SOCRATE-C: Measuring Readiness for Change in Academic Coaching

by

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A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
December 15, 2018

Keywords: academic coaching, SOCRATES, readiness for change,
transtheoretical model of change

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Abstract

Academic coaching is a remedial method to assist undergraduate students experiencing academic difficulties due to counterproductive behavioral patterns related to their academic skills and habits. Developing academic skills and changing academic habits requires a student's willingness to address engrained behaviors that have developed over many years. In other treatment settings that target problematic patterns of behavior (i.e., substance abuse treatment), it has been found that an individual's readiness for change should inform treatment interventions to maximize outcomes. The SOCRATES instrument was developed to address this issue in substance abuse populations. The present study provides validity evidence for the SOCRATES-C, which was adapted to measure readiness for change in academic coaching students. Similar to patterns described in substance abuse literature, academic coaching students who self-refer for academic coaching endorse more awareness/recognition of their problem behaviors and claim to be taking less steps to change their behaviors than students who do not self-refer for academic coaching. Although the present study did not use results from the SOCRATES-C to inform academic coaching intervention, it provides promising findings that the instrument could be used for this purpose in future research and practice to maximize the benefits of academic coaching. Findings from the current study have the potential to greatly improve academic performance and graduation rates for undergraduate students.

Acknowledgments

This dissertation would not have been possible without my advisor, Dr. Annette Kluck's consistently reliable and tireless assistance. Her guidance over the course of my graduate career has made the completion of my degree possible. She helped me establish a dissertation committee which provided exceptional assistance in completion of my study- Drs. Marilyn Cornish, Joseph Buckhalt, Maria Witte, and Diane Boyd.

My assistantship placement was vital to the completion of my degree and dissertation. Drs. Liza Mueller and Kathryn Jarvis both provided expertise, supervision, and opportunities to excel as an academic coach. Their leadership developed and nurtured my interest in academic coaching, which grew into my dissertation topic. Thanks to the support staff- Sandy Baker, Tamara Bowden, Morgan Jenkins, Brittany Rock, and Amanda Sparacio. Each staff member contributed meaningfully to this document.

Most importantly, I would like to thank my family. My parents and siblings have all provided motivation and encouragement on this journey. My wife, Bree Fry, and daughter, Brooklyn Fry provide me ongoing inspiration, endless support, and care that make my personal life as a husband and father fulfilling and joyful. Bree has made considerable sacrifices in support of the completion of my doctorate and I cannot thank her enough for supporting me to the fullest extent both personally and professionally. The end of this journey is almost here!

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List of Abbreviations

ACAC	Academic Coaching and Counseling
AGFI	Adjusted Goodness-of-Fit Index
AIC	Akaike Information Criterion
AMREC	Ambivalence and Recognition Factor
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
EFA	Exploratory Factor Analysis
GFI	Goodness-of-Fit Index
NFI	Normed Fit Index
NNFI	Non-normed Fit Index
RCQ	Readiness to Change Questionnaire
RMSEA	Root Mean Square Error of Approximation
SEM	Structural Equation Modeling
SOCRATES	Stages of Change Readiness and Treatment Eagerness Scale
SOCRATES-C	Stages of Change Readiness and Treatment Eagerness Scale- Coaching
SRMR	Standardized Root Mean Square Residual
TLI	Tucker-Lewis Index
TTM	Transtheoretical Model of Change
URICA	University of Rhode Island Change Assessment

Chapter 1: Introduction

Statement of the Problem

The number of young adults in the United States who attend postsecondary education has grown considerably over the past decade and has grown at a faster rate than the total number of young adults in the U.S. during this period (U.S. Department of Education, National Center for Education Statistics, 2016). Students are continuing to graduate from high school underprepared for the academic rigors at most universities (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Gaertner & McClarty, 2015; Royster, Gross, & Hochbein, 2015). Students' lack of preparedness for postsecondary education is complicated by the influx of students seeking higher education degrees. There have been some efforts, such as implementing the Common Core Standards, to improve postsecondary readiness (Camara, 2013). Despite such efforts, students continue to experience academic difficulties because of their lack of preparedness (Gaertner & McClarty, 2015). A multi-pronged approach would help address the academic needs of the growing student body. This approach could include improved preparation during high school years and remedial efforts after students arrive at postsecondary campuses.

Academic coaching is one remedial approach available to students who enter colleges and universities underprepared for the academic rigors (Barkley, 2010; Robinson & Gahagan, 2010). For the current study, academic coaching refers to a dyad composed of one academic coach and one undergraduate student. The coaching relationship proactively focuses (Barkley, 2010) on strengths, academic goals, study skills, planning, and academic performance (Robinson & Gahagan, 2010). The academic coach encourages students to reflect on their academic

strengths and helps them learn an efficient and flexible set of study skills (Robinson & Gahagan, 2010; Tomás Rivera Center for Student Success, 2016) that lead to student success (Barkley, 2010).

Academic coaches have knowledge about skills that students need to develop in order to achieve academic success. However, students must be motivated to apply these skills to their coursework to benefit fully from the academic coaching experience. Measuring and enhancing students' readiness to make changes to their academic habits is one way to help academic coaches guide undergraduate students in applying these newly learned academic skills.

Many experts believe that readiness for change must be measured before it can be included in a change process (Miller & Tonigan, 1996; Prochaska & DiClemente, 1984). Instruments that measure readiness for change have been studied with a variety of clinical populations (see Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie, Dunn, & Laranjeira, 2005; Maisto, Chung, Cornelius, & Martin, 2003; Maisto, Conigliaro, et al., 1999). However, there is limited research available on instruments to measure an individual's readiness for change in academic settings (see Grant & Franklin, 2007; Grunschel & Schopenhauer, 2015; O'Neil, 2014). The current study examined validity evidence for an instrument measuring students' readiness for change in academic coaching.

Substance abuse literature describes how individuals with substance-related problems differ on their self-reported level of awareness of problem behaviors and self-perceived efforts to change behaviors (Edlund, Booth, & Feldman, 2009; Probst, Manthey, Martinez, & Rehm, 2015). Individuals who self-refer for substance abuse treatment rate themselves as more aware of having substance-related problems than individuals who do not attend treatment volitionally (Edlund et al., 2009). When compared to individuals with substance-related problems who do not

attend treatment volitionally, individuals who self-refer tend to view their own efforts as non-existent and/or ineffective (Wells, Horwood, & Ferguson, 2007). Individuals who self-refer for treatment recognize problem behaviors and are more likely to be willing to attend professional treatment (Edlund et al., 2009; Wells et al., 2007). Those who do not self-initiate treatment are unlikely to perceive problems related to their substance use (Grant, 1997) or believe their substance-related behaviors do not necessitate treatment (Edlund et al., 2009; Falck et al., 2007; Wells et al., 2007; Wu, Pilowsky, Schlenger, & Hasin, 2007). These individuals believe their own efforts to change problem behaviors, which they claim to be engaging in despite evidence to the contrary, will sufficiently address substance-related problems (Wells et al., 2007).

Purpose

The current study investigated the factor structure of the Stages of Change Readiness and Treatment Eagerness Scale reworded for academic coaching (SOCRATES-C; see Appendix A; see Table 1). Research findings and implications are discussed to contribute to the scarce literature about academic coaching. Findings from the current study can be used in future studies to improve outcomes in academic coaching. Findings also contribute to the generalizability of the readiness to change concept.

Significance

Students have continued to arrive to universities underprepared for the upcoming academic challenges (Dunlosky et al., 2013; Gaertner & McClarty, 2015; Royster et al., 2015). This problem occurs alongside the growing number and proportion of students attending postsecondary education in the United States (U.S. Department of Education, National Center for Education Statistics, 2016). The current study adds to the literature and academic community by combining the best available research in academic coaching, measurement development, and

readiness for change to improve undergraduate student development. Incoming students and academic coaches can benefit from these findings.

Academic coaches may lack the skills to assess a student's readiness to change academic habits or knowledge to make use of this information when designing an individualized remedial plan to be the focus of academic coaching. There is limited research on instrument development to measure readiness for change in academic coaching (see Grant & Franklin, 2007; Grunschel & Schopenhauer, 2015; O'Neil, 2014). Indeed, intervention models designed to increase motivation for change in other domains (e.g., decreasing risky alcohol use; Madson, Landry, Molaison, Schumacher, & Yadrick, 2014; Madson, Schumacher, Baer, & Martino, 2016) frequently rely on the use of non-professionals to conduct the interventions. Although non-professionals can be trained to adequately administer techniques commonly used to enhance motivation, such as motivational interviewing, they may not have the background to fully evaluate motivational levels. This makes a standardized instrument an important part of a treatment model to be used by individuals with a range of backgrounds to implement academic coaching on university campuses. The current study addressed this need.

Research Question and Hypotheses

The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) was originally interpreted as measuring three separate factors of readiness for change (Recognition, Ambivalence, and Taking Steps; Miller & Tonigan, 1996). However, several studies have found a better fit with a two-factor model for interpreting the SOCRATES (Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Conigliaro, et al., 1999). The two-factor model collapses Recognition and Ambivalence into a single factor (AMREC) and

retains the Taking Steps factor. The current study explored the factor structure of the SOCRATES-C to measure readiness for change in academic coaching students.

Hypothesis 1 was that the SOCRATES-C would show better model fit for the two-factor model from Maisto, Conigliaro, et al. (1999) when compared to the three-factor model from Miller & Tonigan (1996). This hypothesis was based on previous literature which found a better fit for the two-factor model when compared to the three-factor model for interpreting the SOCRATES with various populations (Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Conigliaro, et al., 1999).

Hypothesis 2 was planned in case neither factor structure should good model fit with the data. For the second hypothesis, it was hypothesized that exploratory factor analysis (EFA) would identify a new model and factor structure that shows good fit with the data. This hypothesis was not tested.

Lastly, hypothesis 3 was that participants would differ on their level of self-reported ambivalence/recognition of their academic problems and whether they reported already taking steps to change their academic habits based on the referral source. More specifically, it was hypothesized that participants who self-reported below average ambivalence/recognition of their academic problems and above average endorsement of already taking steps to change their academic habits would be more strongly represented by participants who were mandated to attend academic coaching than those who self-referred. It was further hypothesized that participants who self-reported above average ambivalence/recognition of their academic problems and below average endorsement of already taking steps to change their academic habits would be more strongly represented by participants who self-referred to academic coaching than by those who were mandated.

Definitions

Confirmatory factor analysis (CFA)- Kline (2011) discusses confirmatory factor analysis (CFA) as a technique that helps identify underlying structure, or latent variables, and how these variables influence scores on observed items on some instrument, or manifest variables. This technique is driven by theory; one must specify a theory-based model prior to running any statistical analyses. Any changes made in the model must be explained by theory.

Exploratory factor analysis (EFA)- Furr and Bacharach (2014) discuss exploratory factor analysis (EFA) as a statistical analysis used to identify underlying factors that are thought to influence how individuals respond to items on some instrument. This is the preferred technique when there are no a priori expectations for the underlying factors that should explain how a participant responds to items. EFA is driven by data; one must observe the statistical output and then explain these findings through some theoretical lens.

Readiness for change- For the current study, readiness for change is used to describe a continuum of readiness for making a commitment to change problem behaviors based on an individual's thoughts and actions toward changing that behavior. Readiness for change can be measured by an instrument that measures how individuals rate themselves on items that are believed to represent some underlying construct of readiness for change. The Stage of Change Readiness and Treatment Eagerness Scale (SOCRATES) is an instrument that measures motivational processes that underlie readiness for change (Miller & Tonigan, 1996).

Study habits- Good study habits can be described as "the degree to which the student engages in regular acts of studying that are characterized by appropriate studying routines (e.g.,

reviews of material) occurring in an environment that is conducive to studying" (Credé & Kuncel, 2008, p. 427) and are likely to help students achieve academic success (Downing, 2013).

Study skills- Good study skills can be defined as "the student's knowledge of appropriate study strategies and methods and the ability to manage time and other resources to meet the demands of the academic tasks" (Credé & Kuncel, 2008, p. 427) and are a prerequisite to achieving academic success (Downing, 2013).

Operational Definitions

Adjusted goodness-of-fit index (AGFI)- Absolute fit index that describes what percentage of shared variance between items is captured by the model (Hooper, Coughlin, & Mullen, 2008). The AGFI favors parsimony by adjusting the GFI based on degrees of freedom; more saturated models have poorer fit. AGFI $\geq .90$ is generally considered indicative of good model fit (Hooper et al., 2008).

Akaike information criterion (AIC)- Predictive fit index used to compare two models with one another. The model with the lower AIC is predicted as most likely to replicate (Kline, 2011). Although AIC scores are not normed on a 0-1 scale, a lower value suggests a better fitting, more parsimonious model (Hooper et al., 2008). Researchers make subjective decisions when using this test rather than referencing some cut-off score. The AIC strikes a balance of identifying a model that fits the data well but can also be generalized beyond the specific data set being analyzed. Unlike many other fit indices used to assess changes in fit of different models, the AIC can be used to compare non-nested models (Hooper et al., 2008).

Chi-square (χ^2)- The chi-square test evaluates whether the observed scores are different than the expected scores in some proposed model (Byrne, 2010). In other words, it determines if the data fit what we are proposing it should based on some theoretical model. A good fitting

model would show an insignificant result with a .05 threshold (Hooper et al., 2008). Some researchers suggest dividing χ^2 by degrees of freedom to limit the inflation of χ^2 caused by large sample sizes (Kline, 2011). For χ^2/d.f., researchers recommend a value less than 2.0 as an acceptable ratio (Tabachnick & Fidell, 2007).

Comparative fit index (CFI)- Incremental fit index that measures how much better the proposed model fits the data than the baseline model of independence (Kline, 2011). Hu and Bentler (1999) suggest CFI $\geq$ .95 as representing acceptable fit.

Goodness-of-fit index (GFI)- Absolute fit index that measures the proportion of variance that is explained by the estimated population covariance (Kline, 2011). In other words, the GFI measures how much better a proposed model fits the data compared to no model at all (Kline, 2011). GFI $\geq$ .95 is the suggested cut-off when evaluating model fit (Hooper et al., 2008)

Normed fit index (NFI)- Incremental fit index that compares the χ^2 of the model to the χ^2 value of the null model, in which the null model specifies that all measured variables are uncorrelated (Hooper et al., 2008). This statistic can sometimes underestimate model fit when sample size is less than 200, so it is not recommended to be used independently (Hooper et al., 2008). Hu and Bentler (1999) recommend a NFI $\geq$ .95 cut-off for determining good model fit.

Root mean square error of approximation (RMSEA)- Absolute fit index which measures how well a model with optimally chosen but unknown parameter estimates would fit the covariance matrix for some population (Hooper et al., 2008). In general, RMSEA $\leq$ .06 may indicate good fit (Hu & Bentler, 1999). In addition, upper bound of the 95% confidence interval should not exceed 1.0 (Kline, 2011).

Standardized root mean square residual (SRMR)- Absolute fit index used in confirmatory factor analysis. This test creates correlation matrices of the sample covariance matrix and the

predicted covariance matrix. It measures the mean absolute correlation residual (the overall difference between correlations that are predicted and observed; Kline, 2011). Hu and Bentler (1999) suggested that SRMR $\leq .08$ indicates acceptable fit.

Tucker-Lewis index (TLI) / non-normed fit index (NNFI)- Incremental fit index that compares the χ^2 of the model to the χ^2 of the null model. This statistic favors parsimony, which addresses some of the concerns when using the NFI with samples of less than 200 (Hooper et al., 2008). Hu and Bentler (1999) recommend TLI $\geq .95$ cut-off value when evaluating model fit.

Chapter 2: Literature Review

Academic Coaching

Many universities offer academic coaching to support undergraduate students who are struggling to achieve academic success (Barkley, 2010; Robinson & Gahagan, 2010). Academic coaching assists students in learning skills that guide them in their academic pursuits and future careers (Robinson & Gahagan; Webberman, 2011). Researchers have reported that many undergraduate students are under-prepared for the rigors of academia (Dunlosky et al., 2013). Students who are intellectually capable may experience academic difficulties in their courses because they lack the requisite skills (e.g., time-management, reading comprehension skills, goal setting; Downing, 2013) to succeed in a college course (Gettinger & Seibert, 2002). Academic coaching helps students develop these requisite skills so they can apply their intellectual abilities in ways that lead to academic success (Barkley, 2010; Robinson & Gahagan, 2010).

Researchers have identified several skills that lead undergraduate students to achieve academic success (Credé & Kuncel, 2008; Downing, 2013; Okpala, Okpala, & Ellis, 2000). This area of research is especially important considering that the college student population in the United States is growing at a much faster rate than the population of same-age peers not seeking postsecondary education (U.S. Department of Education, National Center for Education Statistics, 2016). Skills that lead to academic success include, but are not limited to, time management (Downing, 2013; Grund, Brassler, & Fries, 2014; Hartwig & Dunlosky, 2012), reading comprehension (Downing, 2013; Hartwig & Dunlosky, 2012), study skills (Downing, 2013; Hartwig & Dunlosky, 2012; Webberman, 2011), and goal setting (Downing, 2013;

Webberman, 2011). Academic coaching helps students develop competence with these skills, based upon the areas each student is least developed in.

Students who experience academic challenges share a number of characteristics (Dunlosky et al., 2013; Gettinger & Seibert, 2002). For instance, students who experience learning problems often have poor reading comprehension skills (Gettinger & Seibert, 2002). These students tend to be passive in their learning (Gettinger & Seibert, 2002) and often use the same, frequently ineffective, approach to studying regardless of changes in the material's content, difficulty, or structure (Decker, Spector, & Shaw, 1992). These students are unable to adjust their learning strategies based on unique characteristics of the material. Academic coaching helps students develop new ways of learning material, which increases their ability to be flexible in how they learn (Barkley, 2010; Robinson & Gahagan, 2010).

Students who experience academic difficulties often use ineffective time-management techniques (Gettinger & Seibert, 2002). These students tend to study in long, infrequent sessions (Gettinger & Seibert, 2002). They will often wait until the night before an exam to begin studying (Jones, Slate, Blake, & Holifield, 1992). Students who experience academic difficulties often fail to allot enough time to study (Gettinger & Seibert, 2002) and their study time is frequently interrupted by random activities (e.g., friends, music; Nicaise & Gettinger, 1995). There is no substitute for regularly spending enough time studying (Downing, 2013). Even if a student uses the best strategies for learning a subject, the effectiveness of their learning will be limited to the amount of time they commit to studying the material (Downing, 2013). Therefore, it is vital for students to develop time-management skills and spend enough time to successfully learn course material. If students manage their time effectively, they are likely to reduce stress

(Roberts, 1999), maximize productivity (Hamachek, 2007), increase organization (Roberts, 1999), and achieve their academic goals (Hellyer, Robinson, & Sherwood, 2001).

Setting realistic and relevant goals is a motivating and vital step in academic success (Downing, 2013). Goal setting is a good technique to use in academic coaching for students who report struggling with motivation to complete academic tasks. Downing (2013) believes that motivation "surges up" after an individual has made a firm commitment to achieve a goal. By setting goals, students connect their current behaviors with long-term outcomes.

Study habits represent a long-standing pattern of behavior that can often be difficult to change. From a learning perspective, students are frequently able to achieve their desired outcomes on tests in high school without studying at a level needed for success at a university. In other words, students learn that they can earn A's on tests even though they lack time-management skills, have poor reading comprehension and study skills, and do not set study goals for themselves (Downing, 2013). Therefore, poor grades early in college often results in an externalization of blame (Downing, 2013). The students are using the same study strategies when they arrive at college that they used while in high school, so they expect the same results- good grades (Downing, 2013). This externalization of blame robs students of their motivation to study more or differently.

Downing (2013) describes how college students attend their first classes with some idea of what they believe studying is. They have been students and have taken exams before, so they have developed study skills and study habits that lead to desired outcomes (Downing, 2013). Researchers have found that study skills and study habits are good predictors of academic performance (Credé & Kuncel, 2008). Therefore, it's important to develop these skills in the

growing population of undergraduate students (U.S. Department of Education, National Center for Education Statistics, 2016).

Academic coaching assists students in learning how to perform the skills used by students who achieve academic success (Robinson & Gahagan, 2010; Webberman, 2011). However, the impact of academic coaching is limited to each student's level of participation (Downing, 2013). Only a limited number of coaching models available to academic coaches include a focus on the students' motivation levels (see Robinson & Gahagan, 2010; Webberman, 2011). Downing (2013) notes that even if a student has knowledge of academic skills, the increased knowledge is essentially meaningless if the student does not take the steps necessary to apply these skills in how they approach their academic coursework. For this reason, the present study applied the Transtheoretical Model of Change as a guide to understanding and measuring a student's readiness to change their study habits and study skills in academic coaching.

Transtheoretical Model of Change

In the late 20th century, new psychotherapies emerged at an unprecedented rate (Prochaska, 1979; Prochaska & DiClemente, 1982). Divergent thinking provides the pathway for creativity (Guilford, 1956), which happened in the field of psychology during the creation of new theories for psychotherapy (Prochaska & DiClemente, 1982, 1984). These newly conceptualized forms of therapy would only develop the field of psychotherapy if they were accompanied by hierarchical integration (Werner, 1948). Creating new therapies in the absence of hierarchical integration would lead to regression or chaos because an abundance of disconnected theories would be created (Werner, 1948). Therefore, Prochaska and DiClemente (1982, 1984) sought to hierarchically integrate the multiplying forms of psychotherapy as they developed the

Transtheoretical Model of Change (TTM). The work of Prochaska and DiClemente has distilled common elements in the varying theoretical orientations.

There are several hundred different therapies in the field of psychology (Herink, 1980; Karasu, 1986) and Prochaska and DiClemente (1982; 1984) found characteristics that were common in these therapies. The TTM was conceptualized by Prochaska & DiClemente after they discovered a pattern that occurred in substance users who abstained from using substances both on their own and with the help of therapy (Prochaska & DiClemente, 1983). Prochaska and DiClemente proposed a way of conceptualizing treatments that integrate the verbal and behavioral processes of different therapies. They argued that seemingly disparate treatments can, and should, become complementary when combined through the TTM.

Prochaska and DiClemente (1984) discussed how progress in therapy is evolutionary, rather than revolutionary. Clients build on previous events rather than suddenly making a profound and inexplicable shift in their behaviors. Prochaska and DiClemente report that acquisition of a problem is usually unrelated to how one modifies or changes its results. Therefore, therapies that focus on how maladaptive behaviors developed may be limited or ineffective. Furthermore, change in therapy is a complex procedure that needs to draw from verbal and behavioral processes of change to be most effective. Prochaska and DiClemente argue that a truly comprehensive model of psychotherapy should be able to describe how people overcome problems on their own and with the help of therapy.

Prochaska and DiClemente (1984) originally divided a person's readiness for change into three separate but related parts- stages of change, processes of change, and levels of change. The stages of change describe a person's readiness to change problem behaviors (McConnaughy, Prochaska, & Velicer, 1983; Miller & Tonigan, 1996; Norcross, Krebs, & Prochaska, 2011). The

processes of change describe how a person (with or without the help of therapy) goes about addressing the problems that are the focus of current or future change (Prochaska & DiClemente, 1982, 1984). The levels of change are the content that the person is trying to change (e.g., maladaptive cognitions; Prochaska & DiClemente, 1982, 1984). However, J. O. Prochaska (personal communication, June 27, 2016) stated that the levels of change were no longer included in subsequent research about readiness for change after finding nonsignificant results for how the levels of change can be used to predict and influence treatment.

Clients' readiness for change is frequently measured in settings where clients struggle to make lasting changes to their current behaviors (McConnaughy, DiClemente, Prochaska, & Velicer, 1989; McConnaughy, Prochaska, et al., 1983; Miller & Tonigan, 1996). Once an individual's readiness for change has been assessed, the intervention specialist can implement treatment interventions that are appropriate for the client's state of readiness to change (Norcross, et al., 2011). Knowing a person's readiness for change is important if one hopes to assist them in changing their behaviors. This is especially true when behaviors represent a long-standing pattern (Miller & Rollnick, 2002; Miller & Rose, 2009; Prochaska & DiClemente, 1982, 1983, 1984).

Stages of Change

Stages of change is a psychological construct used to describe a person's readiness to change problem behaviors (McConnaughy, Prochaska, et al., 1983; Miller & Tonigan, 1996; Norcross et al., 2011; Prochaska & DiClemente, 1983, 1984). The stages of change describe when a person is ready for change based on their actions and viewpoints related to changing the behavior (Prochaska & DiClemente, 1984). Knowing an individual's stage of change helps to

maximize the effectiveness of interventions (Norcross et al., 2011; Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, & DiClemente, 2013).

Behavior change has been conceptualized as composed of five stages (precontemplation, contemplation, preparation, action, maintenance) that a person progresses through before, during, and after undergoing changes (Norcross, et al., 2011; Prochaska & DiClemente, 1994). Norcross, et al. defined each of these stages:

> Precontemplation is the stage in which there is no intention to change behavior in the foreseeable future. Most patients in this stage are unaware or underaware of their problems. Contemplation is the stage in which patients are aware that a problem exists and are seriously thinking about overcoming it but have not yet made a commitment to take action. Preparation is the stage in which individuals are intending to take action in the next month and are reporting some small behavioral changes ("baby steps"). Although they have made some reductions in their problem behaviors, patients in the preparation stage not yet reached a criterion for effective change. Action is the stage in which individuals modify their behaviors, experiences, and/or environment to overcome their problems. Maintenance is the stage in which people work to prevent relapse and consolidate the gains attained during action. (p. 144)

Naming and delineating the stages of change allows intervention specialists to determine appropriate treatment interventions to use at some point in the change process. For instance, if an individual is in the precontemplation stage about their behaviors, attempting to make changes to their behaviors is most likely to be ineffective (Prochaska & DiClemente, 1984). These individuals are more likely to benefit from interventions that increase the individual's awareness about the outcomes of their behaviors. The increased awareness allows them to make an

informed decision about whether or not they want to explore the possibility of making changes (Prochaska & DiClemente, 1984).

Processes of Change

The processes of change are the "covert and overt activities that people use to progress through the stages [of change]" (Prochaska & Velicer, 1997, p. 39). Although theories vary on what needs to change in therapy, they vary less on what needs to be done to create this change (Prochaska & DiClemente, 1984). The processes of change in the TTM are applied at both an experiential level and an environmental level (Prochaska & DiClemente, 1984).

Therapy is most effective when specific processes of change are matched to an individual's stage of change (Norcross, et al., 2011; Prochaska, Norcross, et al., 2013). Therefore, it is vitally important that the processes of change are chosen based on an individual's stage of change (Prochaska & DiClemente, 1982, 1983, 1984; Prochaska, DiClemente, & Norcross, 1992; Prochaska, Norcross, et al., 2013). There are ten processes of change that have been found to be common among different systems of psychotherapy (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Below is a summary of each of these ten processes.

- Consciousness raising: the most frequently applied process of change (Prochaska & DiClemente, 1984). It is designed to "increase the information available to the individual so they can make the most effective responses to the stimuli impinging upon them" (Prochaska & DiClemente, 1984, p. 36).
- Self-reevaluation: "both an affective and cognitive reappraisal of one's problem and the kind of person one is able to be, given the problem" (Prochaska & DiClemente, 1984, p. 37). During this process a person appraises both the pros and cons of trying to

overcome a significant problem (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013).

- Social reevaluation: focuses on reappraising how the problem has impacted others in the person's life (Prochaska & DiClemente, 1984). The person may find that their behaviors or experiences are in conflict with values that are essential to their sense of community (Prochaska & DiClemente, 1984).
- Self-liberation: a process of change that increases the client's ability to choose (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Self-liberation makes clients more aware of new alternatives to their behaviors and requires them to believe they can successfully engage in these alternatives (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013).
- Social liberation: "involves change in the environment which lead to more alternatives being open to individuals" (Prochaska & DiClemente, 1984, p. 40). Self-liberation is an intervention of the client's experience; social liberation is an intervention of the client's environment (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013).
- Counter-conditioning: a process of changing an individual's response to a conditioned stimulus (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Gradually, new responses can take the place of previously conditioned responses to stimuli (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013).

- Stimulus control: involves "restructuring the environment so that the probability of a particular conditioned stimulus occurring is significantly reduced" (Prochaska & DiClemente, 1984, p. 41).
- Contingency management: a process of making changes in behaviors by making changes to the contingencies that control the behavior (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013).
- Dramatic relief: the belief that "cathartic reactions can be evoked by observing emotional scenes in the environment" (Prochaska & DiClemente, 1984, p. 43).
- Helping relationships: considered a precondition for change and a process of change (Prochaska & DiClemente, 1984). These relationships can occur both in therapy and in the client's social environment (Prochaska & DiClemente, 1984). This relationship should be characterized by openness, trust, warmth, and understanding (Prochaska & DiClemente, 1984).

These processes of change can be matched to an individual's stage of change to maximize treatment (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Several authors have provided guidelines for which processes should be matched to each stage (see Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). As cited by Prochaska, DiClemente, et al. (1992), only 10% - 15% of smokers are in the Preparation stage, 30% - 40% are in the Contemplation stage, and 50% - 60% are Precontemplation. Interventions focused only on preparing individuals for action would mis-serve the majority of their clients if this trend is consistent in other behaviors and populations. Matching the processes of change to the stages of change highlights the importance of being able to measure a person's readiness for change during treatment.

Validating an instrument for measuring readiness for change in academic coaching will help address this need.

Levels of Change

The levels of change are the actual content that is being changed (Prochaska & DiClemente, 1984). The TTM originally focused on five different levels of change-symptom/situational, maladaptive cognitions, current interpersonal conflicts, family/systems conflicts, and intrapersonal conflicts (Prochaska & DiClemente, 1984). Although a client may believe some other level of the problem is influencing them (e.g., religion), therapists are trained to focus on these five levels with clients (Prochaska & DiClemente, 1984). Systems of psychotherapy usually attribute psychological problems as belonging to one or two levels; TTM lends credibility to each level of a problem (Prochaska & DiClemente, 1984).

Although levels of change were included in the original TTM model (see Prochaska & DiClemente, 1984), later research on the TTM includes a discussion of the stages of change and processes of change without mentioning levels of change (see DiClemente et al., 1991; Norcross, et al., 2011; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013; Prochaska, Velicer, DiClemente, & Fava, 1988). As mentioned above, J. O. Prochaska (personal communication, June 27, 2016) reported that the levels of change were no longer included in subsequent research about readiness for change after finding nonsignificant results for how the levels of change can be used to predict and influence treatment. Academic coaching would fit within these levels of change, even though the levels of change have no predictive value for treatment. For example, academic coaching might focus on modifying maladaptive cognitions that a student has developed about their test-taking behaviors. Academic coaching might also help student adapt to the university environment if they experience a conflict with the academic

system. Nonetheless, the levels of change will no longer be discussed for the current study as there is limited research to support their usefulness.

Measuring Readiness for Change

Several instruments have been developed to measure an individual's readiness for change (Cohen, Glaser, Calhoun, Bradshaw, & Petrocelli, 2005; DiClemente, et al., 1991; McConnaughy, Prochaska, et al., 1983; Miller & Tonigan, 1996; Sutton, 2001). These instruments have been used for various populations, including active duty military service members (Mitchell, Francis, & Tafrate, 2005), adolescents (Maisto, Chung, et al., 2003), people with alcohol use disorder (Bertholet et al., 2009; Burrow-Sanchez, 2014; Heather, Rollnick, & Bell, 1993; Miller & Tonigan, 1996; Rollnick, Heather, Gold, & Hall, 1992), individuals using other drugs (Burrow-Sanchez & Lundberg, 2007), and outpatients with severe and persistent mental illness (Carey, Carey, Maisto, & Purnine, 2002). There is limited research applying these instruments to students in academic settings (see Grant & Franklin, 2007; Grunschel & Schopenhauer, 2015; O'Neil, 2014).

Instruments that measure readiness for change generally fall into two major categories: staging algorithms and multidimensional scaling approaches (Sutton, 2001). For staging algorithms, an individual identifies which description of some stage of change best describes their "typical feelings, attitudes, and/or behaviors" (Cohen et al., 2005, p. 46). Individuals are assigned to one stage; they cannot be in more than one stage at a given point in time (Sutton, 2001). Researchers have used staging algorithms to assign individuals to a particular stage of change and then tested how pretreatment stage of change predicted attempts to quit smoking and cessation success at follow-up (DiClemente, et al., 1991). For DiClemente et al. (1991), the

research question required that individuals being assigned to one stage at the beginning of treatment. Therefore, the staging algorithm was appropriately used for their study.

Sutton (2001) criticized the staging algorithm approach because of arbitrary periods of time that were used to define the TTM. For instance, in order for an individual to move from action to maintenance, they must have abstained from using substances for at least six months (Prochaska & DiClemente, 1982, 1984). Sutton (2001) argued that establishing these arbitrary time cut-offs casts doubt on the assumption that the stages are distinct from one another. Sutton (2001) suggested conceptualizing behavior change as existing on some continuum rather than separated into distinct stages. A case can be made that the multidimensional scaling approach allows one to capture a more complete description of the individual's experience, which the staging algorithm fails to do. Therefore, two previous studies assessing college students' readiness to change academic procrastination (Grunschel & Schopenhauer, 2015) and study skills (Grant & Franklin, 2007) can be improved upon by developing a multidimensional scaling instrument to measure readiness for change.

Multidimensional scaling yields a change profile based on scores from several dimensions related to change (Cohen et al., 2005). In multidimensional scaling, a set of questionnaire items measures each stage (Sutton, 2001). Scores represent where individuals fall on each dimension being measured. For example, if a multidimensional scaling instrument measures four stages (e.g., precontemplation, contemplation, preparation, and action), the individual will receive separate scores for each of the four stages. This method helps gain a more comprehensive understanding of an individual's readiness for change compared to the staging algorithm method (Sutton, 2001).

Three of the most well-known multidimensional scaling instruments used to measure readiness for change include the University of Rhode Island Change Assessment Scale (McConnaughy, Prochaska, et al., 1983), the Readiness to Change Questionnaire (Heather et al., 1993; Rollnick et al., 1992), and the Stages of Change Readiness and Treatment Eagerness Scale (Miller & Tonigan, 1996). There are varying levels of empirical support for each of these measures (see Bergly, Stallvik, Nordahl, & Hagen, 2014; Budd & Rollnick, 1996; Callaghan et al., 2008; Field, Adinoff, Harris, Ball, & Carrol, 2009; Gervey, 2010; Heather et al., 1993). A summary of the literature on these instruments is presented below.

McConnaughy, Prochaska, et al. (1983) were among the first to create a multidimensional scale for assessing stages of change. The Stages-of-Change Scale (McConnaughy, Prochaska, et al., 1983; McConnaughy, DiClemente, et al., 1989) was later renamed the University of Rhode Island Change Assessment Scale (URICA; DiClemente & Hughes, 1990). The URICA asks individuals to rate themselves on a 32-item measure corresponding to the stages of change. Individuals respond to items on a 5-point Likert scale. A higher score indicates a higher level of agreement that the item describes the individual completing the assessment. The results are used to assess an individual's readiness to change (DiClemente & Hughes, 1990; McConnaughy, DiClemente, et al., 1989; McConnaughy, Prochaska, et al., 1983).

The scores on the URICA yield results on four separate scales (precontemplation, contemplation, action, maintenance) that correspond with the stages of change (McConnaughy, Prochaska, et al., 1983). Examples of items from each scale include- "As far as I'm concerned, I don't have any problems that need to change" (precontemplation item); "I think I might be ready for some self-improvement" (contemplation item); "Even though I'm not always successful in

changing, I am at least working on my problem" (action item); "I have been successful in working on my problem but I'm not sure I can keep up the effort on my own" (maintenance item). URICA items are worded in general and inclusive language (e.g., "I am really working hard to change") to address a variety of behaviors an individual may want to change. Studies have found satisfactory reliability and validity with the measure (McConnaughy, DiClemente, et al., 1989; McConnaughy, Velicer, et al., 1983).

Some researchers, however, have raised concerns about the usefulness of the URICA in clinical application (Bergly et al., 2014; Callaghan et al., 2008; Field et al., 2009; Gervey, 2010). Particularly, poor predictive validity evidence was found when the URICA was used in treatment settings (Field et al., 2009). Researchers recommended caution (Bergly et al., 2014) when using the URICA to measure an individual's readiness for change for the purpose of matching treatment interventions to the individual's stage of change (Callaghan et al., 2008), predicting outcomes (Field et al., 2009), measuring progress in treatment (Callaghan et al., 2008), or making clinical decision in vocational counseling (Gervey, 2010). These findings indicate serious concerns of the usefulness of the URICA in clinical settings. Other researchers attempted to develop instruments that addressed some of these concerns (Heather et al., 1993; Miller & Tonigan, 1996; Rollnick et al., 1992).

The Readiness for Change Questionnaire (RCQ) was one of the instruments developed to address limitations of the URICA. The RCQ is a 12-item instrument that measures stages of change for reducing alcohol consumption among excessive drinkers who are not seeking help to change their problem (Heather et al., 1993; Rollnick et al., 1992). The RCQ was originally intended to measure three stages (precontemplation, contemplation, and action; Rollnick et al., 1992). Researchers discovered that three factors emerged in an EFA (Rollnick et al., 1992;

Wells-Parker, Williams, Dill, & Kenne, 1998). However, studies found that the contemplation and action factors correlated positively with one another, suggesting that the questionnaire fails to capture unique features of the stages of change (Rollnick et al., 1992; Wells-Parker et al., 1998). Furthermore, other researchers reported a poor model fit of the original model (Budd & Rollnick, 1996; Heather et al., 1993). Considering these limitations and the lack of empirical research available on the RCQ, there are serious concerns about the usefulness of the RCQ, in its current form, for measuring stages of change.

Although the URICA was applied in one study to assess readiness for change in academic coaching (O'Neil, 2014), some authors have argued that a measure with more specific questions would more accurately reflect an individual's stage of change than the URICA (Miller & Tonigan, 1996). The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) includes items that are tailored to a specific problem behavior (e.g., "I know that I have a drinking problem") rather than general questions about motivation (Miller & Tonigan, 1996). In 1987, W. R. Miller developed an initial set of items for the SOCRATES (Miller & Tonigan, 1996). Miller distributed these items to a dozen of his colleagues for their feedback (Miller & Tonigan, 1996). Based on their review, he developed the initial SOCRATES instrument as a 32-item measure with four 8-item scales corresponding to Precontemplation (P), Contemplation (C), Determination (D), and Action (A; Miller & Tonigan, 1996). The SOCRATES did not originally include items to measure the maintenance stage because it was intended for use with individuals initially presenting for treatment who would not yet be in the maintenance stage (Miller & Tonigan, 1996).

Researchers piloted the SOCRATES with a sample of clients presenting for treatment of alcohol dependence (Miller, Meyers, et al., 1990; Miller, Tonigan, et al., 1990). An EFA yielded

four factors (Miller, Meyers, et al., 1990; Miller, Tonigan, et al., 1990). While the C, D, and A subscales positively correlated with one another, the P subscale negatively correlated with the other three subscales (Miller, Meyers, et al., 1990; Miller, Tonigan, et al., 1990). Data analyses later revealed that the P and D subscales actually comprised a single factor, representing opposite sides of a single problem recognition dimension (Miller & Tonigan, 1996).

A revised version of the SOCRATES was developed based on these findings (Miller & Tonigan, 1996). The revised SOCRATES reworded or substituted some items and added a Maintenance (M) subscale. After testing the new instrument with a population of heavy drinkers from a VA Hospital, several more items were modified (Miller & Tonigan, 1996). After rewording these items, the SOCRATES 4.0 was tested with another sample from a VA Hospital (Miller & Tonigan, 1996). Based on the results of these studies, a final version of the SOCRATES 5.0 (hereinafter referred to as the SOCRATES) was developed for future use.

Miller and Tonigan (1996) developed the final 19-item SOCRATES instrument and discovered that it performed similarly to the longer versions that were previously in use. Miller and Tonigan completed an EFA and used the eigenvalue cut-off of 1.0 to yield a three-factor solution. An eigenvalue describes that amount of variance a factor explains in EFA; the higher the eigenvalue, the more variance the factor explains (Furr & Bacharach, 2014). An eigenvalue cut-off of 1.0 is generally accepted to decide how many factors to retain in EFA (Thompson, 2004).

Miller and Tonigan (1996) assigned items to one of the three factors based on factor loading. Factor loading represents a measure of how much observed item variance can be explained by the underlying factor the item is associated with in the model. Items with loadings greater than .30 were included in the model. When items loaded more than .30 on two factors,

the larger of the loadings was used to assign the item to a factor. It should be noted that this is a weak approach to factor extraction and item selection, as small differences were used to make decisions about factor assignment. Using small differences to make decisions about factor assignment has the potential to include items that may decrease the validity of the instrument or neglect to revise items that need to be reworded or excluded (Furr & Bacharach, 2014).

Statistical analyses revealed that items designed to measure the precontemplation stage and contemplation stages reflected opposite sides of a single dimension (Miller & Tonigan, 1996). Therefore, these factors were collapsed into a single factor. Miller and Tonigan (1996) then interpreted the SOCRATES as measuring three factors related to motivation to change, rather than five dimensions described in the stage of change. Miller and Tonigan recommend against the use of the original scales that measured stages of change (see Prochaska & DiClemente, 1982). The scales on the SOCRATES are better understood as continuously distributed motivational processes that underlie the change process. According to Miller and Tonigan, the three motivational processes measured by the SOCRATES are: Recognition of a problem (Recognition factor), Ambivalence about a problem (Ambivalence factor), and Taking steps to change (Taking Steps factor).

Several studies have found a similar, three-factor model that underlies response patterns on the SOCRATES (Chun, Cho, & Shin, 2010; Mitchell et al., 2005; Vik, Culbertson & Sellers, 2000; Zullino et al., 2007). However, many of these studies have weaknesses that limit their generalizability and cause concerns for the use of a three-factor model for interpreting the SOCRATES. An overview of the research literature on the three-factor model, highlighting significant limitations, will be discussed before presenting the two-factor model for interpreting the SOCRATES.

It should be noted that both the three-factor and two-factor models for interpreting the SOCRATES displayed variability in the items that were retained in the final models. See Tables 2 and 3 for a summary of the items that were retained for each model presented in this literature review as well as the items that were retained for the SOCRATES-C. For sake of clarity, only items that were found to load onto a different factor than originally proposed by Miller and Tonigan (1996) or Maisto, Conigliaro, et al. (1999) will be discussed in the text. Items that were simply not retained will not be discussed but can be reviewed in Tables 2 and 3.

The SOCRATES was translated to German and administered to a sample of alcohol-dependent inpatients (Demmel, Beck, Richter, & Reker, 2004). Demmel et al. (2004) conducted an EFA and found that their translated version of the SOCRATES yielded an 18-item, three-factor structure that corresponded to the findings from Miller and Tonigan (1996). Items 1 ("I really want to make changes in my drinking") and 14 ("I want help to keep from going back to the drinking problems that I had before") loaded onto different factors than was originally cited by Miller and Tonigan. Researchers (Demmel et al., 2004) did not provide any explanation or hypotheses for the discrepant findings. There are concerns of the statistical analyses selected for their study. An EFA is the appropriate analysis when underlying factors are anticipated to influence how individuals respond to items but there is no hypothesis for how items load onto different factors (Suhr, 2005; Furr & Bacharach, 2014). Confirmatory factor analysis (CFA) is a more appropriate analysis to use when researchers have an expectation of the factor structure for an instrument (Furr & Bacharach, 2014). Considering Demmel et al. based their study on findings from Miller and Tonigan, there was a preexisting factor structure for the instrument that warranted the use of CFA. The research from Demmel et al. could have been strengthened if they had conducted and reported a CFA.

Zullino et al. (2007) translated the SOCRATES to French before administering it to a several samples in Switzerland. The participants were classified as hospitalized multi-drug dependent (n = 90), cannabis-abusing patients with schizophrenia (n = 11), or tobacco smokers (n = 24). A principal component analysis identified a 14-item, three-factor model for interpreting the data. They found that only item 14 ("I want help to keep from going back to the drug problems that I had before") loaded on a different factor than the model from Miller and Tonigan (1996). Although previous studies written about using the SOCRATES in treatment settings for alcohol and other drug use (see Carey et al., 2002; Sinha, Easton, & Kemp, 2003; Skylar & Turner, 1999), Zullino et al. were among the first to report the validity of the measure with drugs other than alcohol. A limitation to this study was the use of principal component analysis as evidence to support the replicated factor structure from Miller and Tonigan. Principal component analysis is a statistical technique designed to reduce the number of items in a measure while maximizing explained variance (Kline, 2011). Principal component analysis forces factors to be uncorrelated and does not assume that some latent factors influence how individuals respond (Suhr, 2005). It is not an appropriate technique when comparing findings to an a priori model. CFA would have been the correct statistical analysis to compare Zullino et al.'s model to Miller and Tonigan's model.

The SOCRATES was also translated to Korean and administered to a sample of inpatients and outpatients with alcohol dependency (Chun et al., 2010). The participants in their study were attending treatment at a specialized clinic for alcohol dependence. Chun et al. (2010) conducted both EFA and CFA to determine that a three-factor solution best fit the data. The three-factor structure they identified was the same as that originally proposed by Miller and

Tonigan (1996). Chun et al. split their sample by site, using inpatient sample for EFA and an outpatient sample for their CFA.

Other researchers have reported a three-factor model for the English version of the SOCRATES (Mitchell et al., 2005; Vik et al., 2000). These studies, and the report from Miller and Tonigan (1996), were the only studies that reported a three-factor model for the English version of the SOCRATES. However, all studies of the English version retained different items for the factors. Miller and Tonigan (1996) originally reported on a 19-item instrument. Mitchell et al. (2005) conducted a principal components analysis and only retained 14 of the original items. It should be noted that Factor 3 for Mitchell et al. only had three indicator variables. Kenny (1979) states that although three indicators for a factor are good, four is better, and more is best. Therefore, Mitchell et al.'s model has room for improvement. As mentioned above, principal component analysis is designed to reduce the number of items in a measure, focuses on explaining the maximum amount of variance, and does not conceptualize latent factors as influencing response patterns (Kline, 2011; Suhr, 2005). It does not allow researchers to compare measures with one another. CFA would have been the correct statistical analysis to compare Mitchell et al.'s model to Miller and Tonigan (1996).

Vik et al. (2000) tested the SOCRATES with a population of heavy-drinking college students. Heavy drinkers were defined as men who had consumed five or more alcoholic beverages on one occasion over the past three months and women who had consumed four or more beverages on one occasion over the past three months. Vik et al. conducted a CFA with two models. The first model was the original 19-item model from Miller and Tonigan (1996). The second model only included 16 items. Vik et al. reported that the three items were removed based on previous studies but did not state which items were removed. Vik et al. conducted a

CFA and found that the 16-item, three-factor model showed better fit for the data than the original 19-item, three-factor model. Although these findings provided some support for the research by Miller and Tonigan, the generalizability of the findings is limited. Vik et al. failed to report which items were removed in the 16-item model. Furthermore, no other studies have confirmed these findings since the study was published.

As can be seen, there are some significant limitations in the literature about the three-factor model for interpreting the SOCRATES. Considering these limitations, there has been a considerable research using a two-factor model to interpret the SOCRATES (see Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003; Maisto, Conigliaro, et al., 1999). Many of these studies apply more appropriate statistical techniques for measurement validation to address some limitations in literature on the three-factor model. Furthermore, several studies have shown better fit for the two-factor model than the three-factor model (see Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Conigliaro, et al., 1999).

The two-factor model for interpreting the SOCRATES was first introduced by Maisto, Conigliaro, et al. (1999). They administered the SOCRATES to a sample of at-risk alcohol drinkers (n = 301) at 13 community primary care clinics. A principal components analysis revealed a 15-item, two-factor structure. As their goal was to identify the simplest factor structure, principal component analysis was used. However, considering the same limitations as listed above regarding principal component analysis, an exploratory factor analysis would have been the more appropriate statistical analysis. Nonetheless, Maisto, Conigliaro, et al. applied more stringent criteria for item retention than Miller and Tonigan (1996). The eigenvalue cut-off of 1.0 was used (Maisto, Conigliaro, et al., 1999), which was the same cut-off used by Miller and

Tonigan. For their analyses, Maisto, Conigliaro, et al. retained items that loaded ≥ .40 onto only one factor. A limitation from the Miller and Tonigan model was that items were assigned to factors, even if they cross-loaded onto more than one factor, simply based on their highest loading. Maisto, Conigliaro, et al. addressed this limitation by retaining items that loaded onto only one factor significantly.

Maisto, Conigliaro, et al. (1999) conducted a CFA to compare their 15-item, two-factor model to that of Miller and Tonigan (1996). Maisto, Conigliaro, et al. used the same data in the CFA that was used in their principal components analysis. This is a significant limitation as the principal components analysis had already identified a parsimonious factor structure that fit the data well. As expected, they found that the two-factor model fit the data better than the three-factor structure identified by Miller and Tonigan. The two factors identified by Maisto, Conigliaro, et al. were titled AMREC and Taking Steps. The AMREC factor was comprised of items from Miller and Tonigan's Ambivalence and Recognition scales. They viewed the AMREC factor as measuring the perceived degree of severity of an existing alcohol problem (Maisto, Conigliaro, et al., 1999). Essentially, Maisto, Conigliaro, et al. presented the AMREC as describing a continuum of problem recognition, with items from the original factor of Ambivalence on one extreme and items from the original factor of Recognition on the other extreme. The Taking Steps factor from Maisto, Conigliaro, et al. was composed of six items from Miller and Tonigan's Taking Steps factor. They viewed the Taking Steps factor as measuring how much action individuals are already taking, or have taken in the past, to change the alcohol usage (Maisto, Conigliaro, et al., 1999).

The findings from Maisto, Conigliaro, et al. (1999) led to an abundance of research on the two-factor model for interpreting the SOCRATES (Bertholet et al., 2009; Burrow-Sanchez,

2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003). It should be noted that none of the studies supporting the three-factor model for interpreting the SOCRATES compared their model to a two-factor model (see Chun et al., 2010; Miller & Tonigan, 1996; Mitchell et al., 2005; Vik et al., 2000; Zullino et al., 2007). Several studies supporting the two-factor model evaluated its fit in comparison to the three-factor model (Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005). These studies all reported a better model fit for the two-factor model from Maisto, Conigliaro, et al. (1999) than the three-factor model from Miller and Tonigan (1996).

Evidence of the two-factor structure for interpreting the SOCRATES was found in adolescent alcohol use disorder samples (Burrow-Sanchez, 2014; Maisto, Chung, et al., 2003). Maisto, Chung, et al. (2003) conducted a principal component analysis, followed by a CFA. Although principal component analysis was once again not the appropriate statistical technique, Maisto, Chung, et al. noted their choice to run this analysis was consistent with previous studies examining the factor structure of the SOCRATES. Maisto, Chung, et al. used the same data for the principal components analysis and CFA. As mentioned above, the model identified in the principal components analysis will show better fit when compared to other models in CFA as it has already been identified as the most parsimonious model with the principal component analysis. As expected, Maisto, Chung, et al. found the best fit for a 14-item, two-factor model. The model identified in the principal component analysis failed to retain two items and added one item that was not included in the two-factor model from Maisto, Conigliaro, et al. (1999). Burrow-Sanchez (2014) went a step further by conducting a CFA to compare competing models for interpreting the SOCRATES. He cited evidence for a 13-item, two-factor model for interpreting the SOCRATES when administered to adolescent alcohol use disorder samples. It

should be noted that items 6 ("Sometimes I wonder if my drinking is hurting other people") and 11 ("Sometimes I wonder if I am in control of my drinking") loaded onto a different factor (Burrow-Sanchez, 2014) than was originally proposed by Maisto, Conigliaro, et al.

Evidence for a 16-item, two-factor model for interpreting the SOCRATES was found in a sample of adults who were hospitalized in a general hospital and not attending any specialized alcohol treatment (Bertholet et al., 2009). Researchers screened participants for the study to identify those who are at-risk for alcohol abuse. Bertholet et al. (2009) conducted confirmatory factor analyses to compare the two-factor model from Maisto, Conigliaro, et al. (1999) to the three-factor model from Miller and Tonigan (1996). They found that the two-factor model from Maisto, Conigliaro, et al. fit their data the best.

Researchers have found support for the two-factor model over the three-factor model in a variety of settings (Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005). Burrow-Sanchez and Lundberg (2007) administered to SOCRATES to a sample of indigent adults with alcohol and other drug problems. They conducted a CFA to compare Maisto, Conigliaro, et al.'s (1999) two-factor model to Miller and Tonigan's (1996) model. Although both models had adequate fit to the data, Maisto, Conigliaro, et al.'s had better fit. Two items were removed from Maisto, Conigliaro, et al.'s model because of low total-item correlations. The 13-item, two-factor model slightly improved the model's fit to the data even further.

Figlie et al. (2005) tested the two-factor model with a sample of Portuguese outpatients who were being treated for alcohol abuse. Figlie et al. conducted a CFA and found that the two-factor structure proposed by Maisto, Conigliaro, et al. (1999) fit the data better than the three-factor structure from Miller and Tonigan (1996). Figlie et al. did not remove and reassign any of

the items to different factors. The 15-item, two-factor item they identified was exactly the same as the model proposed by Maisto, Conigliaro, et al.

Despite the abundance of support for the two-factor model for interpreting the SOCRATES, there are some concerns that must be addressed. One of the biggest concerns is that although good evidence can be found for the two-factor model, there is variability in how the items load onto each factor (see Table 3). One explanation for the contradicting findings has been the difference in populations the instrument was administered with (Bertholet et al., 2009; Maisto, Conigliaro, et al., 1999). It is possible that the SOCRATES performs differently depending on the setting, population, region, etc. it is being applied in. Another possible explanation could be limitations in measurement. It is possible that ambivalence is relatively unstable and therefore difficult to reliably measure (Maisto, Conigliaro, et al., 1999). Item content may be unable to make distinctions between underlying phenomena (Figlie et al., 2005).

It is also possible that that variability in findings is due to the variability in statistical techniques that were applied across studies (Figlie et al., 2005). Studies on the SOCRATES used EFA, principal component analysis, and CFA. Each of these techniques serve a different end goal in statistical analysis with the former two allowing the data to have the most influence on factor structure. Therefore, it makes sense that findings would vary across studies using different statistical techniques. A summary of reported model fit statistics can be found in Table 4.

Problem Recognition and Behavior Change Related to Help-Seeking

Individuals with substance-related problems differ on their self-reported level of awareness of problem behaviors and self-perceived efforts to changing their behaviors (Edlund et al., 2009; Probst et al., 2015). Those who independently seek treatment focused on substance use tend to rate themselves as more aware of problems secondary to substance use than individuals

who do not attend treatment volitionally (Edlund et al., 2009). Such individuals are not ambivalent about the existence of problematic behaviors. They explicitly endorse problems that are directly related to their substance use (Edlund et al., 2009; Falck et al., 2007; Wells et al., 2007). Individuals who self-refer for treatment are more likely to be willing to participate in professional treatment to change their behaviors than individuals who are mandated to attend treatment (Edlund et al., 2009; Wells et al., 2007).

When compared to individuals with substance-related problems who do not attend treatment volitionally, individuals who self-refer tend to view their own efforts to change problem behaviors as non-existent and/or ineffective (Wells et al., 2007). Those who do not self-initiate treatment are unlikely to perceive problems related to their substance use (Grant, 1997) or believe their substance-related behaviors do not necessitate treatment (Edlund et al., 2009; Falck et al., 2007; Wells et al., 2007; Wu et al., 2007). Wells et al. (2007) found that individuals with alcohol use disorder may make disingenuous efforts to change their drinking behaviors. Some individuals may even expect their drinking patterns to change on their own, without any substantial efforts or changes in behavior actually taking place. These individuals continue to experience problems secondary to their alcohol use while maintaining patterns of behavior that maintain drinking habits (Wells et al., 2007). Even though these individuals express a belief that their own efforts will be sufficient to decrease problematic drinking patterns, less than half of them reported attempting to quit or cut down their drinking (Wells et al., 2007). Researchers have identified denial (Grant, 1997) and lack of motivation (Parkman et al., 2017) as significant barriers to initiating treatment for individuals who have substance-related problems and do not seek treatment volitionally.

Factor Analysis

Structural equation modeling (SEM) is a family of statistical techniques that includes path analysis, structural regression, and CFA (Kline, 2011). Kline (2011) describes how SEM is composed of two broad classes of variables- manifest variables and latent variables. Manifest variables are observed; they are the collected scores on some measure. Manifest variables can be categorical, ordinal, or continuous. The latent variables, on the other hand, can only be continuous. Latent variables are hypothetical constructs or factors. They are thought to reflect some continuum that cannot be directly observed. An example of these two variables can be found with intelligence. The latent variable of intelligence cannot be directly measured. Therefore, individuals complete some tasks (e.g., intellectual assessment measures) that provide a score. Their score on these observable measures allows one to (roughly) infer intelligence based on the observed score on the manifest variable. This is an example of an indicator variable- an observed variable that indirectly measures some construct (Kline, 2011).

Kline (2011) summarizes how all of the SEM techniques can be used to create or evaluate statistical models for understanding data. There are some major differences in their purposes and required types of data. Path analysis requires that both the manifest variables and factors are observed. That is, all the data that is presented in the model (apart from the error) is being observed. Structural regression only requires that the indicator variables are observed. Underlying constructs, or factors, are calculated based on scores on the indicator variables in structural regression. Structural regression is unique in that the model provides a path diagram for how underlying factors influence one another.

Unlike path analysis, CFA does not attempt to describe how the factors influence one another (Kline, 2011). Kline (2011) describes the goal of CFA is to identify factors in the model

that are independent enough that they explain a unique portion of the variance. If the factors are too related, they may need to be collapsed into a single factor. The factors in CFA are hypothesized to influence how individuals respond to items being measured. That is, some factor (an underlying construct) explains how individuals vary in their responses to items on a questionnaire. Underlying constructs are not measured directly as they would be in path analysis (Kline, 2011).

CFA can be used when there is an expectation for a measure's dimensionality (Furr & Bacharach, 2014). CFA is driven by a theory of the constructs being measured, rather than by the data. That is, one must begin with a model of the relationships between the indicators and latent variables (Landis, Dempsey, & Overstreet, 2003). CFA tests how well a model of the latent variables matches the data in a sample (Furr & Bacharach, 2014). When the data and theoretical matrices match, the data show "good model fit" (Landis et al., 2003). CFA is used to confirm, or disconfirm, hypotheses about a measure's dimensionality. It can also be used to compare how well different models fit a data set (Kline, 2011).

EFA is another statistical technique that can be used to measure an instrument's dimensionality. EFA, as the name implies, is exploratory in nature. It is the preferred statistical analysis when there are few, if any, ideas about the measure's dimensionality (Furr & Bacharach, 2014). EFA is considered exploratory because the results are driven by the data, rather than by theory (Landis et al., 2003). EFA methods are limited because different procedures can lead to different results with the same data (Landis et al., 2003). Additionally, different researchers may interpret the same results differently.

Given that the literature provides support for the two-factor model over the three-factor model for interpreting the SOCRATES (see Burrow-Sanchez & Lundberg, 2007; Figlie et al.,

2005), CFA for the two-factor model was used for the present study to evaluate model fit. Furr and Bacharach (2014) discuss the four major steps involved in CFA: (1) Specification of measurement model, (2) Computations, (3) Interpreting and reporting output, and (4) Model modification and reanalysis.

Step 1- Specification of Measurement Model

After developing test items and collecting data, the hypothesized model for CFA can be entered into a statistical software package to conduct the analysis (Furr & Bacharach, 2014). One must specify the factors, as well as which factor each indicator variable is hypothesized to relate to (Furr & Bacharach, 2014). If there are multiple factors on an instrument, the expected associations between elements must be specified (Furr & Bacharach, 2014).

Step 2- Computations

After the hypothesized model has been entered, the statistical software conducts CFA to determine the model fit (Furr & Bacharach, 2014).

Step 3- Interpreting and Reporting Output

Fit indices are typically examined first to determine how well a hypothesized model fits with the data collected (Furr & Bacharach, 2014). Most statistical programs will provide several measures of goodness of fit for a model. One of the most common tests is the chi-square statistic, which measures how poorly a model fits. That is, if the chi-square goodness-of-fit test is significant, the proposed model fits poorly with the data (Furr & Bacharach, 2014). The chi-square test does not provide data about which aspect of a model led to poor fit, it simply tests if the observed data matches what is expected. It should be noted that chi-square is more likely to become significant as sample size increases (Furr & Bacharach, 2014). This increases the risk that the model will "fit poorly" because of large sample size rather than actual fit.

Kline (2011) notes that it is uncommon to falsely reject the null hypothesis with sample sizes that are typically used in SEM (N = 200 – 300). Kline recommends rejecting the model if a statistically significant chi-square value is found for a model tested with a sample size of 200 – 300. However, a failed chi-square test can be an indication of a potential problem, regardless of how sample size influences the test (Kline, 2011). Researchers must diagnose and adequately explain why the test was failed when a chi-square test is failed (Kline, 2011).

CFA should include additional fit indices because of the potential statistical problems of chi-square tests (Furr & Bacharach, 2014). Alternative indices listed by Furr and Bacharach (2014) include: goodness-of-fit index (GFI), the normed fit index (NFI), the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square of approximation (RMSEA), the standardized root mean square residual (SRMR), and the Akaike information criterion (AIC).

Hu and Bentler (1999) noted the effect that sample size may have on chi-square tests of significance. To address this potential measurement error, they recommend adding SRMR, CFI, and RMSEA analyses before concluding whether a model fits well with a given dataset. The recommended cut-offs for each of these analyses are: SRMR $\leq$ .08, CFI $\geq$ .95, and RMSEA $\leq$ .06. Their recommendations are similar to those from a meta-analysis of CFA studies published in dozens of American Psychological Association journals from 1998 to 2006 (Jackson, Gillaspy, & Purc-Stephenson, 2009). The meta-analysis studied reporting practices for CFA during that time period and created a list of recommendations based on these results as well as previous studies about CFA.

The TLI is an incremental fit index that prevents the addition of parameters that do not contribute significantly to the model. That is, the TLI tends to show poorer fit when parameters are added that do not improve model. The AIC is a statistical test that compares how well

different models fit a given data set. A unique feature of AIC is that models are penalized for adding parameters, which requires additional parameters to add significantly to the amount of variance that is explained by the model. AIC helps researchers identify a model that explains a data set well but also is not too specific to be generalized to other data. The combination of the above statistics will help address limitations of other statistical analyses to provide a comprehensive analysis of the data for the current study.

Step 4- Model Modification and Reanalysis (If Necessary)

CFA results often indicate the need to consider making changes to a hypothesized measurement model (Furr & Bacharach, 2014). If the proposed model is a poor fit to the data, modification indices need to be examined to find clues about revisions that will improve the model. A modification index will calculate how much a model will improve if an item is loaded onto a different factor than it was initially expected to load on. With these improvements in mind, one can make revisions to a model. Kline (2011) recommends only making one change to the model at a time and rerunning the analyses after each change to help isolate which modifications are responsible for the change in model fit.

Furr and Bacharach (2014) recommend caution when modifying a model in CFA. Making modifications begins to obscure the differences between EFA and CFA. Although there is some overlap between the two, CFA is intended to have a priori estimates about item loading. Ignoring too much of the a priori nature of CFA threatens statistical assumptions about the test, therefore, professional judgement should be exercised when making any post-hoc changes to the model. Switching to an EFA makes more sense if the researcher professional judgement indicates that too many changes are being made to the proposed model.

Secondly, modifications should have a clear conceptual basis (Furr & Bacharach, 2014). Deviations from an expected response pattern could potentially be the result of an idiosyncrasy that is unique to the sample, rather than representative of the model when applied to a population. Therefore, any changes should be explained by both statistical modification indices and a strong theoretical basis. Investigators should consider administering a revised instrument to a new sample if considerable changes are made to an instrument.

Chapter 3: Method

Research Question

The current study examined the factor structure of the SOCRATES-C to describe readiness for change in academic coaching students. The SOCRATES-C items were originally reworded to be used for academic coaching at a large state university in the southeastern United States. Participants were undergraduate students who either self-referred or were mandated to attend academic coaching. Archival data for the current study provided an opportunity to begin examining the factor structure for this newly developed instrument to measure readiness for change in academic coaching students.

Hypothesis 1

It was hypothesized that the SOCRATES-C would show good model fit for the two-factor model from Maisto, Conigliaro, et al. (1999) when compared with the three-factor model from Miller & Tonigan (1996). This hypothesis was consistent with previous studies comparing the two models in other populations (see Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Conigliaro, et al., 1999). More specifically, several absolute fit indices (χ^2 exceeds critical value; SRMR $\leq .08$; AGFI $> .90$) and a relative fit index (TLI $\geq .95$) were used to identify a model that fits the data. The AIC was used to identify a model that explains the data well but also does not over-fit the data and limits generalizability. It should be noted that the AIC is capable of comparing model fit for non-nested models which other model fit statistics cannot be used for.

Hypothesis 2

If neither factor model fit the data, an EFA was planned to find a new factor model for interpreting the SOCRATES when applied to academic coaching students. It was hypothesized that EFA would identify a model that shows good fit with the data. For the EFA analysis, an oblique factor rotation method was to be selected as it can be used for factors regardless of whether they are correlated. Maximum likelihood was planned for factor extraction if the assumption of normality in the data were not severely violated (skew < 2; kurtosis < 7; West, Finch, & Curran, 1995). Items would be retained if they had a factor loading above .40 and the next highest factor loading was at least .20 less than the items highest loading (Carriere & Kluck, 2014). This hypothesis was not tested as a model with marginal fit was identified in hypothesis 1.

Hypothesis 3

Lastly, it was hypothesized that participants would differ on their level of self-reported ambivalence/recognition of their academic problems and whether they reported already taking steps to change their academic habits based on the referral source. More specifically, it was hypothesized that participants who self-reported below average ambivalence/recognition of their academic problems and self-reported above average scores on items measuring whether they had already begun taking steps to change their academic habits would be more strongly represented by the participants who were mandated to attend academic coaching than those who self-referred. Since four comparisons will be made to test hypothesis 3, it was hypothesized that participants who self-reported above average ambivalence/recognition of their academic problems and self-reported below average scores on items measuring whether they had already begun taking steps to change their academic habits would be more strongly represented by participants who self-referred to academic coaching than by those who were mandated.

Participants

Participants for the present study were a nonrandom sample of students (*n* = 180; although 182 participants were originally in the sample, two participants were dropped from the sample due to incomplete SOCRATES-C forms) who sought academic coaching between January 2015 – September 2016 at a large state university in the southeastern United States. The data collection locations for the current study served two groups of students who attended academic coaching- (1) Students who attended academic coaching on their own volition through the Office of Academic Support (*n* = 93; 51.7% of the sample) and (2) Students required to attend academic coaching by the Academic Coaching and Counseling (ACAC) Office due to unsatisfactory academic performance (n = 87; 48.3% of the sample). The heterogeneity of referral source was desired. Heterogeneity was intended to help capture students at different levels of readiness to change, which is necessary to adequately evaluate the factor structure of a measure. CFA requires sufficient variability in the sample, which is represented by individuals who respond differently to items based on how they vary on some underlying factor. CFA is unable to identify different factors in an overly homogeneous sample because the sample shares too much variability.

Data from the ACAC Office only included SOCRATES-C responses. Although the office was unable to provide any demographic information pertaining the current sample, they did provide some limited information about the students who sought services there during the Fall 2016 semester. The gender distribution of students served by the ACAC Office during the Fall 2016 semester were 68% male and 32% female. Their average GPA was 1.55 and ACT was 24.5. No other demographic or descriptive information was available for these students.

Of the students from the Office of Academic Support, the gender distribution for the current sample was 64% male and 36% female. Their age ranged from 18 to 26 (*m* = 20.17). The sample was predominately Caucasian (82.2 %) with only 13.7% of participants identifying as African-American and 1.4% identifying as Middle-Eastern, 1.4% identifying as Asian, and 1.4% identifying as Hispanic. Seventy percent of the sample was composed of underclassmen (39% freshman and 30% sophomores). Juniors made up 26% of the sample, and seniors were only 5%. Of the 93 participants who had demographic data available, 25 (27%) were on academic warning, 10 (11%) were serving their first academic suspension, and 7 (8%) were on their second academic suspension.

Students who self-initiated academic coaching did so through the Office of Academic Support. They were required to first meet with the director of the Office of Academic Support for an intake appointment. If the director and the student agreed academic coaching would appropriately address the student's needs, they were scheduled to begin academic coaching. Students from ACAC, on the other hand, were mandated by the university to attend academic coaching. If an intake specialist at the ACAC Office believed a student would benefit from academic coaching, the student was required to meet with an academic coach. If they failed to attend academic coaching, the student was blocked from registering for classes during the following semester.

Kline (2011) recommends collecting a minimum sample size that is five times greater than the total number of parameters being estimated in a factor model. For the current study, there were 15 items in the initial hypothesized model. Each item had two parameters estimated- one parameter estimated the amount of variance explained by the underlying factor and one parameter estimated the amount of variance explained by an error term (anything we are not

interested in measuring). In addition to these 30 parameter estimates, there were two parameter estimates for the disturbance term of each factor and one parameter estimate for the relationship between the hypothesized factors. There were 33 total parameters estimated in the hypothesized model. Following Kline's recommendation, a sample size of $n \geq 165$ (33 x 5) was required for the current study.

Measures

Kazdin (2003) states that modifying psychometrically validated instruments is preferable to employing an untested measure in a research study. Kazdin notes that researchers need to provide some form of evaluation of the psychometric qualities of the modified measure. The current investigation utilized a version of the SOCRATES that was reworded for use with academic coaching students (see Table 1; SOCRATES-C). A committee of subject-matter experts was selected for rewording the items from the original SOCRATES. Committee members were selected based on their professional licensure, current positions in graduate programs, courses taken in relevant topics such as psychology or statistics, clinical experience, or a combination of the aforementioned. None of the committee members had specific training or experience with the SOCRATES at the time of rewording.

The committee for rewording included three academic coaches as well as the Academic Coaching Coordinator of the Office of Academic Support. At the time of the committee meetings, all three academic coaches were doctoral students in the Auburn University Counseling Psychology or Counselor Education doctoral programs. The committee was composed of two women and two men, ranging from age 26 to 63. Two of the committee members were born and raised in Europe, while two others were from the southeastern United States. All committee members identify as white. The minimum level of training for each

academic coach was one year of academic coaching, including one hour of weekly supervision with the Academic Coaching Coordinator. Each academic coach had completed graduate-level courses that provided them with a background for understanding readiness for change. Furthermore, all academic coaches had clinical experience in substance abuse counseling and frequently applied the constructs of readiness for change to their clinical work. With their knowledge and experience in both the academic coaching and substance abuse fields, individuals on the committee were equipped to reword the SOCRATES items for measurement validation.

The author of the current study drafted the initial rewording of the items. The author's intent was to capture a concept related to academic coaching that would resemble the content of the original SOCRATES items. For instance, item 1 on the original SOCRATES states "I really want to make changes to my drinking." In the SOCRATES-C item 1 was reworded to "I really want to make changes to my academic habits." Both items focus on a description of a behavior that individuals are seeking help to change. Item 1 does not contain any emotional-charged terms.

Committee members were provided with copies of the drafted items and were given one week to compare the reworded items to the original items. The committee then met and discussed each member's feedback on the reworded items. Although there was disagreement on several items, a detailed record of which items were revised after the committee meeting was not kept. When there was disagreement on items, committee members discussed their reasons for preferring one option over the other and then casted votes on which rewording would be used. The Academic Coaching Coordinator made the final decision on which rewording to use when consensus was not reached after discussing items and casting votes about rewording.

It should be noted that the committee spent a considerable amount of time discussing the appropriate rewording for items 2 and 17. On the original SOCRATES, items 2 and 17 use the term "alcoholic." The first drafts of these items were reworded to include the term "failure" to capture an emotionally-charged response similar to the original item. However, the committee expressed concerns that the term "failure" was too general and could unintentionally elicit a response based on non-academic feelings of failure. It was decided to use the term "bad student" instead. Although it likely wouldn't elicit the same emotional response as the term "failure," the committee believed it would better capture the focus of academic coaching.

There are some potential concerns of bias that should be noted. The committee for rewording was chosen based on convenience and each member had a vested interest in the process of academic coaching. Therefore, it is possible that committee members were unable to be entirely objective when making decisions about the rewording of items. For instance, committee members may have had some concern about using the term "failure" based on personal experience with students at the university or anecdotal evidence that interfered with their willingness to use the term. This could have limited their ability to focus on how the content of the item represents the construct of interest rather than worrying about how it might impact the students these committee members would likely interact with. Committee members may have been motivated (knowingly or unknowingly) to phrase items in a way that would benefit them. This concern is noted as a potential conflict in the rewording of items.

Design

The current study was a measurement validation study of an instrument that was adapted for use with a new population. Data for the study were archival data that involved a descriptive design. That is, no manipulation was done by the investigator. The variables studied were not

under experimenter control. Natural variation in the construct of interest, motivation to make changes in academic strategies, already present within the sample was used to verify the underlying relationship between responses to instrument items. Analyses examined whether the SOCRATES-C had a similar factor structure when administered to an academic coaching sample as the original SOCRATES when administered with other populations (e.g., alcohol use disorder, at-risk drinkers, other drug abuse; see Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003; Maisto, Conigliaro, et al., 1999).

Procedure

It was standard practice for students seeking academic coaching at both the Office of Academic Support and ACAC to complete a packet of forms before attending their academic coaching intake appointment (see Appendix B). The SOCRATES-C was included in these forms and provided the data for the current study. Although this sample of convenience would only include students who sought academic support services, findings from the present study are only intended to be generalized to students seeking academic coaching and not the entire undergraduate population. Therefore, this limited sample would be appropriate for the purposes of the SOCRATES-C.

It has been standard procedure for a student worker to check the intake paperwork for completion, which was also done when data was collected for the current study. If any items on the intake paperwork or SOCRATES-C were left blank, the student worker asked the student to complete them. This was only done once; if the student did not complete all items after being asked to do so by the student worker, then the incomplete paperwork was accepted. Although this reduced the number of omitted items, it had the potential to introduce response bias in the

sample. For instance, students may have left items blank because items did not apply to the student or because the student did not understand the item. Their response may introduce variability that is unrelated to the item content and may limit the accuracy of the findings and introduce extra variance and error into measurement of the construct of motivation to make changes to academic skills and habits.

There were concerns that the setting would act as a confound because the ACAC Office can mandate students to attend academic coaching and the Office of Academic Support screened self-referred students to see if they would likely benefit from academic coaching. These two groups may differ in their assumptions about how the SOCRATES-C would impact their eligibility for services. For instance, a student who self-referred may have self-reported more awareness of the problem and willingness to make changes. Students who were required to meet with an intake specialist at the ACAC office may have minimized their need for help to avoid being required to complete any additional meetings with ACAC staff. Data analyses were conducted to measure whether any difference between these two groups of students exist.

The current study was of minimal risk to participants. The data was archival and there was no direct interaction with participants in the study. The original data was collected as a part of the services provided by the site. The purpose of the current study was to examine the instrument the site had been using to identify a factor structure for interpreting the SOCRATES-C. Therefore, there was no expected or observed harm or discomfort caused by the study.

Analytic Strategy

Students who completed an intake at the Office of Academic Support and ACAC were included in the analysis, regardless of whether they later attended academic coaching. Incomplete forms were excluded from the analyses since the data in the CFA is dependent on the

other data for each participant, meaning that omitted items would impact the entire data for that individual. Kazdin (2003) cautions that excluding individuals who entered the study from the final analyses can introduce selection bias into the sample. An examination of incomplete forms was planned to eliminate concerns of selection bias. However, only two participants were removed from the final data due to incomplete forms. Comparing such a small sample (n = 2) of participants removed from the sample to those who were retained in the final sample (n = 180) violates statistical assumptions and prevents comparing the omitted forms from those retained in the study. Due to these limitations, analyses to determine whether specific items were omitted more frequently, or whether demographic variables predicted instrument completion, could not be completed. Nonetheless, removing two participants from an original sample is equivalent to less than 1% of the original sample, so the impact of omitted case was minimal at best. No further exclusion criteria will be implemented.

The recommendations from Furr and Bacharach (2014) for evaluating model fit were applied to the current study for determining and reporting goodness-of-fit. These recommendations include statistical analyses of chi-square change, an incremental fit index (i.e., TLI), a residuals-based measure (i.e., SRMR), an absolute fit index (i.e., RMSEA) and adjusted goodness-of-fit (AGFI). Chi-square differences were examined to compare models to one another and AIC was used to identify a parsimonious model that showed good fit with the data.

Chapter 4: Results

Results Introduction

For the current study, confirmatory and exploratory factor analytic techniques were used to identify a good fitting model for the data. While the two-factor model showed better fit than the three-factor model, some modifications were made to the two-factor model to further improve model fit. It should be noted that model building allows researchers to make some subjective decisions about model fit based on a collection of model fit statistics. Therefore, when describing how a model fits the data based on an assortment of fit statistics, the terms "good", "marginal", and "poor" are used somewhat subjectively in this chapter to describe improvements in model fit. The final model in the present study showed marginal fit to the data, with good internal consistency reliability. Additionally, participants in the present varied on their self-reported level of awareness/recognition of academic problems and how much action they claimed to already be taking to change academic problems based on whether they self-referred or were mandated to attend academic coaching. Below is a detailed summary of the statistical analyses used in the present study.

Confirmatory Factor Analysis

CFA was used to determine whether the data for the current study fit better with a two-factor or three-factor model. A comprehensive list of model fit statistics for the two-factor model were compared with those for the three-factor model is included in Table 5. The two-factor model showed better fit than the three-factor model on all absolute fit indices (AGFI = .812 vs. .717; GFI = .861 vs. .778; RMSEA = .087 vs. .108; SRMR = .0829 vs. .1412), all incremental fit

indices (CFI = .912 vs. .818; NFI = .859 vs. . 756; TLI = .897 vs. .791), and predictive fit (AIC = 272.043 vs. 544.656). Therefore, it was determined that the two-factor model showed better fit with the data than the three-factor model.

Although the two-factor model showed better fit than the three-factor model, model fit statistics did not yet show acceptable fit with the data. Therefore, modifications were explored with the two-factor model to further improve model fit. CFA examined how well the data from the current study fit with the model originally proposed by Maisto, Conigliaro, et al. (1999) and supported with various populations (Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003). A model that mirrored the two-factor model for interpreting the SOCRATES (Maisto, Conigliaro, et al., 1999) was the starting point. The original factor structure identified by Maisto, Conigliaro, et al. used for the SOCRATES-C will hereinto be referred to as "Starting Model."

In their study, Maisto, Conigliaro, et al. (1999) cited a chi-square (χ^2) of 250.01 ($p < .01$, d.f. = 81), goodness-of-fit (GFI) of .89, and a normed fit index (NFI) of .90. In the current study, the Starting Model (see Figure 1) showed relatively poor fit according to conventional model fit indices (AGFI $\geq$ .90, lower AIC value, χ^2 p-value > .05, GFI $\geq$ .95; Hooper et al., 2008; CFI, NFI, & TLI $\geq$ .95, RMSEA $\leq$ .06, SRMR $\leq$ .08; Hu & Bentler, 1999; χ^2/d.f. $\leq$ 2; Tabachnick & Fidell, 2007) and when compared to several fit statistics reported by Maisto, Conigliaro, et al. (see Table 5). The Starting Model had a χ^2 value of 210.043 ($p < .001$, d.f. = 89), χ^2/d.f. = 2.36, standardized root mean square residual (SRMR) = .0829, root mean square error of approximation (RMSEA) = .087 (CI = .072 - .102), GFI = .861, adjusted goodness-of-fit index (AGFI) = .812, NFI = .859, Tucker-Lewis index (TLI) = .897, confirmatory fit index (CFI) = .912, and Akaike information criterion (AIC) = 272.043. The relatively poor model fit statistics

dictated a need to explore possible modifications to the Starting Model to improve model fit. Modifications were made incrementally. That is, the second modification included the first modification, the third modification included the first and second modification, and so on.

Following these guidelines, the first change to the Starting Model was to allow error terms associated with items 2 ("Sometimes I wonder if I am a bad student") and 17 ("I am a bad student") to covary as they showed the highest modification index (24.202; see Table 6). The updated model ("Updated Model 1"; see Figure 2) had a χ^2 value of 184.429 ($p < .001$, d.f. = 88), χ^2/d.f. = 2.10, SRMR = .0819, RMSEA = .078 (CI = .062 - .094), GFI = .880, AGFI = .836, NFI = .876, TLI = .917, CFI = .930, and AIC = 248.429. This change led to an improvement in all fit indices (see Table 5). However, Updated Model 1 showed potential for improvement and further modifications were made to continue improving model fit.

Upon examining the output for Updated Model 1, it was discovered that two error terms once again showed a large covariance (modification index = 11.852; see Table 7). Error terms for items 3 ("If I don't change my academic habits soon, my grades are going to get worse") and 15 ("I know that I have academic problems") were set to covary. Updated Model 2 (see Figure 3) had a χ^2 value of 172.043 ($p < .001$, d.f. = 87), χ^2/d.f. = 1.98, SRMR = .0803, RMSEA = .074 (CI = .058 - .090), GFI = .891, AGFI = .850, NFI = .884, TLI = .926, CFI = .938, and AIC = 238.043. This change once again led to an improvement in all fit indices (see Table 5). Although allowing error terms to covary provided meaningful improvement in model fit indices, additional changes were made to continue improving model fit.

The covariance matrix for Updated Model 2 indicated some problematic items (see Table 8). Several items were correlated with items from the other factor and with the other factor itself. Appropriate practice dictates that in order to remove an item from the model, there must be a

strong theoretical explanation and supporting statistics to justify the removal of an item and/or path. For the SOCRATES-C, the majority of items were expected to fit based on theory. Item 17 ("I am a bad student"), however, raised concerns during the rewording process and appears to be contributing to the less than desired model fit. Furthermore, item 17 covaried with the Taking Steps factor and the following items on the Taking Steps factor- 4, 8, 9, 13, and 18 (see Table 8). Based on the poor performance of item 17 as well as construct validity concerns, it was decided to remove the item from the model. This final updated model ("Final Model"; see Figure 4) had a χ^2 value of 148.204 ($p < .001$, d.f. = 75), χ^2/d.f. = 1.98, SRMR = .0754, RMSEA = .074 (CI = .056 - .091), GFI = .898, AGFI = .857, NFI = .889, TLI = .929, CFI = .941, and AIC = 208.204.

The Final Model showed marginal fit to the data (see Table 5). Model fit can be described as marginal when fit statistics show promising trends that do not show good model fit according to conventional cut-off scores (see Kim, Ku, Kim, Park, & Park, 2016; Lane, Lane, & Matheson, 2004; MacCallum, Browne, & Sugawara, 1996). Although there are no strict and consistent cut-off scores found in literature to classify a model as having marginal fit (see Kim et al., 2016; Lane et al., 2004; MacCallum et al., 1996), model fit statistics for the Final Model showed promising trends that will be labeled as indicative of marginal fit. Even though removal of further items would possibly improve model fit, there wass not a strong theoretical basis to remove any further instrument items.

Raw scores were also examined to eliminate possible concerns of skewness and kurtosis (see Table 9; West et al., 1995). Although several items showed possible trends of skewness and kurtosis, none were above recommended thresholds (skew < 2; kurtosis < 7; West et al., 1995). Error terms for items 2 and 17 were originally covaried but this was no longer relevant when item 17 was removed in the Final Model. Therefore, the final modifications made from the

Maisto, Conigliaro, et al. (1999) model were to remove item 17 and to covary error terms associated with items 3 and 15 (see Figure 4).

Although the model fit statistics for the Final Model may not be as high as desired based on conventional recommendations for model fit statistics (AGFI ≥ .90, lower AIC value, χ^2 *p*-value > .05, GFI ≥ .95; Hooper et al., 2008; CFI, NFI, & TLI ≥ .95, RMSEA ≤ .06, SRMR ≤ .08; Hu & Bentler, 1999; χ^2/d.f. ≤ 2; Tabachnick & Fidell, 2007), the two-factor model identified by Maisto, Conigliaro, et al. (1999) has been used in numerous research studies (Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003). Therefore, previous literature supporting the continued use of the two-factor solution identified by Maisto, Conigliaro, et al. for interpreting the SOCRATES provided justification for not strictly adhering to conventional model fit statistics. Furthermore, many model fit statistics for the Final Model were comparable or better than those found in previous studies examining the factor structure of the SOCRATES (see Table 4).

As hypothesized, the two-factor model (see Maisto, Conigliaro, et al., 1999) clearly fit the data better than the three-factor model (see Miller & Tonigan, 1996). All model fit statistics were considerably better for the two-factor model than the three-factor model (see Table 5). This lends further support to literature supporting the two-factor model for interpreting the SOCRATES (Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003). A summary of mean factor scores, both overall and broken down by referral source, can be found in Table 10.

Exploratory Factor Analysis

Because the Final Model showed marginal fit to the data, an EFA was conducted to determine if some undetected or unexpected factor structure may be limiting the fit to the data.

As the EFA was completed post-hoc to an identified model for interpretation, it was permissible to use the same data for the EFA as was used for the CFA. The sample data did not violate any assumptions of normality and therefore Maximum Likelihood (ML) factor extraction method was utilized. Although the two factors for the Final Model did not have a strong correlation (r = -.179), an oblique factor rotation method (direct oblimin) was applied to aid in the interpretation of results.

The EFA extracted two factors and the items loaded on these two factors exactly as was predicted in the SOCRATES two-factor model identified by Maisto, Conigliaro, et al. (1999; see Table 11). The two-factor solution explained 59.3% of the variance. A simple factor structure was observed, with all item loadings being greater than .45 onto a factor; none of the items cross-loaded or failed to load cleanly onto a single factor. The χ^2 goodness-of-fit statistic (d.f. = 76) was 150.946 ($p < .001$). These findings lend further support to the use of a two-factor model identified with the CFA above, and in particular, they support the notion that items should not be loaded onto multiple factors for the sole purpose of improving model fit.

Internal Consistency Reliability

Researchers often utilize instruments intended to measure multiple factors or underlying constructs. An important aspect when constructing such an instrument is determining whether items intended to measure the same underlying factor share enough variance. That is, when participants' score higher or lower on a factor, the individual items should show a pattern that follows these scores if the items are truly measuring what the factor purports to measure. Internal consistency reliability was assessed for the two-factor Final Model. Cronbach's alpha coefficients for the AMREC factor ($\alpha = .906$) and Taking Steps factor ($\alpha = .829$) were both found to be acceptable. Reliability coefficients for the factors suggest they each have satisfactory

internal consistency in the sample used for this study. These findings lend further support to the initial decision to begin with a two-factor model rather than a three-factor model.

Chi-Square Test with Post-Hoc Analyses

Using a mean split, the present sample was divided into four "Readiness" groups- (1) participants with factor scores below the mean on both factors (LowAR-LowTS), (2) participants with factor scores below the mean on the AMREC factor and above the mean on the Taking Steps factor (LowAR-HighTS), (3) participants with factor scores above the mean on the AMREC factor and below the mean on the Taking Steps factor (HighAR-LowTS), and (4) participants with factor scores above the mean on both factors (HighAR-HighTS). It was hypothesized that individuals who were mandated to attend academic coaching would be disproportionality represented in the LowAR-HighTS Readiness group than individuals who self-referred to academic coaching. It was also hypothesized that participants who self-referred for academic coaching would show a higher representation in the HighAR-LowTS Readiness group than individuals who were mandated to attend academic coaching.

A chi-square test of independence determined that participants were indeed differently distributed among the Readiness groups ($\chi^2 = 30.371$, d.f. = 3, $p < .001$). The chi-square test of independence only identified whether participants were differently distributed between two categorical variables; it did not identify where this difference could be found. Therefore, follow-up analyses were needed to interpret the findings. Tukey's post-hoc analysis was applied to identify how the groups are distributed.

For the post-hoc analyses, there were eight groups (2 Referral sources x 4 Readiness groups) which were each evaluated to determine if participants were distributed evenly across groups as hypothesized by the null. The risk of falsely rejecting the null hypothesis is increased

when multiple analyses are run. Therefore, more stringent criteria must be applied for rejecting the null hypothesis to protect from committing a type I error. One such method is the Bonferroni correction (Armstrong, 2014). For the Bonferroni correction, *p*-critical is divided by the number of analyses to be run (8 analyses were needed to explain the chi-square test of independence). In this case Bonferroni correction = .05 ÷ 8, which would result in a Bonferroni-corrected *p*-critical of .00625. The Bonferroni-corrected *p*-value was used in place of the traditional $p = .05$ to protect from falsely rejecting the null hypotheses.

Using the Bonferroni-corrected *p*-critical, the third hypothesis was confirmed (see Table 12). That is, (1) participants who were mandated to attend academic coaching reported below average awareness/recognition of their academic problems while also reporting above average behavioral efforts/changes to improve their academic habits than participants who self-referred to academic coaching and (2) participants who self-referred for academic coaching reported above average awareness/recognition of their academic problems while also reporting below average behavioral efforts/changes to improve their academic habits than participants who were mandated to attend academic coaching.

Chapter 5: Discussion

Discussion

The present study conceptualized the academic coaching process through the Transtheoretical Model of Change (TTM). The TTM highlights the importance of understanding readiness for change to inform treatment. However, the literature provides insufficient support for a validated instrument to measure readiness for change in academic coaching students (see Grant & Franklin, 2007; Grunschel & Schopenhauer, 2015; O'Neil, 2014). The present study addressed this issue by providing validity evidence to support the use of a two-factor model for interpreting the SOCRATES-C with undergraduate students seeking academic coaching. These findings bridge literature between academic coaching and the abundant literature to support the TTM for addressing problematic patterns of behavior. A major tenant of the TTM regarding treatment indicates that interventions should be matched to an individual's readiness for change (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Although academic coaching could benefit from providing inventions which are selected based on a student's readiness for change, literature has provided insufficient support for how to measure readiness for change in academic coaching (see Grant & Franklin, 2007; Grunschel & Schopenhauer, 2015; O'Neil, 2014).

The SOCRATES-C was reworded to measure readiness for change in academic coaching and provides a tool for researchers and academic coaches to determine a student's readiness for change in academic coaching. Hypothesis 1 was confirmed as the data for the present study shows marginal fit with a 14-item, two-factor structure for interpreting the SOCRATES-C.

Administering the SOCRATES-C to students attending academic coaching would provide an opportunity to measure underlying change processes which may impact the coaching process. The SOCRATES is not a comprehensive measure of readiness for change (Miller & Tonigan, 1996) but it can provide a good initial measure of readiness for change when individuals present for treatment. Because the first hypothesis was confirmed, hypothesis 2 was not tested as it was no longer necessary after a model with marginal fit to the data was identified.

An interesting phenomenon from substance abuse literature was replicated in the present study. Individuals with substance-related problems who independently seek treatment focused on substance use tend to rate themselves as more aware of problems secondary to substance use than individuals who do not attend treatment volitionally (Edlund et al., 2009). When compared to individuals with substance-related problems who do not attend treatment volitionally, individuals who self-refer tend to view their own efforts to change problem behaviors as non-existent and/or ineffective (Wells et al., 2007). Wells et al. (2007) found that individuals with alcohol use disorder may make disingenuous efforts to change their drinking behaviors. Even though these individuals express a belief that their own efforts will be sufficient to decrease problematic drinking patterns, less than half of them reported attempting to quit or cut down their drinking (Wells et al., 2007).

This same phenomenon was observed in the present sample, which confirms hypothesis 3. When compared to individuals who self-referred to academic coaching, participants who were mandated to attend academic coaching were more likely to endorse below average ambivalence/recognition of academic problems despite claiming to already have taken steps to change their academic habits. When compared to individuals who were mandated to attend academic coaching, individuals who self-referred to academic coaching reported more awareness

about their academic problems and were less likely to report having made changes to their academic habits.

This phenomenon is of interest because some authors believe problem awareness and recognition are prerequisites to treatment (Norcross et al., 2011; Prochaska & DiClemente, 1994). Miller and Tonigan (1996) provide one possible interpretation for this phenomenon. When they drafted the SOCRATES and identified a three-factor structure for interpretation, they noted the instrument was intended to measure underlying motivational processes that influence how someone might respond to treatment interventions. They viewed the change process, including problem recognition/ambivalence about changing and taking steps to change behaviors, as a fluid process that may not be as distinct as the discrete stages of change from the TTM. Miller and Tonigan acknowledge how the SOCRATES does not measure many other variables that can greatly impact a change process, including "self-efficacy, outcome expectancies, specific pros and cons of change, and social support for drinking and abstinence" (p. 88). Therefore, it may be helpful to adopt a similar view of the change process to understand this phenomenon- the two factors measured by the SOCRATES-C may be related but problem recognition is not a prerequisite to taking steps to change problem behaviors.

Limitations

Despite the interesting findings in the current study, there are some noteworthy limitations. A sample of convenience for the present study included participants from a single university in the southeastern United States from January 2015 until September 2016. Random selection was not employed, which limits the generalizability of the findings. It is possible that an unanticipated cohort effect may be present. Participants may have shared some unique sample characteristic because of the timeframe or site used to collect the data. The sample lacked

sufficient demographic variability, as the majority of participants from the Office of Academic Support were Caucasian (82.2%) and/or identified as male (64%). Moreover, demographic information for the data was limited to academic coaching students who completed the SOCRATES-C at the Office of Academic Support as the ACAC Office was unable to provide any demographics for the current sample. These are all concerns for the generalizability of findings from the present study.

Items on the SOCRATES-C were originally reworded to create an instrument that was not intended for research purposes (see Appendix A; see Table 1). Therefore, some recommendations for rewording items on instruments intended for research and diagnostic purposes (Kline, 2005) were not followed. When writing items for an instrument, Kline (2005) recommends using subject-matter experts who either are researchers in the area of interest or are laypersons with expertise in the area under investigation. Kline also recommends using subject-matter experts from multiple sites so that the rewording is not confounded by some characteristic of the site. The subject-matter experts who reworded items for the current study came from a single site. They were laypersons with expertise in academic coaching and readiness for change. Kline's recommendations are intended to limit the amount of unexplained variance found in the sample that could potentially be eliminated by following rigorous rewording procedures. Because the current studies failed to follow these guidelines, there may be unexplained variance related to poorly reworded items.

Another limitation of the current study was a lack of external criteria to evaluate how the factors related to relevant constructs. Although the Office of Academic Support had access to several variables that measured whether students benefited from academic coaching, including semester grades and their Study Skills Inventory (self-reported behaviors students engage in that

lead to academic success), it was not possible to determine how the outcome of academic coaching related to SOCRATES-C data due to the use of archival and de-identified data. As noted earlier, the participants for the present study consented to completing the SOCRATES-C with their academic coaching intake paperwork. They did not consent to having their semester grades, academic coaching record, or Study Skills Inventory accessed.

The current study did not include any outcome measures for academic coaching or readiness for change. The focus was on identifying the factor structure for interpreting a modified instrument that measures readiness to change in academic coaching. The current study does not examine how readiness to change could be used to increase academic coaching motivation or measure change in motivation for students seeking academic coaching.

Suggestions for Future Research

As the current study used a sample of convenience with limited demographic variability, future research could explore how the SOCRATES-C performs when administered to a more diverse sample. Previous research has cited that the original SOCRATES performs relatively similar in a variety of settings (Bertholet et al., 2009; Burrow-Sanchez & Lundberg, 2007; Chun et al., 2010; Maisto et al., 1999; Zullino et al., 2007), languages (Chun et al. 2010; Demmel et al., 2004; Figlie et al., 2005; Zullino et al, 2007), and presenting problems (Burrow-Sanchez, 2014; Carey et al., 2002; Mitchell et al., 2005). Due to limitations in the current study, findings cannot yet be generalized until the SOCRATES-C has been administered and examined with a more diverse sample than was presently available.

As data for the present study was not initially intended for research purposes, the rewording of items did not follow some of the recommendations researchers have made for rewording instruments (Kline, 2005). Therefore, another future direction for research would be

to improve the process for rewording items. The rewording committee initially had some concerns about which term to use instead of "alcoholic" for items 2 and 17. It was eventually decided to replace "alcoholic" with "bad student" despite concerns that the replacement did not carry the same emotional charge. Modification indices showed item 17 contributed to poor model fit and cross-loaded with several items from the other factor. Item 17 was removed from the model. The reworded term "bad student" is rather value laden, which may add unexplained variance to the instrument. Future studies could examine alternative terms that would ideally be less value laden while eliciting a similar emotionally-charged response as the term "alcoholic." Some examples of this might include "academic failure", "unsuccessful student", "academically incapable." Similar to the term "alcoholic", the reworded item should inquire about the individual's identity rather than capabilities. Although no other items were removed, there are concerns that the model fit could be improved even further by using a more rigorous rewording process. Future researchers are encouraged to remain open to revising the reworded items.

Future studies could include additional measures that allow for the analysis of convergent and divergent validity. Such measures might include generic measures of readiness for change or some measure of academic behaviors. Convergent validity for the AMREC factor could be assessed by administering an additional instrument that is more general in nature, designed to measure problem awareness/recognition. Scores on the AMREC should correlate with those scores. In addition, an instrument to measure locus of control could help researchers better understand how much influence academic coaching students believe their decisions and behaviors have on outcomes. One can reasonably expect an academic coaching student to adjust their level of effort based on whether they believe their actions (e.g., academic habits) or external factors (e.g., difficulty of major or professor) are primarily responsible for outcomes. Responses

on the Taking Steps factor are expected to correlate with some specific behavioral changes in academic habits. Participants could be asked to review a list of behaviors that lead to academic success and endorse how many they engage in. Individuals who score higher on the Taking Steps factor would be expected to endorse a higher frequency of behaviors from the list.

The two-factor models for the SOCRATES found in previous research (Bertholet et al., 2009; Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007; Figlie et al., 2005; Maisto, Chung, et al., 2003) along with the model found in the present study, indicate that not all items appear to measure the construct the instrument is designed to measure. The final model for the present study retained 14 of the original 19 items. Previous researchers reported two-factor models ranging from 13 items (Burrow-Sanchez, 2014; Burrow-Sanchez & Lundberg, 2007) to 16 items (Bertholet et al., 2009). It would be useful to conduct research on the factor structure for an abbreviated instrument which only includes the items that were retained in the two-factor models. Ideally, the abbreviate instrument would yield the similar results with a quicker, less cumbersome instrument. A shortened instrument, containing only the items included in the model, would be more user- and administrator-friendly. It is also possible that shortening the instrument would change the model fit. Although administering more items can increase reliability, researchers are encouraged to utilize a more parsimonious instrument whenever possible as additional, unnecessary items, can add unexplained error variance into the study. Future research should examine how an abbreviated version of the SOCRATES performs.

Lastly, it should be noted that although the SOCRATES was first designed to measure four factors (precontemplation, contemplation, determination, and action; Miller & Tonigan, 1996) from the TTM, factor analytic techniques found the instrument only measures two (Maisto, Conigliaro, et al., 1999) or three factors (Miller & Tonigan, 1996). One possible

explanation is that SOCRATES does not include items that sufficiently differentiate between the distinct stages described in the TTM. Despite their original goal to measure four distinct stages with the SOCRATES, Miller and Tonigan (1996) encouraged people to view the SOCRATES as continuously distributed motivational factors underlying the change process. This view is vastly different than the distinct stages described in the TTM. Therefore, future research should examine whether items can be reworded or added to the SOCRATES that independently measure all the stages of change described in the TTM. If this goal is not achieved, it would be useful to examine and provide a thorough explanation for the inconsistencies in item-factor assignment and the number of factors identified in models for interpreting the SOCRATES.

Another possible explanation for this discrepancy is that the distinct stages described in the TTM do not accurately reflect motivational factors that underlie the change process. The irony should not be lost that Prochaska and DiClemente (1982, 1984) originally developed the TTM in an effort to create hierarchical integration with all the multiplying forms of psychotherapy. Psychotherapy literature has continued to grow in the decades since the TTM was first written about. Failing to integrate these findings flies directly in the face of the problems Prochaska and DiClemente were hoping to address in their development of the TTM. Considering the abundant research supporting the two-factor model for interpreting the SOCRATES for measuring readiness for change researchers should examine whether some revision to the TTM are warranted.

Implications

Despite the limitations listed earlier in this chapter, the current study provides some promising findings. Implications are made with relative caution as additional validity support is necessary before any major recommendations can be made for the SOCRATES-C. However,

findings from the current study are promising enough to warrant a discussion of potential treatment implications.

Previous research indicates that interventions should be tailored based on an individual's level of awareness of their problem behaviors and how much action they have taken to begin changing their behaviors (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Individuals who are earlier in the change process tend to benefit from interventions that are designed to increase their awareness of problem behaviors. They are unlikely to benefit from interventions targeting behavior change because they are unlikely to view their behaviors as problematic to begin with (Prochaska & DiClemente, 1984; Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 2013). Interventions focused on increasing their awareness allow these individuals to make informed decisions about whether or not they wish to make a commitment to change problem behaviors. On the other hand, individuals who already have some awareness about the problem behaviors and have made a commitment to change are unlikely to need or benefit from interventions designed to increase their awareness. Interventions for this group should be targeted at preparing them for action, taking action, and/or maintaining the changes they have already made.

The SOCRATES-C provides a newly validated instrument to measure how aware academic coaching students are of their academic problems. Academic coaching models tend to focus primarily on changing behaviors (Barkley, 2010; Robinson & Gahagan, 2010; Webberman, 2011) that are associated with academic success (Credé & Kuncel, 2008; Downing, 2013; Okpala, Okpala, & Ellis, 2000). It is possible that the benefits of academic coaching are limited to individuals who are aware of their problem behaviors and are prepared to make a commitment to change their academic habits. The SOCRATES-C could help academic coaches

detect students who do not yet recognize their academic problems. Focused interventions could increase the students' awareness, which improves the chances that they will make a commitment to change. Relatedly, response patterns on the SOCRATES-C can identify academic coaching students who display good awareness of their academic problems. For these students, interventions focused specifically on changing problem behaviors are likely to be more beneficial than interventions focused on increasing their awareness of problematic behavior patterns.

Although the SOCRATES-C was validated for academic coaching students in the present study, the reworded items are not worded in a way that limits the instrument's use only to academic coaching. It is possible that the instrument could also be used in other academic settings (e.g., academic advisors, career counselors) at the onset of treatment. Similar to the recommendations above regarding academic coaching, The SOCRATES-C could elucidate where students fall on their underlying level of awareness of academic problems and action taken toward change. Response patterns could help identify appropriate interventions for individualized plans created by university staff members.

One apparent distinction between substance abuse and academic coaching is the focus of treatment interventions. In substance abuse treatment, the ultimate outcome desired is decreasing behaviors with negative consequences, whereas academic coaching aims at increasing behaviors with positive consequences. Although the desired outcomes differ, both treatments do show some overlap (e.g., substance abuse treatment often focuses in increasing adaptive coping skills, academic coaching often focuses on decreases procrastination). Considering this apparent distinction, previous research has already noted how TTM is effective regardless of whether the focus of treatment is on decreasing problem behaviors, such as cigarette smoking (DiClemente &

Prochaska, 1982), or increasing healthy/desired behaviors, such as pharmacological treatment adherence (Abughosh et al., 2017; Possidente, Bucci, & McClain, 2005). Therefore, this distinction does not appear to impact how effective application of the TTM is based on whether the treatment is designed to increase positive behaviors or decrease negative behaviors.

Conclusions

Findings from the present study support the use of a 14-item, two-factor model for interpreting the SOCRATES-C. This instrument measures underlying change processes in students who present for academic coaching. More specifically, it can help academic coaches determine how aware an individual is of their academic problems and whether they are already taking steps to change their academic habits. This is especially important considering the increased proportion of young adults who are entering postsecondary education underprepared for the academic challenges they face.

The SOCRATES-C has the potential to benefit the abundance of undergraduate students hoping to achieve academic success. Considering the limited research available on academic coaching, and even more so on measuring readiness for change in academic coaching and/or behaviors, findings from the present study provide intriguing results to be built upon in future research. Suggestions have been made for future research that could further strengthen the findings and allow for increased generalizability to more diverse samples.

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Appendix A

INSTRUCTIONS: Please read the following statements carefully. Each one describes a way that you might (or might not) feel about your *academic habits*. Academic habits include, but are not limited to time management, utilizing additional educational resources (supplemental instruction, study partners, meeting with professors, online resources, etc.), study skills, reading textbooks, test taking skills, and attending study groups. For each statement, circle one number from 1 to 5, to indicate how much you agree or disagree with it *right now*. Please circle one and only one number for every statement.

	Strongly Disagree	Disagree	Undecided or Unsure	Agree	Strongly Agree
1. I really want to make changes in my academic habits	1	2	3	4	5
2. Sometimes I wonder if I am a bad student	1	2	3	4	5
3. If I don't change my academic habits soon, my grades are going to get worse	1	2	3	4	5
4. I have already started making some changes in my academic habits	1	2	3	4	5
5. I was studying too little at one time, but I've managed to change my academic habits	1	2	3	4	5
6. Sometimes I wonder if my academic habits are hurting my future	1	2	3	4	5
7. I have problems with my academic habits	1	2	3	4	5
8. I'm not just thinking about changing my academic habits, I'm already doing something about it	1	2	3	4	5
9. I have already changed my academic habits, and I am looking for ways to keep from slipping back to my old patterns	1	2	3	4	5
10. I have serious problems with my academic habits	1	2	3	4	5
11. Sometimes I wonder if I am in control of my academic performance	1	2	3	4	5
12. My academic habits are causing my grades to suffer	1	2	3	4	5
13. I am actively doing things now to improve my academic habits	1	2	3	4	5
14. I want help to keep from going back to the academic problems that I had before	1	2	3	4	5
15. I know that I have academic problems	1	2	3	4	5
16. There are times when I wonder if I study enough	1	2	3	4	5
17. I am a bad student	1	2	3	4	5
18. I am working hard to change my academic habits	1	2	3	4	5
19. I have made some changes in my academic habits, and I want some help to keep from going back to the way I used to study	1	2	3	4	5

Appendix B

Academic Support Services Client Questionnaire

Date _____ Semester/Year _____ | Office use only- assigned coach:

Welcome to Academic Support Services! Our mission is to assist students in their personal, social, academic and career development. Completion of this questionnaire should help you to review and prioritize your needs. The information you supply will likely quicken and broaden our understanding of your concerns, allowing us to serve you better. Please give careful thought to each item. The information you provide is voluntary and you may omit items which you do not wish to answer.

Background Information

Name _____ Preferred name _____
Last First MI

Banner No. _____ Email at AU _____ @auburn.edu

Local address _____ Hometown _____
Street City/State ZIP

Cell/home phone ( ) _____ Age _____ Gender _____

Ethnicity _____ Relationship status _____ (Single, Partnered, Married, Separated, Divorced, Widowed)

University status ❑ Fr ❑ So ❑ Jr ❑ Sr Student veteran ❑ Yes ❑ No

Major _____ Credit load _____ hrs. Projected graduation date _____

Last sem. GPA _____ Cum. AU GPA _____ ACT score _____ SAT score _____

Credit hours attempted _____ / _____ Credit hours earned _____ / _____
Total / AU Total / AU

Previous colleges/universities attended _____

Academic status ❑ Warning ❑ 1st Susp. ❑ 2nd Susp. ❑ Expulsion

If suspended, how many semester(s) have you been out? ❑ 0 ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5 ❑ >5

Primary sources of income?	**Where do you live?**	**Who do you live with?**
❑Family	❑Residence Hall	❑Alone
❑Job	❑Fraternity House	❑Roommate(s)
❑Financial Aid	❑Off Campus	❑Parents
❑Savings	❑At Home	❑Partner/Spouse
❑Scholarship	❑Other _____	
❑Loans		

Non-academic work per week: _____ hrs. Place of employment _____

Mother's highest degree _____ Father's highest degree _____

Appendix B

Were you referred to Academic Support? ❑ Yes ❑ No If Yes, by whom? _____

Academic Advisor _____

Reason for seeking services _____

Special circumstances that may have impacted your grades (e.g., death in family, accident, medical conditions) _____

Date **Staff Notes**

Appendix B

Academic Success Worksheet
Academic Obstacles

Please check all *OBSTACLES* that may apply to you.

FINANCIAL OBSTACLES
- ❑ Worried about money
- ❑ Financial requirements
- ❑ Inadequate financial aid
- ❑ Time limit on school funds

Other _____

WORK-RELATED OBSTACLES
- ❑ Work too many hours
- ❑ Work too few hours
- ❑ Problems with boss
- ❑ Problems with co-workers
- ❑ May lose job
- ❑ Cannot find part-time work
- ❑ Must work to survive
- ❑ Lack appropriate job skills

Other _____

PERSONAL OBSTACLES
- ❑ New independent status
- ❑ Relationship worries/breakup
- ❑ Parental pressure
- ❑ Family issues/concerns
- ❑ Roommate issues
- ❑ Housing problems
- ❑ Loneliness
- ❑ Socially uncomfortable/shy
- ❑ High anxiety
- ❑ Lack of sleep
- ❑ Illness/health problems
- ❑ Value conflicts
- ❑ Dislike college and studying
- ❑ Previous failure
- ❑ Dislike Auburn University

Other _____

OBSTACLES RELATED TO FEAR OF
- ❑ Failure
- ❑ Not being perfect
- ❑ Accomplishments
- ❑ Pressures
- ❑ Success
- ❑ Commitment
- ❑ Making decisions
- ❑ Making mistakes
- ❑ Difficult tasks
- ❑ Other _____

FREE TIME OBSTACLES
- ❑ TV
- ❑ Netflix
- ❑ Computer/gaming
- ❑ Social media
- ❑ Phone
- ❑ Greek life
- ❑ Too much social life
- ❑ Lack of social involvement
- ❑ Napping
- ❑ Fitness/recreation
- ❑ Clubs/organizations

Other _____

ACADEMIC/STUDY SKILL OBTACLES
- ❑ Learning disability
- ❑ Poor concentration
- ❑ Inadequate reading skill
- ❑ Inadequate writing skill
- ❑ Inadequate math skill
- ❑ Inadequate science skill
- ❑ Inferior academic preparation
- ❑ Poor note-taking skills
- ❑ Poor study habits
- ❑ Ineffective studying
- ❑ Poor study environment
- ❑ Inadequate study time
- ❑ Poor time management
- ❑ Unhappy with professor/instructor
- ❑ Professor/instructor impersonal
- ❑ Poor academic advising
- ❑ Unclear educational goals
- ❑ Negative attitude

Other _____

OBSTACLES RELATED TO MAJOR
- ❑ Selecting a major
- ❑ Program/major admission requirements
- ❑ GPA requirements
- ❑ Classes unavailable
- ❑ Preferred major not offered
- ❑ Not happy with chosen major

Other _____

SENSITIVE OBSTACLES
- ❑ Sensitive obstacles (e.g., depression, physical abuse, emotional abuse, rape/assault, illness or death of a loved one, substance abuse or use, etc.)

Other obstacles that were not listed above _____

Appendix B

Referring party _____ Date _____

Phone number _____ Fax number _____

Academic Support Services
Student Referral From

Name _____ Date _____
Banner number _____ AU email _____
Emergency phone _____

- ❑ Academic Advisor _____ Name

- ❑ Career Center _____ Name
  303 Martin Hall
  (334)844-4744

- ❑ Student Counseling Services _____ Name
  AU Medical Clinic
  400 Lem Morrison Drive Suite 2086
  (334)844-5123

- ❑ Office of Accessibility _____ Name
  1228 Haley Center
  (334)844-2096

- ❑ Other _____ Name

Confidentiality Statement

By signing below, you are giving permission for information to be exchanged among staff of the Undergraduate Academic Counseling and Advising Center, Academic Support Department, and other appropriate university personnel. Your signature also indicates that you understand that follow through is a critical component of success, and you are willing to fully participate.

This permission will be in effect until you revoke it. Any disclosure outside these units will be done only with your written permission. The exception to this rule is when such disclosure is necessary to protect you or someone else from physical harm, or in the event of suspected child or elder abuse or neglect, or by subpoena.

Permission to exchange information

Signature _____ Date _____

Indication of willingness to follow through with center recommendations

Signature _____ Date _____

Name _____

Table 1

Reworded SOCRATES Items

Reworded items on SOCRATES-C
1. I really want to make changes in my academic habits
2. Sometimes I wonder if I am a bad student
3. If I don't change my academic habits soon, my grades are going to get worse
4. I have already started making some changes in my academic habits
5. I was studying too little at one time, but I've managed to change my academic habits
6. Sometimes I wonder if my academic habits are hurting my future
7. I have problems with my academic habits
8. I'm not just thinking about changing my academic habits, I'm already doing something about it
9. I have already changed my academic habits, and I am looking for ways to keep from slipping back to my old patterns
10. I have serious problems with my academic habits
11. Sometimes I wonder if I am in control of my academic performance
12. My academic habits are causing my grades to suffer
13. I am actively doing things now to improve my academic habits
14. I want help to keep from going back to the academic problems I had before
15. I know that I have academic problems
16. There are times I wonder if I study enough
17. I am a bad student
18. I am working hard to change my academic habits
19. I have made some changes to my academic habits, and I want some help to keep from going back to the way I used to study

Note. For original item wording please see Miller and Tonigan (1996).

Table 2

Item Assignment for Three-Factor Model

	Miller & Tonigan (1996)			Demmel et al. (2004)			Chun et al. (2010)			Mitchell et al. (2005)			Zullino et al. (2007)		
Item	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
2	*			*			*			*			*		
6	*			*			*						*		
11	*			*			*			*			*		
16	*			*			*			*			*		
1		*				*		*						*	
3		*			*			*			*			*	
7		*						*			*			*	
10		*			*			*			*				
12		*			*			*			*			*	
15		*			*			*			*			*	
17		*			*			*			*				
4			*			*			*			*			*
5			*			*			*			*			*
8			*			*			*						*
9			*			*			*			*			*
13			*			*			*			*			
14			*		*				*					*	
18			*			*			*						
19			*			*			*						

Note. Vik et al. (2010) identified a three-factor structure for interpreting the SOCRATES but did not identify which items the included in their final 16-item model.

Table 3

Item Assignment for Two-Factor Model

	Maisto, Conigliaro, et al. (1999)		Maisto, Chung, et al. (2003)		Figlie et al. (2003)		Burrow-Sanchez & Lundberg (2007)		Bertholet et al. (2009)		Burrow-Sanchez (2014)		Current study	
Item	1	2	1	2	1	2	1	2	1	2	1	2	1	2
2	*		*		*				*		*		*	
3	*				*		*		*				*	
6	*		*		*		*		*			*	*	
7	*		*		*		*		*		*		*	
10	*		*		*		*		*		*		*	
11	*		*		*							*	*	
12	*				*		*		*				*	
15	*		*		*		*		*		*		*	
17	*		*		*		*		*		*			
4		*		*		*		*		*		*		*
5		*		*		*		*		*		*		*
8		*		*		*		*		*		*		*
9		*		*		*		*		*		*		*
13		*		*		*		*		*		*		*
18		*		*		*		*		*		*		*
1														
14									*					
16									*					
19				*								*		

Table 4

SOCRATES Model Fit Indices

	χ^2	SRMR	RMSEA	GFI	AGFI	NFI	TLI	CFI
Current study	148.204	.0754	.074	.898	.857	.889	.929	.941
Bertholet et al. (2009)	-	-	-	-	-	-	-	-
Burrow-Sanchez (2014)	124.631	-	.081	-	-	.891	-	.952
Burrow-Sanchez & Lundberg (2007)	199.90	-	.08	.92	.89	-	-	-
Chun et al. (2010)	461.54	-	.08	-	-	.87	-	.91
Demmel et al. (2004)	-	-	-	-	-	-	-	-
Figlie et al. (2003)	335.72	-	.092	.887	.849	-	-	-
Maisto, Conigliaro, et al. (1999)	250.01	-	-	.89	-	.91	-	-
Maisto, Chung, et al. (2003)	114.83	-	.066	-	-	-	-	.96
Miller & Tonigan (1996)	-	-	-	-	-	-	-	-
Mitchell et al. (2005)	-	-	-	-	-	-	-	-
Vik et al. (2010)	-	-	.095	-	-	-	-	.981
Zullino et al. (2007)	-	-	-	-	-	-	-	-

Notes. Several studies included in the table evaluated the factor structure for the SOCRATES with exploratory factor analysis or principal component analysis, neither of which would produce model fit statistics. For sake of clarity, all studies that examined the factor structure for the SOCRATES were included in the table even if the authors did not report conventional model fit statistics. Model fit indices are abbreviated as such: χ^2- chi-square value; SRMR- standardized root mean square residual; RMSEA- root mean square error of approximation; GFI- goodness-of-fit index; AGFI- adjusted goodness-of-fit index; NFI- normed fit index; TLI- Tucker-Lewis index; CFI- comparative fit index.

Table 5

Model Building Fit Statistics

	Three-factor solution	Two-factor solution			
Statistic	Model	Starting Model	Updated Model 1	Updated Model 2	Final Model
χ^2	462.656***	210.043***	184.429***	172.043***	148.204***
d.f.	149	89	88	87	75
χ^2/d.f.	3.11	2.36	2.10	1.98	1.98
AGFI	.717	.812	.836	.850	.857
AIC	544.656	272.043	248.429	238.043	208.204
CFI	.818	.912	.930	.938	.941
GFI	.778	.861	.880	.891	.898
NFI	.756	.859	.876	.884	.889
RMSEA	.108	.087	.078	.074	.074
C.I.	.097-.120	.072-.102	.062-.094	.058-.090	.056-.091
SRMR	.1412	.0829	.0819	.0803	.0754
TLI	.791	.897	.917	.926	.929

Notes. *** indicates $p < .001$. Model fit indices are abbreviated as such: χ^2- chi-square value; d.f.- degrees of freedom; AGFI- adjusted goodness-of-fit index; AIC- Akaike information criterion; CFI- comparative fit index; GFI- goodness-of-fit index; NFI- normed fit index; RMSEA- root mean square error of approximation; C.I.- 95% confidence interval; SRMR- standardized root mean square residual; TLI- Tucker-Lewis index.

Table 6

Covariances for Starting Model

Items	Modification Index	Par Change
e17 ↔ e2	24.202	.271
e15 ↔ e3	12.842	.133
e17 ↔ TS factor	12.013	-.157
e18 ↔ AR factor	9.212	.102
e12 ↔ e2	8.529	-.134
e15 ↔ e18	8.336	.082
e9 ↔ AR factor	8.231	-.156
e9 ↔ e5	7.862	.183
e11 ↔ e2	7.674	.182
e3 ↔ TS factor	7.174	.117
e3 ↔ e18	6.901	.092
e3 ↔ e5	6.545	-.136
e13 ↔ e5	5.809	-.092
e15 ↔ e5	5.698	-.103
e6 ↔ e5	5.180	.124
e2 ↔ e5	5.175	.140
e5 ↔ e4	5.096	.092
e17 ↔ e12	4.827	-.090
e2 ↔ e18	4.491	-.086
e10 ↔ e5	4.202	-.099

Notes. Items beginning with "e" denote error terms followed by the corresponding item number (i.e., e17 is the error term for item 17). "TS" represents the Taking Steps factor; "AR" represents the AMREC factor.

Table 7

Covariances for Updated Model 1

Items	Modification Index	Par Change
e17 ↔ TS factor	12.265	-.148
e15 ↔ e3	11.852	.127
e18 ↔ AR factor	9.542	.101
e9 ↔ AR factor	7.938	-.148
e15 ↔ e18	7.893	.079
e9 ↔ e5	7.878	.183
e3 ↔ TS factor	6.817	.114
e3 ↔ e18	6.558	.089
e3 ↔ e5	6.202	-.132
e11 ↔ e2	5.996	.151
e13 ↔ e5	5.794	-.092
e6 ↔ e5	5.643	.130
e15 ↔ e5	5.285	-.099
e5 ↔ e4	5.100	.092
e17 ↔ e10	4.348	.084

Notes. Items beginning with "e" denote error terms followed by the corresponding item number (i.e., e17 is the error term for item 17). "TS" represents the Taking Steps factor; "AR" represents the AMREC factor.

Table 8

Regression Weights for Updated Model 2

Items	Modification Index	Par Change
18(TS) ← 15(AR)	15.662	.187
18(TS) ← 3(AR)	14.523	.168
18(TS) ← AR factor	8.679	.192
18(TS) ← 12(AR)	6.216	.104
18(TS) ← 10(AR)	5.710	.093
18(TS) ← 6(AR)	5.263	.088
18(TS) ← 7(AR)	4.810	.091
17(AR) ← TS factor	11.451	-.291
17(AR) ← 13(TS)	10.843	-.224
17(AR) ← 8(TS)	9.812	-.200
17(AR) ← 18(TS)	5.654	-.153
17(AR) ← 9(TS)	5.603	-.123
17(AR) ← 4(TS)	4.778	-.166
9(TS) ← 15(AR)	9.633	-.237
9(TS) ← 2(AR)	8.591	-.178
9(TS) ← 17(AR)	7.886	-.188
9(TS) ← AR factor	7.503	-.288
9(TS) ← 7(AR)	6.398	-.169
9(TS) ← 12(AR)	5.743	-.161
9(TS) ← 5(TS)	5.612	.166
5(TS) ← 3(AR)	8.083	-.190
5(TS) ← 15(AR)	6.664	-.186
5(TS) ← 9(TS)	5.569	.146
5(TS) ← 10(AR)	5.264	-.136
6(AR) ← 5(TS)	7.669	.163
6(AR) ← 8(TS)	5.230	.156
3(AR) ← 18(TS)	6.989	.170
3(AR) ← 8(TS)	5.079	.143
3(AR) ← TS factor	4.757	.187
10(AR) ← 5(TS)	5.683	-.123
11(AR) ← 2(AR)	5.183	.140
13(TS) ← 5(TS)	4.181	-.084

Notes. The parenthetical letters represent which factor the preceding items were assigned to. "TS" represents the Taking Steps factor; "AR" represents the AMREC factor.

Table 9

Descriptive Statistics for Items and Factors

Item/Factor	Mean	Standard Deviation	Skewness	Kurtosis
AMREC Factor	3.49	.86	-.620	.277
Taking Steps Factor	3.86	.68	-.653	1.669
Item 2	3.30	1.19	-.279	-.938
Item 3	3.92	1.02	-.650	-.270
Item 4	4.18	.75	-1.192	3.015
Item 5	3.43	1.03	-.392	-.396
Item 6	3.67	1.17	-.622	-.461
Item 7	3.58	1.08	-.571	-.277
Item 8	3.95	.89	-.998	1.392
Item 9	3.58	1.10	-.445	-.526
Item 10	2.97	1.15	.055	-.811
Item 11	2.79	1.20	.082	-1.010
Item 12	3.67	1.07	-.773	.107
Item 13	4.04	.84	-1.006	1.470
Item 15	4.04	.94	-1.136	1.453
Item 17	2.47	1.08	.449	-.304
Item 18	3.97	.88	-1.136	2.047

Notes. Following the recommendations from West et al. (1995) for skewness < 2 and kurtosis < 7, it was determined that factors and instrument items do not violate assumptions of normality.

Table 10

Factor Means

	Taking Steps Factor			AMREC Factor		
Statistic	Total Sample	Self-referred	Mandated	Total Sample	Self-referred	Mandated
n	180	93	87	180	93	87
Mean (Median)	3.86 (3.83)	3.71 (3.67)	4.02 (4.00)	3.49 (3.63)	3.85 (3.88)	3.11 (3.13)
S.D.	.68	.64	.68	.86	.59	.93

Note. Factor scores for calculating each mean ranged from 1-5.

Table 11

Rotated Factor Matrix: Exploratory Factor Analysis

Item	AMREC factor	Taking Steps factor
2	**.665**	-.192
3	**.675**	.015
4	-.159	**.631**
5	-.177	**.499**
6	**.757**	-.079
7	**.859**	-.237
8	-.065	**.815**
9	-.261	**.515**
10	**.813**	-.241
11	**.609**	-.168
12	**.808**	-.121
13	-.165	**.793**
15	**.779**	-.083
17	**.679**	-.346
18	.013	**.812**

Notes. Maximum likelihood factor extraction and direct oblimin factor rotation were used for the above analysis. Item loadings are in **bold** for the factors they loaded onto cleanly. RMSEA (.0742) was calculated for this model (χ^2 = 150.946; d.f. = 76; *N* = 180)

Table 12

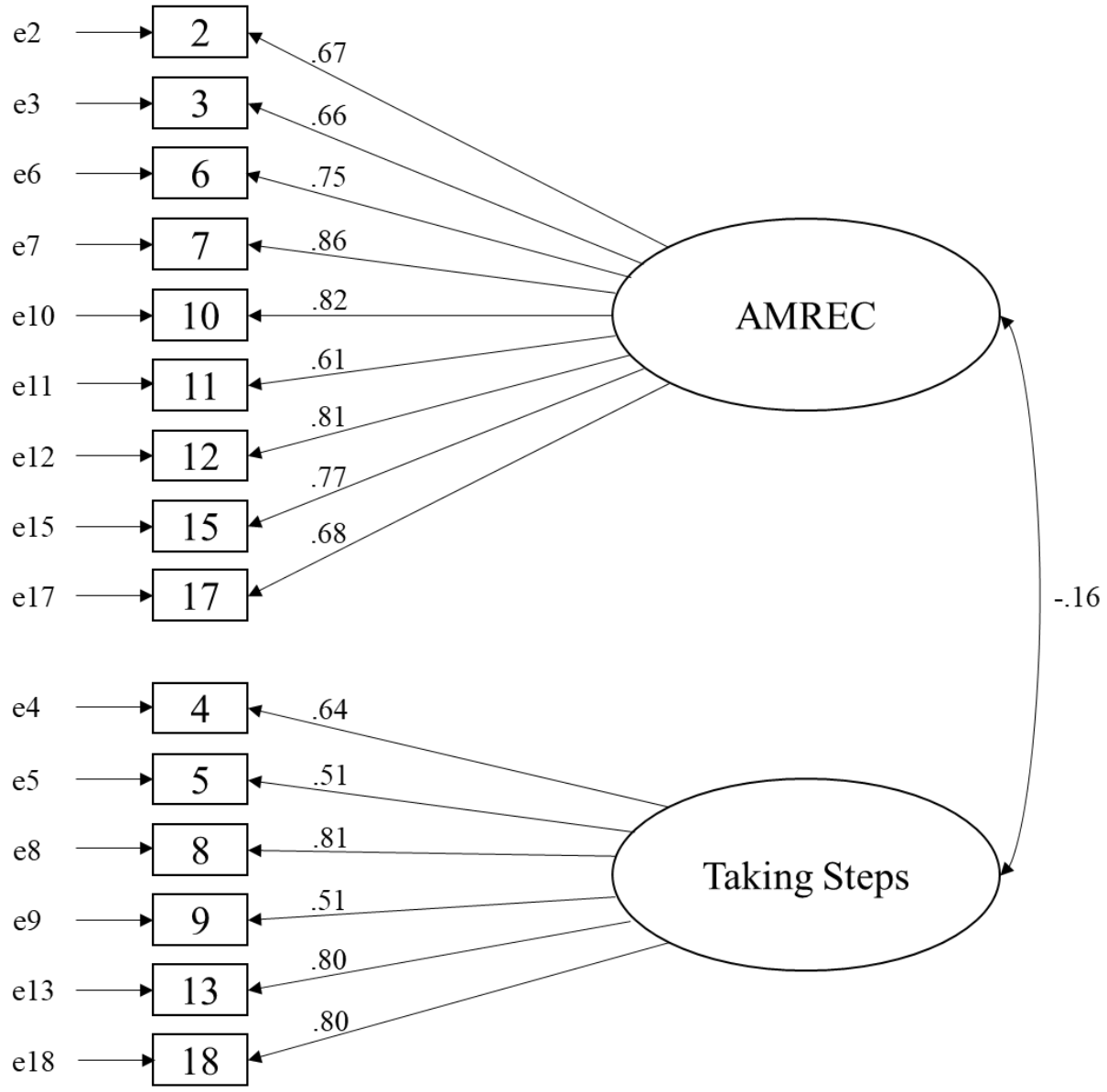
Distribution of Readiness Group x Referral Source

Referral Source		LowAR-LowTS	LowAR-HighTS	HighAR-LowTS	HighAR-HighTS	Total
ACAC	*n*	19	33	22	13	87
	% within referral source	21.84%	37.93%	25.29%	14.94%	100%
	Adjusted residual	1.18	4.90***	-2.92***	-2.57	
	p-value	.23800	.00000	.00350	.01017	
Office of Academic Support	*n*	14	7	43	29	93
	% within referral source	15.05%	7.53%	46.24%	31.18%	100%
	Adjusted residual	-1.18	-4.90***	2.92***	2.57	
	p-value	.23800	.00000	.00350	.01017	
Total	Count	33	40	65	42	180
	%	18.3%	22.2%	36.1%	23.3%	100%

Notes. *** notes standardized residuals that were found to be statistically significant based on the Bonferroni corrected *p*-critical = .00625. The referral source Academic Coaching and Counseling is abbreviated as ACAC. Participants were divided into four groups based on where they scored compared to the mean for each factor. For example, participants in the LowAR-LowTS group scored below the mean on both factors.

Figure 1

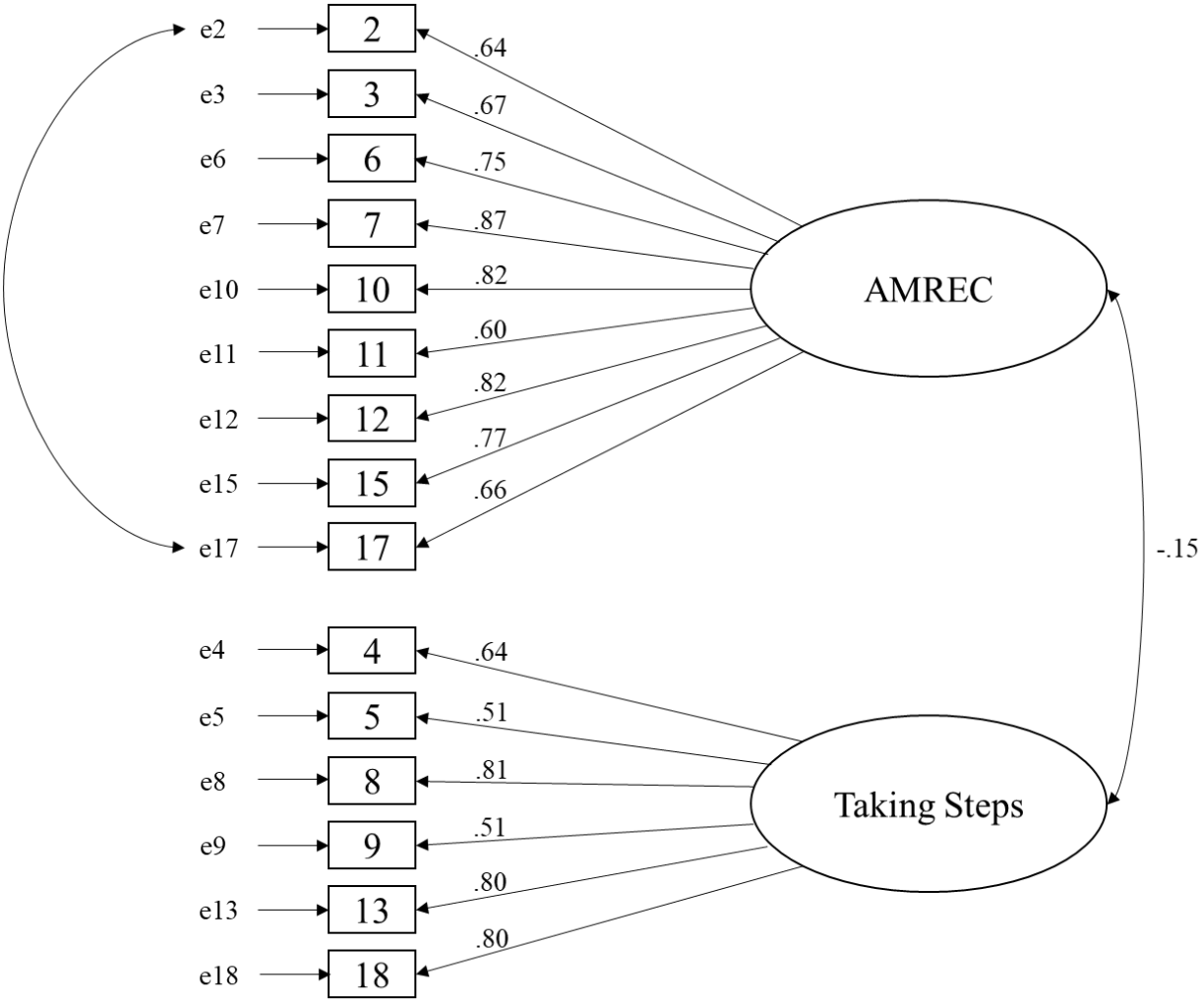
Starting Model



Notes. The factors are latent variables and are circled. Numbers enclosed in rectangles are instrument items. Error terms are labeled with a lower case "e" followed by the item number the error term corresponds with.

Figure 2

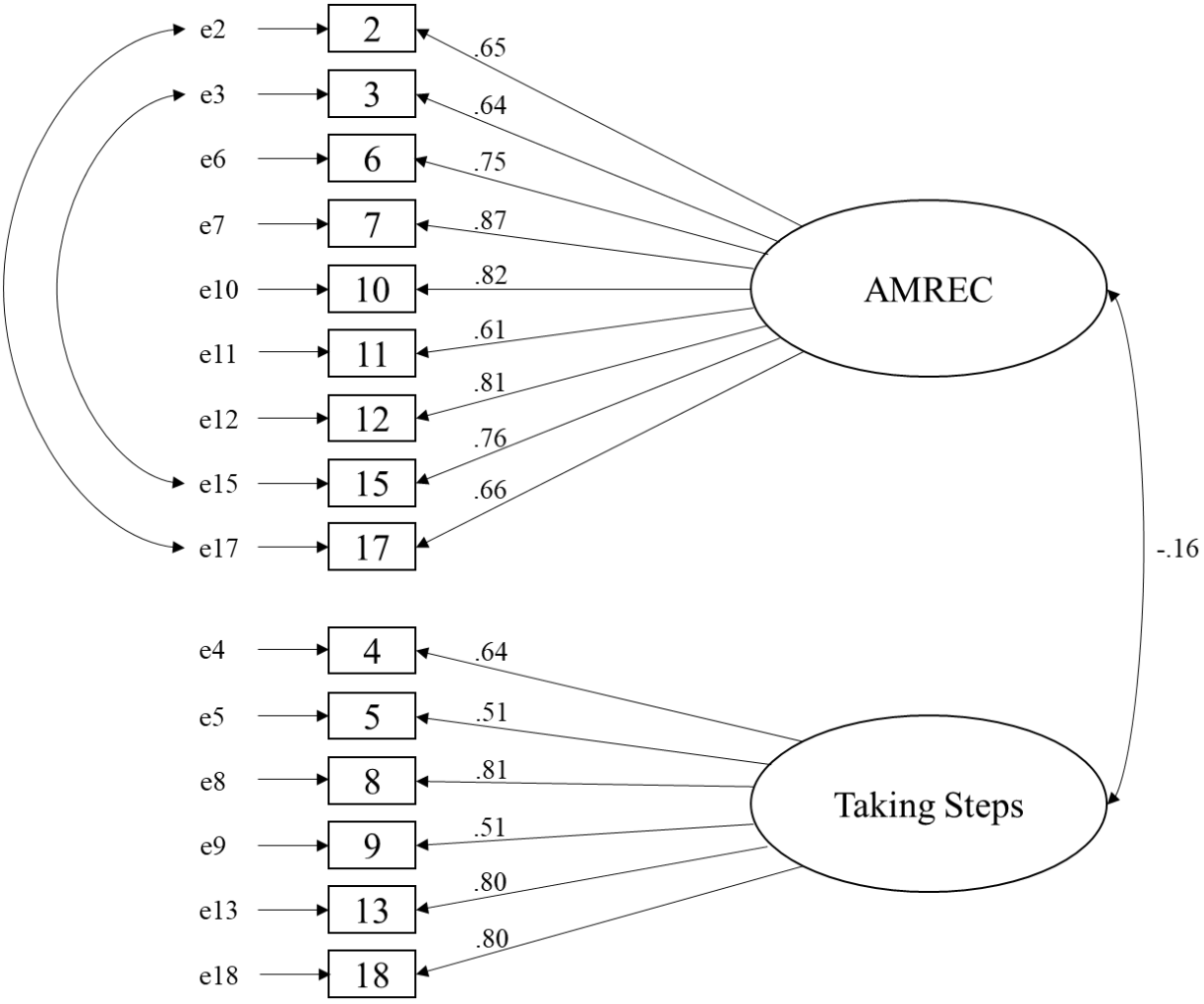
Updated Model 1



Notes. The factors are latent variables and are circled. Numbers enclosed in rectangles are instrument items. Error terms are labeled with a lower case "e" followed by the item number the error term corresponds with.

Figure 3

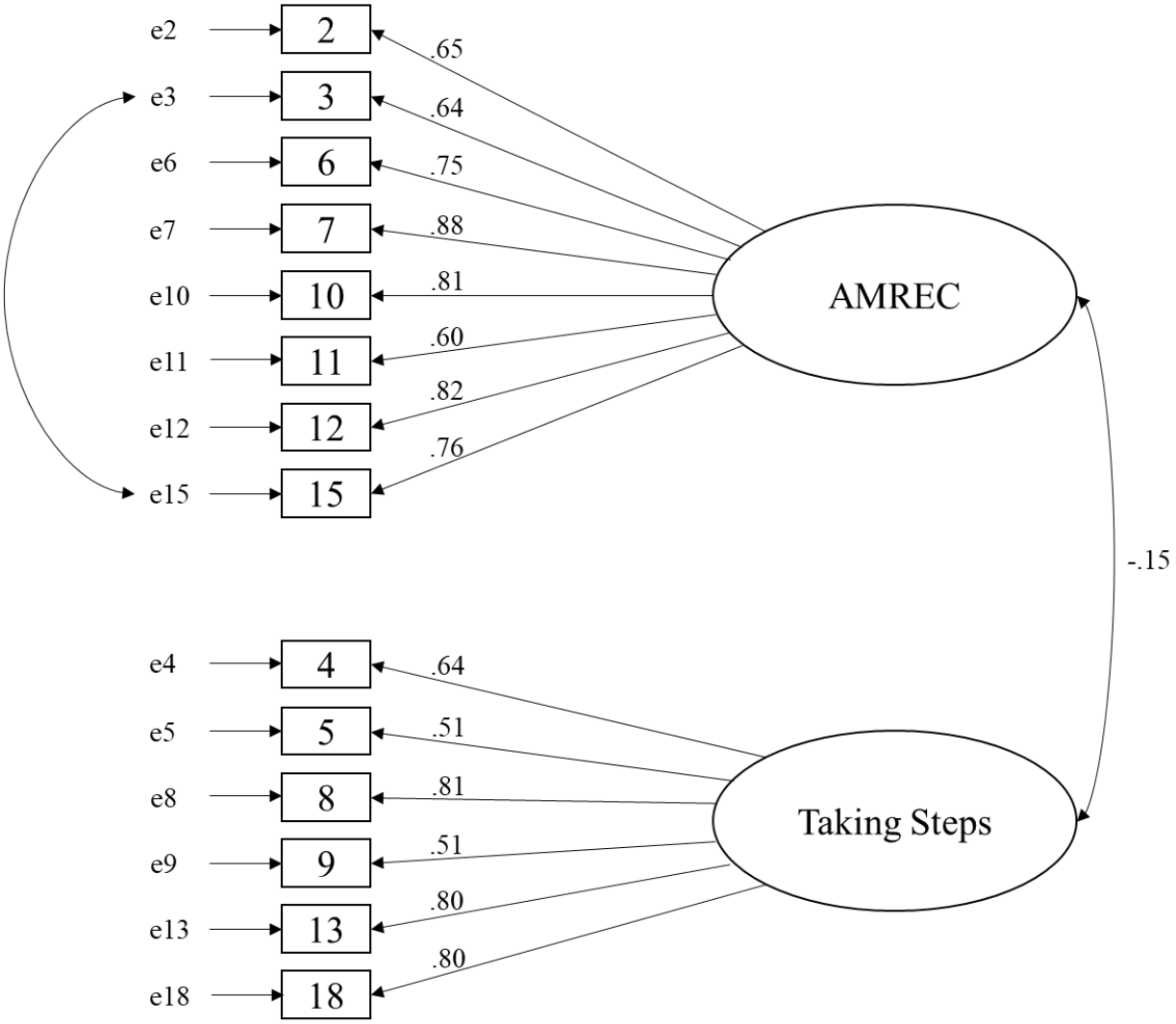
Updated Model 2



Notes. The factors are latent variables and are circled. Numbers enclosed in rectangles are instrument items. Error terms are labeled with a lower case "e" followed by the item number the error term corresponds with.

Figure 4

Final Model



Notes. The factors are latent variables and are circled. Numbers enclosed in rectangles are instrument items. Error terms are labeled with a lower case "e" followed by the item number the error term corresponds with.