

ORIGINAL ARTICLE

# Predictors of Readiness to Change Young Adult Drug Use in Community Health Settings

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**This study evaluated readiness to change drug use in young adult patients aged 18–25 years who were provided screening and brief intervention as part of a Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Capacity Expansion Project. Non-treatment-seeking young adults at risk for drug problems ( $n = 1,560$ ) were assessed for readiness to change. Structural equation modeling examined latent constructs: emotional distress, age, drug use severity, criminal behavior, gender, and race/ethnicity. Drug use severity fully mediated the relationship between emotional distress and readiness. In addition, females and young adults with more severe drug problems may be more amenable to behavior change.**

**Keywords** structural equation modeling, brief intervention, young adults, drug use, readiness to change, non-treatment seeking

## INTRODUCTION

With over 152 million people world-wide suffering from substance-related disorders, substance abuse is a major public health burden, contributing significantly to morbidity and mortality (World Health Organization, 2010). In the USA, an estimated 22.5 million Americans (8.9%) are suffering from a substance-related disorder (SAMHSA, 2010). Substance-related disorders have led to an increasing financial toll with illicit drug use alone accounting for approximately \$181 billion in health, crime-related, and productivity loss costs for the USA (Office of National Drug Control Policy, 2004). Of special concern are the 18–25-year-olds who consume more drugs than any other age group (SAMHSA, 2010).

Readiness to change has been closely associated with brief therapeutic interventions that have shown promising results treating substance use (The InSight Project Research Group, 2009; Madras et al., 2009). It has further been shown to affect how well patients respond to ther-

apeutic interventions, particularly in regards to building rapport and treatment retention rates (DiClemente, Doyle, & Donovan, 2009; Hesse, 2006; Joe, Simpson, & Broome, 1998; Miller & Rollnick, 2002). By gaining a better understanding of predictors of readiness to change drug use in young non-treatment-seeking adults, medical providers may be better equipped to facilitate an optimum therapeutic experience for these patients. The purpose of this article is to enhance understanding of readiness to change as it relates to substance abuse by exploring factors related to readiness to change drug use behavior, specifically for young non-treatment-seeking patients. According to a review of the literature, relevant factors include emotional distress, age, severity of drug use, criminal behavior, gender, and race/ethnicity. To this author's knowledge, this is the first article of its kind to study the predictors of readiness to change drug use in young adults receiving care in community health settings.

## PREDICTORS OF READINESS

### Emotional Distress

Emotional distress has been found to be a positive predictor for readiness to change substance use within the literature. Nwakeze and colleagues' (2002) study with 190 drug-using soup kitchen attendees found individuals with depressive symptoms were more likely to have higher motivation for change than those without depressive symptoms. Further, in Gossop, Stewart, and Marsden's (2007) longitudinal study with 1,075 adult heroin users, anxiety and depression were found to be associated with higher levels of readiness to change at time of intake. Support for this relationship has also been demonstrated with college students (Barnett et al., 2006) and alcohol-dependent adults (DiClemente et al., 2009).

During adolescence and young adulthood, individuals experience a multitude of social and neurological changes including substantial development of the prefrontal cortex (National Institute on Drug Abuse, 2011a). This area of

the brain is believed to be involved in complex cognitive behavior, decision making, and social behavior (Yang & Raine, 2009). Development of the prefrontal cortex coincides with further development of processes, such as impulse control and affect regulation, that are believed to be important in coping with negative emotions and individual's behavior including substance abuse (Littlefield, Sher, & Wood, 2009; National Institute on Drug Abuse, 2011a). According to recent studies, the majority of young adults are using drugs to self-medicate when dealing with distressing emotions (Ham, Zamboanga, Bacon, & Garcia, 2009; Shamloo & Cox, 2010).

### Age

As young adults grow older, their emotions tend to stabilize and their drug use decreases. Winick (1962) initially described this trend as "maturing out" based on a study detailing the path of opiate addiction as it experiences a precipitous downward trend for users as they reach their later 30s. This theory gained support from a recent meta-analysis that demonstrated a clear pattern of change across the life course, with people becoming more conscientious, socially dominant, and emotionally stable with age (Roberts, Walton, & Viechtbauer, 2006). Additional support was gained in a recent study by Sinha, Easton, and Kemp (2003), which identified that young adult (aged 18–25 years) outpatient treatment beneficiaries were found to demonstrate higher levels of readiness to change their drug use than their older counterparts (aged 26–45 years). Other studies, however, have found differing results (Baker et al., 2002), or no association at all (Stevens, McGeehan, & Kelleher, 2010).

### Drug Use Severity

Frequently cited predictors of readiness to change substance use include severity of use and severity of consequences associated with use. The relationship between substance use severity and motivation to change substance use is somewhat mixed in the literature. Several studies of adults' readiness to change substance use have differing findings with some indicating linkages between increased severity and increased readiness (DiClemente et al., 2009), others finding less frequency of substance use related to increased readiness (Blanchard, Morgenstern, Morgan, Labouvie, & Bux, 2003), while still others finding no association at all (Field, Duncan, Washington, & Adinoff, 2007). In studies of adolescents and young adults, results were also inconsistent. For example, studies with college students found that high motivation to change substance use was correlated with higher levels of drinking (Vik, Culbertson, & Sellers, 2000), while another study of 196 adolescents admitted to outpatient substance abuse treatment found that substance use severity was unrelated to motivation to change (Battjes, Gordon, O'Grady, Kinlock, & Carswell, 2003). In further contrast, a study examining motivation to change among adolescents being treated for an alcohol-related injury in the emergency department found that higher levels of drinking and drinking problems at baseline were

related to lower levels of motivation to change substance use (Barnett et al., 2002). More research needs to be conducted on the relationship between readiness to change substance use behavior and severity of use.

### Criminal Behavior

Substance use has been closely associated with criminal behavior (Hkansson & Berglund, 2012). According to Deterrence Theory, individuals experiencing negative consequences, such as an arrest, are more likely to be sensitive to the consequences of their actions in their future activities (Braga & Weisberg, 2012; Ross, 1984). Similarly, negative consequences associated with criminal involvement have also been found to be positively associated with readiness to change. Battjes and colleagues (2003) found number of days engaged in illegal activity to be predictive of greater motivation to change. Another study found that legal problems associated with substance use as measured by the Addiction Severity Index predicted both greater external and internal motivation (Blanchard et al., 2003). Gregoire and Burke (2004) examined the relationship of legal coercion and readiness to change among admissions to publicly funded substance abuse outpatient treatment programs and found that legal coercion was associated with greater readiness to change. However, not all studies have found a positive relationship with legal coercion and readiness for change (Marshall & Hser, 2002).

### Static Factors

#### *Gender*

Finally, gender and race/ethnicity are two static factors that have received a fair degree of consideration within the literature. Studying the association between gender and substance use is important due to the unique consequences that young adult women experience including accelerated psychological distress (NIAAA, 1990) and high risk pregnancies (Sharpe & Velasquez, 2008). Although results have been mixed, the preponderance of research supports that women demonstrate higher readiness to change substance-related behavior than men. In a recent study with alcohol-dependent drinkers, being female was predictive of higher levels of readiness to change (DiClemente et al., 2009) when measured by the University of Rhode Island Change Assessment Scale (URICA). Support for this phenomenon has also been illustrated with college drinkers (Barnett et al., 2006) and homeless drug users (Nwakeze, Magura, & Rosenblum, 2002).

#### *Race/Ethnicity*

There is compelling need for testing the relationship between race/ethnicity and readiness to change substance use in young adults. Hispanic and African Americans with substance use problems have been found to experience numerous treatment disparities including greater rates of unmet treatment needs (Wu, Hoven, Tiet, Kovalenko, & Wicks, 2002) and disproportionate rates of treatment dropout (Office of Applied Studies, 2000). Despite these concerns, there is minimal research examining the role of race/ethnicity in regards to readiness to

change substance use behavior. Only three studies were found during this article's literature review that addressed race/ethnicity. In Gossop et al.'s (2007) study with heroin users, being White was positively associated with higher baseline readiness to change. Differing from these results, Bertholet et al.'s (2009) study with primary care patients found that being White was negatively associated with readiness. Similarly, in DiClemente and colleagues' (2009) study with alcohol-dependent subjects, being White was associated with low readiness for change. Clearly, there is need for additional clarification on this area of research, specifically to capture any differences in level of readiness associated with being Hispanic/Latino. In response to this limitation, this study includes a large population of Hispanic/Latino subjects.

In summary, this article examines predictors of readiness to change drug use in a young adult population. This study expands upon existing literature by utilizing subjects from real-world community health settings and by including a large sample of Hispanic/Latino subjects. Readiness to change drug use has been demonstrated to be a complex construct with plausible predictors rooted in emotional distress, age, drug use severity, criminal behavior, and static demographic factors. Based on the findings, the following hypotheses have been proposed:

- Hypothesis 1: Higher drug use severity and criminal behavior will result in higher readiness to change drug behavior
- Hypothesis 2: Drug use severity will mediate the relationship between emotional distress and readiness to change
- Hypothesis 3: Age will positively correlate with readiness
- Hypothesis 4: Females will indicate more readiness to change

In addition, the following research question will be analyzed for exploratory purposes based on limited studies in the literature.

- Research Question 1: Does race/ethnicity impact readiness to change drug use?

## MATERIALS AND METHODS

### Sample

This study is a secondary data analysis based on The InSight Project Research Group's (2009) study on the impact of Screening, Brief Intervention and Referral to Treatment (SBIRT) on alcohol and substance use patients within the Harris County Hospital District. During this study, 59,760 patients were screened for alcohol, drug, and tobacco use at various medical facilities between July 1, 2005, and September 30, 2008. Medical settings included emergency rooms, community health centers, and in- and outpatient clinics. From this population, 1,560 (3%) adults between the ages of 18 and 25 years were assessed to be at risk for substance use problems based on scoring above zero on the 10-item Drug Abuse Screening Test (DAST-10; Bohn, Babor, & Kranzler, 1991).

The mean DAST score for the sample was 4.34 (SD = 2.83) indicating a moderate level of drug-related problems (The InSight Project Research Group, 2009), while the mean Alcohol Use Disorder Identification Test score (AUDIT) was 7.93 (SD = 8.71) indicating borderline hazardous alcohol use (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Subjects reported subclinical levels of mental illness with a mean K6 score of 10.96 (SD = 6.17) (Kessler et al., 2010). The mean age was 22 years (SD = 2.26) and men represented 67% of the sample ( $n = 1,046$ ). The racial/ethnic breakdown included 37% ( $n = 573$ ) African American, 36% ( $n = 562$ ) Hispanic/Latino, 24% ( $n = 368$ ) White, and 3% ( $n = 51$ ) Other. The vast majority, 86.1% ( $n = 1,300$ ), was single. The highest grade completed for 33% ( $n = 287$ ) of the participants was 12th, while 55.6% ( $n = 484$ ) did not finish high school. Most had housing (89.6%), however 61.1% were staying in someone else's apartment. Eleven percent of females were pregnant and 37.9% of the sample had at least one child. In terms of social connectedness, 93.9% did not attend a non-faith-based self-help group, 98.3% did not attend a religious-oriented self-help group, and 98.2% did not attend any other type of support meeting. However, 62.1% had interaction with family or friends who were supportive of recovery.

IRB approval for the InSight study was obtained through the University of Texas at Austin. Additional details regarding the sampling and screening process can be found from The InSight Project Research Group (2009).

### Measures

#### *Readiness Ruler*

The score for readiness to change drug use was calculated from the Readiness Ruler (Miller, 1999). The Readiness Ruler was chosen for this study for its brevity and ease of administration in busy community health clinics and large urban hospital emergency departments (The InSight Project Research Group, 2009). Although no research has been conducted on the Readiness Ruler for drugs specifically for 18–25-year-olds, the Readiness Ruler has demonstrated adequate construct validity with poly-substance users (Hesse, 2006), criterion validity with college drinkers (Collins, Logan, & Neighbors, 2010), and predictive validity with adolescents (Maisto et al., 2011a, 2011b). In Maisto et al.'s (2011b) study with adolescents beginning treatment in an Intensive Outpatient Program, the Readiness Ruler was found to have stronger predictive validity than the Stages of Change and Treatment Eagerness Scale (SOCRATES) or the Staging Algorithm. The measure is a single-item 10-point scale in which those receiving treatment are asked how ready they are to change their drug use (1 = not at all ready to change (quit) and 10 = actively working on changing/quitting).

#### *Demographic Characteristics*

For race/ethnicity and gender, Hispanic/Latino, African American, White, and Male were dummy-coded with the named variable equaling 1 and all others equaling 0.

### Age

The variable age was measured as a continuous variable and calculated based on reported birth date and intake date.

### K6

The K6 is a brief screening tool for rapid assessment of serious mental illness in the general population comprised of six, five-point Likert scale items (Kessler et al., 2010). The facilitator asks the respondent, "In the past 30 days, about how often did you feel . . . e.g., nervous? hopeless?" Answers range from, "none of the time" to "all of the time." The internal consistency for the overall K6 was strong in this study population ( $\alpha = .888$ ). In other studies, the K6 has been shown to have a sensitivity of 36% and a specificity of 96% in predicting serious mental illness in the general population and similar internal reliability (Cronbach's  $\alpha = .89$ ; Kessler et al., 2002, 2003). For the model, Items 1 and 3 were aggregated to form the latent variable K6Anx (Anxiety). Cronbach's  $\alpha$  for this subscale was acceptable at .793. Items 2, 4, 5, and 6 were aggregated to form the latent variable K6Dep (Depression). Cronbach's  $\alpha$  for the K6Dep subscale was moderate at .859. These items were aggregated in order to simplify the model and in accordance with their similarity to related DSM-IV TR definitions (American Psychological Association, 2000).

### Drug Abuse Screening Test-10

The Drug Abuse Screening Test-10 is a measure of drug use severity and drug-related problems. It is comprised of 10 dichotomous items scored as 1 for yes, and 0 or no. The internal consistency for the overall DAST was strong in this study population ( $\alpha = .939$ ). Similar to the K6, related items were aggregated in order to simplify the model. Items 1 and 2 were aggregated to form the indicator variable DAST\_Use, intended to measure patterns of the patient's drug use. Cronbach's  $\alpha$  for this subscale was acceptable at .793. Likewise Items 3, 4, 9, and 10 were aggregated to form DAST\_Phys, a measure of physiological symptoms of substance abuse. An example of the physiological symptoms items is, "Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?" Cronbach's  $\alpha$  for the DAST\_Phys subscale was moderate at .824. Finally, Items 5, 6, 7, and 8 were aggregated to form DAST\_Social, a measure for social consequences related to substance abuse. An example of the social consequences items is, "Does your spouse (or parent) ever complain about your involvement with drugs?" Cronbach's  $\alpha$  for the DAST\_Social subscale was strong at .917. In a comprehensive review of articles from 1982 to 2005, the DAST-10 yielded satisfactory measures of sensitivity (41%–95%) and a specificity from 68% to 99% with various populations. Internal reliability derived a Chronbach's  $\alpha$  ranging from .86 to .94 (Yudko, Lozhkina, & Fouts, 2007).

### Criminal Behavior

The latent variable Criminal Behavior was composed of the continuous variables (# of) Days in Jail, Other Arrests, and Drug Arrests in the past 30 days. These variables measure the frequency of over the past 30 days. An example is, "Over the past 30 days, how many times have you been arrested?"

### Models

Structural equation modeling (SEM) was used to test the aforementioned hypotheses and research questions. The analysis was conducted using AMOS 17.0. SEM holds multiple advantages over other statistical methods. Some of these advantages include but are not limited to: the ability to test measurement models associated with path models; the ability to generate alternative model fit statistics; and the use of confirmatory factor analysis for modeling latent variables (Tomarken & Waller, 2005). Maximum likelihood was used as the estimation procedure to conduct this analysis and three parameters (one for drug use, one for emotional distress, and one for criminal behavior) were fixed to the value 1 in the measurement model.

### RESULTS

When the model (see Figure 1) was tested, the overall fit was strongly supported:  $n = 1,560$ ; CFI = .992; RMSEA = .024; and  $p = .000$  ( $\chi^2 = 87.7$ ,  $df = 47$ ). Although significant, the chi-square statistic is sensitive to sample size. Each of the other fit statistics indicated that the data fit the model and therefore, no modifications were necessary. Results indicated that two of the four hypothesized relationships were supported and one was partially supported (see Table 1). In accordance with Hypothesis 2, Drug Use fully mediated the relationship between Emotional Distress and Readiness to Change. The direct effect of Emotional Distress on Readiness measured  $b = -.180$ ,  $p = .324$ , while the cumulative indirect effect measured  $b = 1.17$ ,  $p < .001$ . Direct effects were calculated using the Aroian Test Equation (Aroian, 1944/1977). Gender (Hypothesis 4) was also found to be a significant predictor of Readiness with females associated with higher readiness to change their drug use than males ( $b = -.59$ ,  $p = .02$ ). Finally, Hypothesis 1 was partially supported with the direct effect of severity of Drug Use on Readiness measuring  $b = 13.00$ ,  $p = < .001$ .

Contrary to Hypothesis 1, Criminal Behavior as a consequence of substance use was not positively associated with Readiness to Change. In fact, measurements indicated a significant negative association between Criminal Behavior and Readiness to Change ( $b = -5.39$ ,  $p = .003$ ). Hypothesis 3, supposing that Age would be positively related to Readiness, was also not supported in the model ( $b = .072$ ,  $p = .141$ ). Finally, measurements for Research Question 1 also failed to demonstrate any significant differences between Race/Ethnicity and Readiness levels.

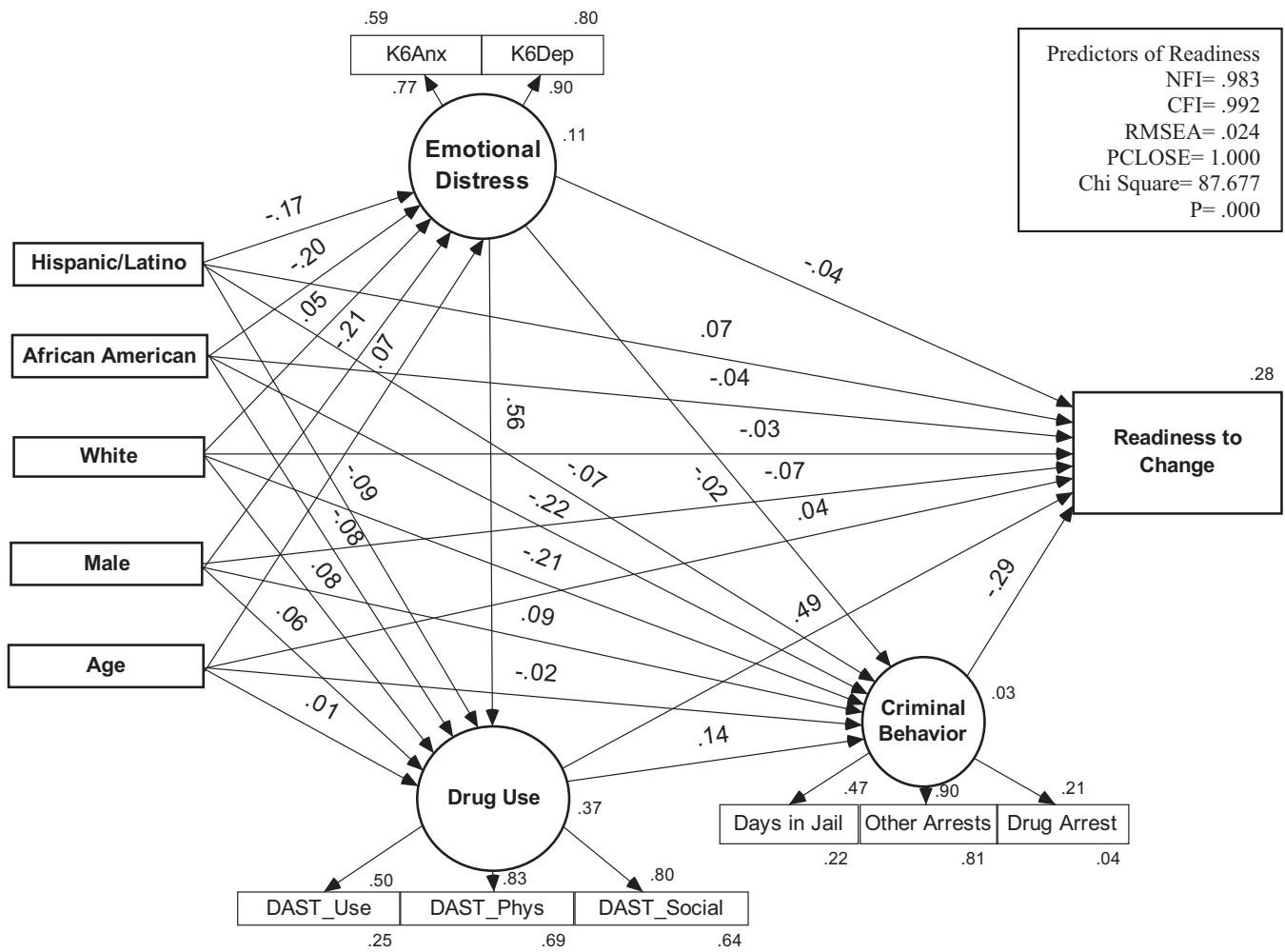


FIGURE 1. Full model with standardized regression estimates.

**DISCUSSION**

Substance abuse is a major contributor to the world-wide health burden, significantly increasing morbidity and mortality (World Health Organization, 2010). Young adults are more likely to use drugs than any other age group, placing them at increased risk for multiple health and development concerns (Littlefield et al., 2009; National Institute on Drug Abuse, 2011b). Brief interventions have

shown promise in reducing substance use in young adults receiving care in emergency department and primary care settings. Theory indicates that a great deal of this behavior change can be attributed to one’s readiness, or motivation to change (Miller & Rollnick, 2002; Prochaska & DiClemente, 1992). Despite support in the literature for these concepts with young adults found in college health care settings, there have been no studies conducted that

TABLE 1. Unstandardized structural estimates: Figure 1

Independent variables	Dependent variables			
	Emotional distress	Drug use	Criminal behavior	Readiness to change
Hispanic/Latino	-.327*** (-3.842)	-.027* (-2.279)	-.031 (-1.292)	.558 (1.476)
African American	-.368* (-2.441)	-.023 (-1.080)	-.086 (-1.786)	-.260 (-.304)
White	.099 (.685)	.025 (1.229)	-.091 (-1.868)	-.231 (-.268)
Male	-.422*** (-7.406)	.020* (2.433)	.041 (1.911)	-.589* (-2.289)
Age	.029* (2.555)	.001 (.570)	-.002 (-.472)	.072 (1.472)
Emotional distress		.086*** (13.558)	-.004 (-.356)	-.180 (-.987)
Drug use			.193 (1.887)	12.998*** (9.313)
Criminal behavior				-5.393** (-2.969)

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001; *N* = 1,560.

examine predictors of readiness to change drug use in young adults receiving care in community health settings.

The most compelling relationship uncovered by this study was the path connecting Emotional Distress, Drug Use, and Readiness to Change. With standardized regressions of .56 and .49, it also contained the two strongest direct effects measured in Figure 1. These findings support previous research on alcohol use among emerging adults by Ham et al. (2009) and Shamloo and Cox (2010), and may infer that young adults receiving care in community health settings are utilizing substances in response to emotional distress. Further, the more severe the distress and subsequent drug use, the higher the readiness for change.

Gender was also found to be predictive of Readiness as young adult females showed a higher score on readiness to change drug use. This finding lends support to growing body of work associated with alcohol (Barnett et al., 2006; DiClemente et al., 2009) and drug use (Nwakeze et al., 2002). Further examination revealed that young adult women were also considerably more likely to experience the aforementioned Emotional Distress than their male counterparts ( $b = -.442, p < .001$ ). Future research and treatment interventions may benefit from further exploring the roles that gender and emotional distress play in the path to readiness to change for young adult females.

Although not hypothesized in this article, the absence of a direct positive association between Emotional Distress and Readiness to Change is worth mentioning given the support for this relationship in the literature (Barnett et al., 2006; DiClemente, Doyle, & Donavon, 2009; Gossop et al., 2007). Testing the breakdown of Emotional Distress by more specific conditions such as anxiety and depression may be worth examining.

The intensity of consequences through Criminal Behavior was not found to be positively associated with Readiness to Change. In fact, there was a strong negative association between the variables. This differs from prior research identifying a positive relationship between negative consequences and readiness for change (DiClemente et al., 2009; Shealy, Murphy, Borsari, & Correia, 2007). Barnett et al.'s (2006) study on young adult college drinkers in the emergency room may offer an explanation for this phenomenon. His results indicated that patients with fewer prior alcohol-related consequences had higher levels of motivation to change. This relationship hinged on the concept of perceived severity, or level of averseness to the incident. Within the current study, criminal behavior was measured as a continuous variable with severity indicated by the individual's number of arrests or days in jail. It is feasible to conceive that after numerous arrests, the young adults in this sample simply became desensitized to the motivating impact of being jailed. This outcome opens the door to future research regarding the roles of frequency versus perceived severity in promoting readiness to change in young adults.

The two relationships that were not supported, Age (Hypothesis 3) and Race/Ethnicity (Research Question 1), still provide valuable knowledge about the concept of

readiness. For instance, while examining age, it is possible that the 18–25-year-old window was simply too narrow to begin to see associations with readiness. Future research may wish to include a wider range of ages, or compare age groupings. Regarding Race/Ethnicity, although no statistically significant differences were measured between groups and readiness, this study is valuable because of its inclusion of Hispanic/Latino young adults. Practical implications may lend support to the racial/ethnic generalizability of the concept of readiness to change drug use in young adults.

The results of this study must be interpreted within the context of the methodological limitations of the design. First, the data examined was derived from a convenience sample of young adults aged 18–25 years, presenting to community health locations within the Harris County Hospital District for medical care. Due to the restricted age range and lack of information regarding patients who refused participation, these findings may lack generalizability. In addition, all scores were self-report and therefore response bias cannot be ruled out. Further, data were cross-sectional and do not permit causal inference. A longitudinal study with this at-risk population may afford better understanding of relevant paths and associations. Finally, substance abuse has been likened to a socially situated learning experience, particularly with young adults (Lederman & Stewart, 2005). Although this dataset failed to provide social variables, theory indicates that inclusion of these constructs is required for an exhaustive examination of young adult populations.

In summary, the present study constitutes a valuable contribution to the limited body of literature on at-risk young adults receiving care within the community health system. Strengths of this study include the use of SEM to examine the paths and associations related to readiness to change drug use in young adults. Further, this study expanded on the literature base with the inclusion of an ethnically diverse and relatively large sample of young adults. Results indicated a fully mediated path between Emotional Distress, Drug Use, and Readiness but no direct paths between Emotional Distress and Readiness. These results indicate that for this sample of young adults in community health care settings, emotional distress only impacts readiness to change in the presence of higher drug use severity. Further, gender differences in readiness to change drug use may be helpful in assisting providers deliver the optimum care to their patients. With this added understanding, caregivers may be better equipped to address young adult drug use and expanding health care costs associated with substance-related disorders within the community healthcare system.

### Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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## GLOSSARY

**Readiness to change:** A willingness or openness to engage in a particular process or to adopt or change a particular behavior.

**SBIRT:** Screening, brief intervention, and referral to treatment.

**Structural equation modeling:** Statistical technique for testing and estimating causal relations using a combination of statistical data and qualitative causal assumptions.

**Young adult:** Individuals who are 18–25 years old.

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