☐
5. Your counselor is easy to talk to.	☐	☐	☐	☐	☐
6. You are willing to talk about your feelings during counseling.	☐	☐	☐	☐	☐
7. This program is organized and run well.	☐	☐	☐	☐	☐
8. You are motivated and encouraged by your counselor.	☐	☐	☐	☐	☐
9. You have made progress with your drug/alcohol problems.	☐	☐	☐	☐	☐
10. You are satisfied with this program.	☐	☐	☐	☐	☐
11. You have learned to analyze and plan ways to solve your problems.	☐	☐	☐	☐	☐
12. You have made progress toward your treatment program goals.	☐	☐	☐	☐	☐
13. You always attend the counseling sessions scheduled for you.	☐	☐	☐	☐	☐
14. Your counselor recognizes the progress you make in treatment.	☐	☐	☐	☐	☐
15. Your counselor is well organized and prepared for each counseling session.	☐	☐	☐	☐	☐
16. Your counselor is sensitive to your situation and problems.	☐	☐	☐	☐	☐
17. Your treatment plan has reasonable objectives.	☐	☐	☐	☐	☐
18. Your counselor views your problems and situations realistically.	☐	☐	☐	☐	☐
19. Other clients at this program care about you and your problems.	☐	☐	☐	☐	☐
20. You have stopped or greatly reduced your drug use while in this program.	☐	☐	☐	☐	☐
21. Your counselor helps you develop confidence in yourself.	☐	☐	☐	☐	☐
22. You always participate actively in your counseling sessions.	☐	☐	☐	☐	☐
23. You have made progress in understanding your feelings and behavior.	☐	☐	☐	☐	☐
24. Other clients at this program are helpful to you.	☐	☐	☐	☐	☐
25. You have improved your relations with other people because of this treatment.	☐	☐	☐	☐	☐
26. The staff here are efficient at doing their job.	☐	☐	☐	☐	☐
27. You are similar to (or like) other clients of this program.	☐	☐	☐	☐	☐
28. You have made progress with your emotional or psychological issues.	☐	☐	☐	☐	☐
29. Your counselor respects you and your opinions.	☐	☐	☐	☐	☐
30. You have developed positive trusting friendships while in this program.	☐	☐	☐	☐	☐
31. You give honest feedback during counseling.	☐	☐	☐	☐	☐
32. You can depend on your counselor's understanding.	☐	☐	☐	☐	☐
33. There is a sense of family (or community) in this program.	☐	☐	☐	☐	☐
34. You can get plenty of personal counseling at this program.	☐	☐	☐	☐	☐
35. This program location is convenient for you.	☐	☐	☐	☐	☐
36. You are following your counselor's guidance.	☐	☐	☐	☐	☐

Client ID#



Today's Date
Month Day Year



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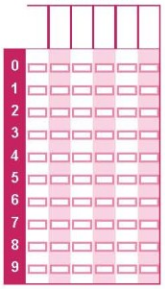

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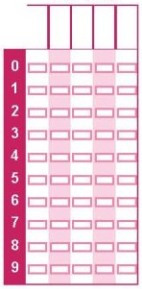
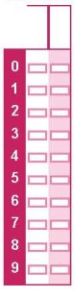


Administration



VITA

Personal Background	Julie Stein Gray Fort Worth, Texas Daughter of George and Jeannine Voege Stein Married Scott Michael Gray, September 4, 1976 Two children
Education	Bachelor of Science, Education, Florida State University, Tallahassee, FL, 1976 Master of Science, Psychology, Texas Christian University, Fort Worth, TX, 2010 Doctor of Philosophy, Psychology, Texas Christian University, Fort Worth, TX, 2012
Research Experience	Texas Christian University, Fort Worth, Texas, 2003-2012
Select Presentations	Gray, J. S., Knight, K., Cohn, A. M., Desmarais, S. L., Doherty, S., & Flynn, P. M. (2012, October). *Medication-assisted treatment: Patient-level outcomes study.* Poster Session presented at the Addiction Health Services Research Conference, New York, New York. Gray, J. S. (2010, September) *Innovations in data collection: determining eligibility, capability, and suitability using TCU assessment tools.* Invited full-day training, presented to the Connecticut Department of Corrections, Health and Addiction Services, Hartford, CT. Gray, J. S. (2007, July). *Scantron: Hands-on hardware and software for automating assessments.* Presented at UCLA Integrated Substance Abuse Programs, David Geffen School of Medicine, Semel Institute for Neuroscience and Human Behavior, Los Angeles, CA.
Publications	Simpson, D. D., Joe, G. W., Knight, K., Rowan-Szal, G. A., & Gray, J. S. (2012). Texas Christian University (TCU) short forms for assessing client needs and functioning in addiction treatment. *Journal of Offender Rehabilitation, 51*(1-2), 34-56.
Technical Reports	Gray, J. S. (2010). *A guide for using ScanTools Plus and Excel to collect and analyze data from TCU ADC assessments*, Fort Worth, TX: Texas Christian University, Institute of Behavioral Research.

ABSTRACT

THE DEVELOPMENT AND EXAMINATION OF A SELF-CONTROL SCALE DERIVED FROM A STANDARD ADDICTION RESEARCH ASSESSMENT

by Julie Stein Gray, Ph.D., 2012
Department of Psychology
Texas Christian University

Dissertation Advisor: Timothy M. Barth, Professor of Psychology

High self-control is a dispositional feature that is strongly related to success. Having high self-control is associated with outcomes such as goal achievement success in school and at work, as well as better interpersonal functioning both as individuals and in groups. This project was interested in developing a "treatment-friendly" self-control scale in order to measure the relationship of dispositional self-control to substance abuse treatment outcomes. Using the Self-Control Scale (SCS; Tangney, Baumeister, and Boone, 2004) as a model, items embedded a standard instrument, the Client Evaluation of Self and Treatment (CEST; Simpson, Joe, Knight, Rowan-Szal, & Gray, 2012), were selected for the new CEST Self-Control scale. This project includes three studies that present psychometric results from diverse samples, incarcerated adults, university students, and adolescents in substance abuse treatment. In the student sample, this project uniquely presents CEST scale scores from a sample of normal-functioning individuals living in a non-substance abuse treatment, non-prison setting. The CEST-SC scale demonstrated good internal reliability, convergent validity, and cross-validity when compared to the SCS. It showed promise in predicting treatment outcomes. Once fully implemented, the CEST-SC has potential as a "treatment-friendly" self-control scale.