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Validation of the College Planning Behaviors Scale

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To the Graduate Council:

I am submitting herewith a thesis written by Katherine Danielle Cook entitled "Validation of the College Planning Behaviors Scale." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

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Validation of the College Planning Behaviors Scale

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ABSTRACT

College preparation is an important topic in the educational attainment for high school students. Much of the research on college planning focuses on the importance and timing of preparing for postsecondary education; however, little research exists that has determined which steps students actually take while preparing for college. The current study utilizes the Social Cognitive Career Theory (SCCT; Lent et al., 1994) framework to create a validated measure to assess choice behavior. In this study, college planning behaviors (CPB), which are the concrete behaviors an individual engages in to prepare for college, were considered as choice actions within the SCCT model. The purpose of the current study was to create a validated measure for choice actions, as well as survey 10th and 11th grade students (n = 503) from rural Appalachian high schools to identify the behaviors in which they are engaging to prepare for postsecondary education. The measure was found to demonstrate good reliability and validity in this population, providing good internal consistency and construct validity. Further, these findings indicate support that CPB are linked to barriers, college-going self-efficacy (CGSE), and college outcome expectations (COE).

Keywords: SCCT, college-planning, choice actions, Appalachia, college-going self-efficacy

TABLE OF CONTENTS

CHAPTER I: INTRODUCTION

College planning is an important factor in career development and college readiness for high school students (Radunzel & Noble, 2012). Planning for postsecondary education has become increasingly important given the changing career outlook of contemporary society. Specifically, a greater proportion of careers that provide a living wage and benefits require increasingly advanced training and/or education (Hoffman et al., 2011). Yet, there is an alarming discrepancy between the proportion of students who say they aspire to attend college (87%) and those who actually do attend (66.2%, Bureau of Labor Statistics, 2019).

One reason for this discrepancy between aspirations and behaviors may be a lack of preparation. Indeed, regardless of their reported expectations to attend postsecondary opportunities, only half of students actually feel prepared for college (YouthTruth, 2017). This is specifically disconcerting, given that the unemployment rate is 7.2% higher for high school graduates compared with college graduates (BLS, 2019). The primary focus of college planning involves the actions that individuals take to become more prepared for applying to college, yet little formal, theory-driven research has been conducted to measure the actual behaviors.

Social Cognitive Career Theory

Social Cognitive Career Theory (SCCT; Lent at al., 1994) is an important model for career development in various populations. SCCT has specifically been used to understand how students and adolescents contemplate their career aspirations and interests (Ali & Saunders, 2009). The SCCT model's main focus is to conceptualize how

individuals consider their academic and career aspirations, including factors that promote choice actions for pursuing career and educational opportunities (Lent et al., 2003). Within the framework, an individual's self-efficacy evaluation (whether or not they feel capable of successfully completing specific activities) and outcome expectations (the extent to which they anticipate positive results from the activities) influence the extent to which they are interested in attempting the activity. Furthermore, self-efficacy and outcome expectations are associated with choosing goals, as well as choosing actions to meet those goals. The paths from the core constructs of self-efficacy and outcome expectations have been shown to correlate with choice actions in other domains, such as STEM (Lent et al., 2003) and college-going (Gonzalez, 2012). What's more, as SCCT would predict, those variables influenced by self-efficacy and outcome expectations (interests, choice actions, and goals) directly affect performance and attainment.

Much of the current SCCT research focuses on distinguishing between goals and actions. Goals (intentions to pursue a specific career or educational path) and actions (decisions that individuals actually make) are thought to be influenced by self-efficacy beliefs and interests (Lent et al., 2003). In contrast, prior research has found that outcome expectations might not be predictive of choice actions (Rogers & Creed, 2019; Turner et al., 2019). For instance, a high school student may conceive of the benefits having a postsecondary education might accrue (i.e., positive outcome expectations), but choose not to pursue those opportunities for a variety of reasons. Instead, self-efficacy beliefs and goals have been shown to be most closely associated with choice actions (Lent et al., 1999; Rogers & Creed, 2019; Turner et al., 2019). According to Bandura (1999),

individuals will be more likely to engage in an activity and persevere if they believe in their own capability to succeed in a task.

Relationships among SCCT variables have been demonstrated using path analysis. The present study utilizes a serial mediation model to test how college planning behaviors (choice actions) might relate with college-going self-efficacy, college outcome expectations, and college-going barriers. Prior SCCT literature highlights direct relationships between choice actions and college-going self-efficacy that were important to measure in the current study (Rogers & Creed, 2019; Turner et al., 2019). Additionally, there is evidence that choice actions might not directly relate to college outcome expectations; however, this relationship still needs to be explored (Rogers & Creed, 2019; Turner et al., 2019). Previous literature also found an indirect relationship between contextual affordances (barriers) and choice actions, which might allow researchers to understand more about increasing students' self-efficacy beliefs and decreasing barriers to college-going (Lent et al., 2003). The present study utilized a serial mediation model (Figure 1) because research suggests that self-efficacy mediates the relation between barriers and outcome expectations, both of which predict choice actions. Moreover, self-efficacy, specifically, has been shown to mediate the relationship between barriers to choice actions (Lent et al., 1994; Lent et al., 2003). Though this alternative model has not been used in prior literature, it is useful for practical purposes for ease of interpretation and to highlight a couple of the main variables within the SCCT choice framework.

Although college planning seems to be an intuitive predictor of career outcomes for students, relatively little theory-informed research has been conducted in this area. In

the SCCT model, college planning can be considered a choice action because it requires intentional behaviors be taken by students in order to prepare for colleges and careers. Importantly, it is thought that intentional, well-measured, and timely goals are more likely to lead to choice actions (Bandura, 1986; Lent et al., 2003) Because of this, measures of intention and persistence have been used as proxies for choice actions in relation to other SCCT variables. These types of measures, however, might not capture that an intentional behavior is different from an interest or aspiration and must be recognized as an independent construct. One of the challenges with trying to understand the relationships among self-efficacy, outcome expectations, choice goals, and choice actions is that college-going choice actions are not clearly defined. Moreover, no specific, well-validated measure for college planning behaviors exists. Our study sought to bridge this gap by a single, validated survey that could be used to evaluate the actual behaviors of high school students.

College Planning Goals Versus College Planning Behaviors

Prior literature refers to the college planning process as "college choice." College choice involves both the decision to enroll in college and the decision to enroll in a specific college (Perna, 2006). The college choice variables outline an individual's preparedness for college, their financial means, and their perception about the importance of a college degree (Perna, 2006). College planning encompasses all of these factors, allowing students to weigh the costs and benefits before preparing to apply for college; however, little is known about how this is related to actual behaviors students engage in to enact their plans.

There are a variety of college-planning checklists available to students online to help students begin the college planning process (Johnson, 2015; Millis, 2007a; Millis, 2007b; Millis, 2007c). These checklists help students understand when and how they should begin their postsecondary planning. However, few studies exist about what types of college preparation students are actually using during high school. These checklists have not been validated, which further increases the need for a validated scale for college planning activities, as well as demonstrating that such a measure is a valid indicator of the choice actions variable from the SCCT model. It is possible that studying the actual behaviors and assessing which actions students are taking can help career educators and researchers uncover the needs of individuals engaged in the college planning process. The results could also support how career educators and researchers understand the discrepancy between students' postsecondary aspirations and their actual attainment.

Though there are not validated measures of college planning, there have been ways in which researchers have studied choice actions within the SCCT model. Previous studies measured choice actions through persistence, asking participants whether or not they planned to enroll or stay enrolled in college (Borrego et al., 2018; Lent et al., 2003). Rogers and Creed (2019) measured choice actions through career planning and career exploration. They assessed how participants gained knowledge about the career planning process (e.g. thoughtfulness about finances associated with training or education for a specific career) and resources they have utilized for assistance with career planning (e.g. parents or teachers). Finally, assessments of intention have also been used to measure choice actions. For example, some studies assessed choice actions by asking participants

whether or not they intended to enroll in advanced STEMM coursework or intended to pursue a STEMM career (Fouad & Smith, 1996; Turner et al., 2019).

As noted earlier, however, measures of intention do not capture the true concept of an action because intentions are more in line with an individual's aspirations rather than their behaviors. Intentions are also difficult to measure in a timely manner because they focus more on goal setting instead of concrete ways of behaving. Similarly, measures of persistence do not gauge the exact behaviors that an individual is engaging in as they work toward performance attainment; rather, persistence might be examined as a measure of motivation, rather than concrete steps. Moreover, intentions cannot be considered a fair measure of college-going because of the disparity between those who want to attend college and those who actually go on to attend (BLS, 2019). In our study, we wanted to be able to quantify the specific behaviors a student is engaging in to plan for college, rather than asking students broadly whether they *intend* to enroll in college or relying on the more distal behavioral outcome of actual college enrollment. A framework for developing such a measure is discussed in Gibbons and colleagues' (2006) article, which addresses factors important to the college planning process such as college exploration or research, finances associated with college, and college-going social support. Combining these conceptual factors with specific items drawn from existing checklists and the experience of school counselors and others who engage directly in college planning with students, we created an initial College Planning Behaviors survey to operationalize college-going choice actions within the SCCT framework.

Research Question #1: What are the psychometric properties of the newly created College Planning Behaviors Scale?

Rural Appalachian Students and Postsecondary Aspirations

While the need to analyze college planning behaviors is important for all students, it is especially relevant for those who have historically been underrepresented in the postsecondary population. Prior literature has recognized the need for career education within the region of rural Appalachia (Bennett, 2008). Students in this region often face significant challenges to college-going, including financial barriers and access to resources. The region of Appalachia comprises 420 counties, 13 states, and more than 25 million people. Of these counties, 25% are marked "at-risk" of becoming economically disadvantaged (ARC, 2017). Adults in the Appalachian region from economically distressed counties are less likely to attend any type of postsecondary education, with only around 49% of individuals in this area attending some type of postsecondary education after high school, compared to an average of 65.1% from non-distressed areas (ARC, 2017). In the current study, we focused on high school students within rural Appalachia to understand how these students are preparing for college. Understanding these college planning behaviors may help career educators distinguish between actions and aspirations to attend college with students from this region, thereby narrowing the gap between aspirations and actual educational attainment.

Students from rural Appalachian communities report high desire to attend college and often have strong values toward education; however, the rates of postsecondary education are still very low in these regions (Shaw et al., 2004). Strikingly, students in this population acknowledge but tend to minimize barriers, such as finances, that might

impact their decision to actually attend college (Gibbons et al., 2019). Clearly, systemic barriers play a role in understanding college planning because many students do not receive the support and resources they need when contemplating the decision to attend some type of education beyond high school.

Due to the gap in educational attainment within the rural Appalachian region, many students' vocational aspirations are formed through social networks and academic self-efficacy (Wettersten et al., 2005). Consistent with SCCT, Rosecrance and colleagues (2019) demonstrated that students with college-going aspirations report higher college-going self-efficacy and higher college outcome expectations. Additionally, rural Appalachian students are more likely to attend college when reporting fewer barriers to college-going, such as limited finances and lack of support (Chenoweth & Galliher, 2004). Perhaps students in this region may engage in more college-going behaviors (or choice actions) if they perceive fewer barriers and experience higher college-going self-efficacy and college outcome expectations.

Research Question #2: How do other SCCT variables, such as college-going self-efficacy, college outcome expectations, and barriers, relate to CPB scores?

Prospective First-Generation College Students

For a number of reasons, though, students who report that their caretakers have no experience with any type of postsecondary education (i.e., prospective first-generation college students; PFGCSs), might be less likely to engage in activities that might help them prepare for college. For instance, individuals who are PFGCSs may be less likely to engage in advanced coursework, such as non-required math and science classes, during high school (Horn & Nunez, 2000). Moreover, it appears that lack of adequate academic

preparedness may contribute to PFGCSs being less likely to attend college and, if they do attend, having higher attrition rates than continuing-generation college students (Hand & Payne, 2008).

Although academic preparation likely contributes to difficulties in PFGCSs getting to and through college, it does not fully account for such postsecondary disparities. PFGCSs have less opportunity to discuss college planning practices either formally with school counselors or informally with peers, including crucial information about the financial responsibilities and opportunities associated with postsecondary education (Engle, 2007). Individuals whose caretakers did not attend any postsecondary education are less likely to be familiar with the processes or requirements in applying to school and often struggle to provide informed guidance, despite intentions otherwise (Kantamneni et al., 2018). From a public education perspective, those who are PFGCSs appear less likely to enroll in college preparatory courses (Gibbons et al., 2006). Beyond inequalities in academic preparedness and access to information, there are also opportunity gaps in supplemental activities, such as visiting college campuses or volunteering in the community.

Even though academic rigor, lack of access to information, and instrumental challenges all affect one's choice to pursue an activity, we still know little about how this translates to observable actions and there remains a dearth of understanding about how this process originates. Though a number of hypotheses can be put forth to explain the disparities in college attendance and attrition between first-generation college students and their continuing generation peers (e.g., lack of resources, exposure to information, fewer peer models), it is unclear where the rift between aspiration and action begins.

According to SCCT, the choice actions that an individual will take are predicted by self-efficacy and outcome expectations, however, these variables are affected by contextual affordances, such as social support or financial barriers (Lent, 2003). It is possible that, in addition to not taking advanced coursework, PFGCSs may also face a different set of supports and barriers than their continuing-generation peers (for instance, being a primary contributor to family finances or caretaker to siblings). Regardless of the discrepancy in environmental affordances between prospective first-generation and continuing-education college students, it is necessary to have a concrete and quantitative way of describing the choice actions they may or may not be taking.

Research Question #3: To what extent are there differences in college planning behaviors based on gender and prospective first-generation college student status?

Purpose of Study

The present study is part of a larger intervention project in which Social Cognitive Career Theory (SCCT; Lent et al., 1994) is applied to a career education intervention with students in rural Appalachian high schools. Funded by the National Institutes of Health through a Science Education Partnership award five-year grant, this program, called "Possibilities in Postsecondary Education and Science (PIPES)" seeks to improve college-going and STEMM efficacy and interest in rural Appalachian high school students. This project utilized a sample of 10^{th} and 11^{th} grade students (n = 503) from six rural Appalachian high schools. We explore the ways in which students from this sample are (or are not) planning for college by creating a scale to operationalize the educational planning behaviors of high school students. The College Planning Behaviors (CPB) Scale was created to assess which types of behaviors students are engaging in to plan for

college. The main purposes of this scale development are (a) to foster theoretically-grounded research by creating a validated measure of the choice actions construct to uncover relationships among choice actions, self-efficacy, outcome expectations, and barriers; and (b) to create an assessment that can be used by students, school counselors, and other career educators to foster evidence-based college planning.

CHAPTER II: METHOD

Colton & Covert (2007) recommend several steps in scale development including: 1) identifying constructs, 2) generating items through review of the literature, 3) having content experts judge the appropriateness of the items, 4) administering the survey items, 5) conducting an EFA to consider the utility of each item, and 6) refining the survey as needed. We utilized these steps, as well as prior scale development literature from Gibbons and colleagues (2006), to create our instrument. In the first phase of this work, we completed steps 1-3; in the second phase, we completed steps 4-6.

Phase I: Item Generation

The first steps, according to Colton and Covert (2007) are identification of constructs and item generation. Our research team consisted of graduate students and professors in both counselor education and counseling psychology, all of whom had experience delivering career education to high school students and discussing college planning. Based on review of several existing non-validated checklists (Johnson, 2015; Millis, 2007a; Millis, 2007b; Millis, 2007c) and prior college-going literature (Gibbons et al., 2006), as well as a research team brainstorming session, we identified 135 potential items.

In line with the third step (Colton & Covert, 2007), two of the research team members (a faculty member and graduate student in Counselor Education) served as content experts and individually coded each of the items into various categories. They then met with one another, as well as a third member of the research team who acted as mediator, to compare the items and place them into these categories. The categories they

hypothesized would relate to college planning behaviors included: academic preparation, career knowledge, college knowledge, finances, general planning, and instrumental support, based on previous research from Gibbons and colleagues (2006). The two research team members then reviewed the list of items for redundancy and narrowed the list to 82 potential items.

Finally, the entire research team then coded the items into three categories: behaviors specific to career planning only, behaviors specific to college planning only, and behaviors specific to both college and career planning. Each team member was asked to separately review and place the items into these three categories. Team members then met in-person to discuss rationale and obtain consensus for item categorization. To ensure that the items on the final scale pertained to college planning specifically, we removed items that we agreed were relevant only to career planning. We then reviewed the remaining items for developmental appropriateness and to identify any potentially redundant items. This process resulted in 49 items that were ultimately retained for the initial College Planning Behaviors (CPB) survey. Although we had a priori identified items on the basis of conceptual categories (e.g., finances, general planning), the factor structure was still unknown; thus, we decided that an exploratory factor analysis would be the best choice of action, rather than a confirmatory factor analysis.

Phase II: Exploratory Factor Analysis and Validation

The purpose of this phase was to complete the next three steps proposed by Colton and Covert (2007) to test and validate the measure. After administering the measure, we explored the factor structure and psychometric properties of the 49-item CPB through exploratory factor analysis, which then allowed us to refine the measure.

We also analyzed how three other SCCT variables - self-efficacy, outcome expectations, and barriers - relate to CPB as a choice actions measure, using a multiple mediation model to provide construct validity for the measure within the rural Appalachian population.

Participants

The students who participated in this study attended five high schools in the rural Appalachian region of East Tennessee. Students engaged in an in-school, six- or eight-week career education intervention during their 10th grade year. This NIH-funded program, called "Possibilities in Postsecondary Education and Science (PiPES)," utilizes Social Cognitive Career Theory (SCCT; Lent et al., 1994) to help students consider broad college and career pursuits (see Gibbons et al., 2019, for a detailed description of the career education intervention). All students were required to attend the intervention as part of their regular school day and to complete surveys for program evaluation purposes; however, caregivers had the opportunity to decline consent and students to provide assent to have their program evaluation data used for research purposes.

For the exploratory factor analysis, we used data from 503 students. These data were collected from 99 11th graders in Fall 2017 and 404 10th graders in Fall 2017, Fall 2018, and Fall 2019. Of these 503 students, most identified as White (n = 471); 17 self-identified as Black or African American, 17 as Latinx, 22 as American Indian, 9 as Asian or Pacific Islander, and 35 as multiracial; nine did not respond. Prospective first-generation college student (PFGCS) status was determined through responses to questions about parental education level. Students who reported that neither parental figure had any college experience were identified as prospective first-generation college

students (PFGCSs). Based on this definition, one-quarter of participants (n = 127) were PFGCSs; 66.4% of students reported having at least one parent who completed some form of post-secondary education, and thus were categorized as prospective continuing-generation students. Finally, 3% of students were unsure of their parental education level. Subsequent analyses were completed only on the 10th grade subsample (n = 404). This subsample was predominantly White (n = 375); 15 students self-identified as Black or African American, 6 as Asian or Pacific Islander, 19 as American Indian, and 13 as Latinx, and 28 as multiracial; nine did not respond. The 10th grade subsample was nearly equally split between young men (49.1%) and young women (49.2%; the remaining 1.3% preferred to not respond). Nearly one-quarter of the 10th grade sample (n = 100) were identified as PFGCSs; another 8.9% (n = 36) of the students reported being unsure of their parents' or guardians' educational statuses.

Although all students completed the surveys for program evaluation purposes, parents and students had the opportunity to decline consent (assent) for the responses to be used for research. Across the three semesters, 21 parents and guardians declined consent for their children's responses being used for research purposes. Those students' responses were removed from data analysis.

Measures

College Planning Behaviors (CPB). All students completed the 49-item CPB survey. The survey asks questions that assess whether or not students have engaged in activities to prepare for two-year or four-year college, such as "I have a plan to pay for college" or "I have started exploring careers." Students were instructed to answer "yes" (1) or "no" (0) about whether or not they completed the listed activity. Participants were asked

to only answer "yes" if they had completed the activity, not if they had intended to complete it. CPB scores were averaged, ranging from 0 to 1, which indicate the percentage of items that were endorsed. Scores closer to one indicate more planning behaviors; whereas, scores closer to zero indicate fewer planning behaviors.

Demographic Items. All students self-reported their gender, age, race, school, grade, and parental education status.

College-Going Self-Efficacy Scale. Tenth graders completed the College-Going Self-Efficacy Scale (Gibbons & Borders, 2010), a 30-item scale originally developed for use with middle school students that was designed to measure students' confidence in their ability to engage in tasks necessary to attend and persist in post-secondary education. Using a 4-point Likert response scale (1 = *not at all sure* to 4 = *very sure*), participants respond to the scale in two sections: attendance and persistence. The attendance subscale assesses an individual's belief that they can enroll in college; the persistence subscale assesses an individual's belief that they can stay in college once enrolled. The scale includes items that ask participants: "How sure are you about being able to do the following," with sample items, such as "I can choose a good college" and "I could pay for college each year." We included two instructed-response items to check for participants' attention (Meade & Craig, 2012). These two items instruct students to select "*sure*" and "*somewhat sure*." The CGSES has also been used to measure self-efficacy in diverse middle school students (Gibbons & Borders, 2010) and Latino youth (Gonzalez et al., 2012). It has also been used successfully with rural Appalachian high school students (Rosecrance et al., 2019). The scale demonstrates an excellent internal consistency (α = .95) within our sample.

College Outcome Expectations Scale. Tenth graders also completed the College Outcome Expectations Scale (COE; Flores et al., 2008), a 19-item scale that was revised from a previous outcome expectations scale for STEM beliefs (Fouad & Smith, 1996). Items assess students' beliefs about outcomes they might experience if they attend college (e.g. "A college education will allow me to obtain a job I like doing."). The measure uses a Likert-type response scale, ranging from 1 (*strongly disagree*) to 10 (*strongly agree*). We included one instructed-response item, asking students to *"Select 9*." Scores were averaged in the present study to yield total scores that may range from 1 to 10, with higher scores indicating greater belief in the value of a college education. The COE scale has been used successfully with diverse youth, including rural Appalachian high school students (Rosecrance et al., 2019). The measure has high internal consistency within this sample ($\alpha = .94$).

Perception of Educational Barriers- Revised. The Perception of Educational Barriers Scale- Revised (PEB-R; Gibbons & Borders, 2005) was administered to 10th grade students in our sample to assess perceived barriers to college-going. The measure was revised by Gibbons from McWhirter and colleagues' (2000) *My Perception of Barriers* Scale. It has also been used with college students (Raque-Bogdan & Lucas, 2016) and rural youth within a predominantly Latino community (Rasheed Ali & Menke, 2014). The scale has also been used with rural Appalachian youth, although concerns have been raised about the extent to which the measure might underestimate barriers in this population (Gibbons et al., 2019). The scale contains 45 items that list potential college attendance barriers students may face, such as "Not enough money" and "Teachers don't support my plans." The measure uses a four-point Likert-type response scale that allows

participants to rate possible barriers from one (*not at all likely*) to four (*definitely likely*). The scale also includes an instructed-response item, which instructs students to select "*a little likely*." Cronbach's alpha demonstrates good internal consistency ($\alpha = .89$) in the current sample.

Procedure

After gaining permission through the University Institutional Review Board, parents and guardians received paperwork at the beginning of the school year describing the career education program and giving caregivers the opportunity to opt their students out of research. Students attending our PiPES intervention high schools completed a battery of measures each semester through electronic surveys delivered on hand-held tablet devices in intact classrooms. Measures were presented in counterbalanced order, with the demographics questions always presented last. After students completed all the measures for program evaluation purposes, they were given the opportunity to provide or decline assent for their responses to be used for research purposes. Only data from students who provided assent and whose caregivers did not decline consent are used in this study.

CHAPTER III: RESULTS

Data Screening

The final sample of usable data was screened for univariate outliers, defined as scores more than three standard deviations from the mean (Wiggins, 2000). However, there were no observed univariate outliers within the dataset.

Exploratory Factor Analysis

To determine the factor structure underlying the CPB items, as well as to identify potentially problematic items, we conducted an exploratory factor analysis (EFA), using the statistical software, R. We used a Promax (non-orthogonal) rotation, assuming that the items were correlated with one another, with a weighted least squares estimation method, which has been demonstrated to be most effective with a large dichotomous dataset (Glockner-Rist & Hoijtink, 2003). Although there are few clear guidelines for the minimum number of participants needed for an EFA (Osborne & Costello, 2004), with 49 items and 503 participants, we did achieve the common heuristic guideline of at least 10 participants per item.

Determination of the number of factors

To uncover the factor structure of the measure, we specified 1-, 2-, 3-, and 4-factor solutions. In addition to examining the scree plot and variance accounted for by each additional factor, we also looked at the item loadings on each of the factors in each solution, looking for interpretable solutions with items loading highly ($\geq .30$) on only 1 factor, and at least three items loading > .30 per factor (Gorsuch, 1997). Based on these

criteria, we concluded that a three-factor structure is preferred (Table 1). First, analysis of the scree plot demonstrated that eigenvalues leveled off after three factors. We used Cattell's (1966) approach to assess initial eigenvalues, which indicated that the first three factors explained 21%, 15%, and 8% of the total variance. Eigenvalues of factors one and two were greater than one (14 and 6) with the third factor leveling out at 2, which also supported a three-factor structure over a one- or two-factor structure. In the four-factor solution, the eigenvalue was < 1, indicating that it is not gaining any variance explained and should not be retained (Cliff, 1988; Hayton et al., 2004). Ultimately, a three-factor structure contained the appropriate number of items per factor and was easier to interpret than the other solutions. Overall, the three factors accounted for 44% of the total variance.

The items on the first factor involved researching or finding information about colleges or careers (e.g., "I have researched what programs of study are available in college"); we thus labeled this factor *Exploration*. The items on the second factor involved concrete behaviors or actions that the individual is engaging in to prepare for college or a career path (e.g., "I have attended a financial aid workshop or scholarship night"); we thus labeled this factor *Concrete Activities.* The items on the third and final factor involved behaviors that are helpful to, but not necessarily required for, college acceptance (e.g. "I have participated/ currently participate in an extracurricular club or sport"); we thus labeled this factor *Supplemental Activities.*

Determination of items to be retained across the three factors

To determine whether any of the 49 items should be removed from the scale, we considered factor loadings and communalities. In the three-factor solution, there were

four items (4, 28, 32, and 43) that did not load above .25 on any of the three factors and were thus removed from the scale. All remaining items had communalities ≥ .20, as recommended (Child, 2006).

Some items that did not fit within our criteria were retained in the measure. Items 14 ("I have found someone who can answer my questions about college") and 40 ("I/my family have started saving for college") clearly loaded on Factor 3, but this strongest loading was less than .30 (Item 14 had a loading of .29 and Item 40 had a loading of .28). These items were kept in the measure as we felt that they were relevant to college planning and were mentioned in previous college planning checklists, as well as the literature about college planning.

Additionally, three items cross-loaded between factors, defined as items that either had loadings greater than .32 on more than 1 factor or items that had a difference less than .15 between the top 2 loadings (Worthington & Whittaker, 2006). Those items were #1: "I have taken the SAT and/or ACT;" #46: "I have talked with friends about what they want to do after high school;" and #49: "I have run for a leadership position in a club or sport." Item #1 ("I have taken the SAT and/or ACT") cross-loaded on factors one (exploration: -.43) and two (concrete activities: .70). We retained the item on factor two due to its higher loading on this factor. In the state of Tennessee, students are required to take the ACT during their 11th grade year of high school. The standardized test is given to all students for free and administered during the regular school day; thus, for students in Tennessee, taking the ACT is not a college-planning behavior. However, we retained this item among the 45 CPB items because the SAT and ACT are tests that

are generally required for college admittance, and this item is included on many of the checklists that we utilized in item generation.

Item #46 ("I have talked with friends about what they want to do after high school") cross-loaded on factors one (exploration: .39) and three (supplemental activities: .38). This item was retained in the first factor after reviewing the literature and deeming it important to talk to others for support during college planning. Item #49 ("I have run for a leadership position in a club or sport") cross-loaded on factors two and three (concrete activities: .34 and supplemental activities: .56). Ultimately, we retained this item on the third factor due to its high (> .40) loading and its fit with this specific construct. Supplemental activities involved behaviors that may require more time and are helpful, but not required, for college planning.

After dropping four items, choosing to retain another three cross-loading items, and choosing to retain two items with low loadings, this resulted in a 45-item, three factor scale. The first factor, exploration, includes 23 items. The second factor, concrete activities, includes 12 items. The third and final factor, supplemental activities, includes 10 items that are helpful to, but not necessarily required for, college acceptance. Reliability was measured through Cronbach's alpha coefficient using a tetrachoric correlation matrix. For factor one, exploration, Cronbach's alpha was .89, indicating good internal consistency; for factor two, concrete activities, the coefficient was .77, indicating acceptable internal consistency. For factor three, supplemental activities, the coefficient was .79, indicating acceptable internal consistency for the final construct.

Evidence for Construct Validity

We examined the relations among CPB scores and scores on several other theoretically-related measures using data from the 10th grade students (n = 404; as noted above, 11th grade students did not receive the other measures). Supporting the construct validity of CPB, simple correlation analyses indicated that CPB scores correlated with these other variables as would be predicted by SCCT (Lent et al., 1994): greater college planning behaviors were associated with lower perceived barriers (r = -.24, p < .01), higher college outcome expectations (r = .33, p < .01), and higher college-going self-efficacy (r = .53, p < .01).

Tests of Mediation

We designed the CPB as a measure of choice actions within the SCCT (Lent et al., 1994) model. As such, we hypothesized that college outcome expectations (COE) and college-going self-efficacy (CGSE) mediate the effect of perceived barriers on college-planning behaviors. To test these hypotheses, we used the PROCESS macro (Model 6; Hayes, 2017) to test a serial mediation model (Figure 1). The bootstrapping method was used with 10,000 bootstrap samples, as suggested by Preacher and Hayes (2008). Barriers were the independent variable (X), college planning behaviors were the outcome variable (Y), and college-going self-efficacy (M_1) and college outcome expectations (M_2) were mediating variables within the model (Figure 1, Table 2). A serial mediation model was used instead of a simple mediation model because, according to SCCT (Lent et al., 1994), self-efficacy influences outcome expectations, which both lead to goals and actions. The purpose of a serial mediation model is to also recognize the relationship among mediators (Hayes, 2017).

The mediation model indicated that 26% of the variance in college planning behaviors was explained by perceived barriers, college outcome expectations, and college-going self-efficacy. Perceived barriers are a significant direct predictor of college-going self-efficacy, B = -.473, SE = .055, $p < .05$; however, perceived barriers did not directly predict college outcomes expectations, B = .03, SE = .01, $p > .05$. The 95% bootstrap confidence interval for the indirect effects of perceived barriers on college planning behaviors through college-going self-efficacy was -.09 to -.05. This indicates that there is evidence of an indirect effect of perceived barriers on college planning behaviors through college-going self-efficacy. In contrast, there was no evidence for a significant indirect effect of perceived barriers on college-planning behaviors through college outcome expectations (95% C.I. -.003, .002). A post hoc test, however, showed evidence of an indirect effect of barriers on college outcome expectations through college-going self-efficacy (95% C.I. -.92, -.51).

Group Differences Among Participants

After coding for prospective first-generation college student (PFGCS) status, we analyzed differences in college planning behaviors based on generation status, grade, and gender. The analysis utilized one-way ANOVA with the CPB mean total score as the dependent variable. The results of the one-way ANOVA found that college planning behaviors varied significantly based on generation status, F (2, 497) = 5.28, p = .005. Post hoc comparisons using the Tukey HSD test indicated that the mean score for continuing generation college students (M = .44, SD = .16) was significantly higher than that of PFGCSs (M = .38, SD = .15) and students who are unsure about their caretakers' educational attainment (M = .34, SD = .18). PFGCSs and students within the "unsure"

group did not differ significantly. Young women (M = .44, SD = .15) reported engaging in significantly more college-planning behaviors than the young men (M = .38, SD = .16). There were no significant differences between grade level based on the total mean CPB score.

In order to determine if the CPB subscales differ based on gender, PFGCS status, and grade level, we conducted a 2 (gender: male or female) x 2 (grade level: 10th or 11th grade) x 3 (PFGCS status: first-generation, non-first-generation, or unsure) multivariate analysis of variance (MANOVA). This MANOVA used the three CPB subscale scores as dependent variables. Gender and PFGCS status displayed small main effects (*p*s < .01, partial η^2 = .03). For factor one (exploration), young women engaged in significantly more planning behaviors (M = .58, SD = .22) than young men (M = .49, SD = .24). Factors two (concrete activities) and three (supplemental activities) did not show significant gender differences.

College planning behaviors also varied significantly based on generation status (Table 3; Table 4). In considering the subscales, for exploration, prospective continuing generation college students (M = .57, SD = .23) scored higher than PFGCSs (M = .50, SD = .23) and students unsure of their parents' educational attainment (M = .44, SD = .26). Factor two (concrete activities) did not show any significant differences among generation status; however, for factor three (supplemental activities), prospective continuing generation college students (M = .08, SD = .12) also scored higher than PFGCSs (M = .06, SD = .10) and students unsure of their parents educational attainment (M = .05, SD = .07). There was also a small but significant main effect for grade level (*p* = .049, partial η^2 = .02). There was a significant effect (*p* = .02) for the second factor

(concrete activities), indicating that 11th grade students (M = .12, SD = .12) reported significantly more concrete behaviors than 10th grade students (M = .06, SD = .10). There were no significant two- or three-way interactions.

CHAPTER IV: DISCUSSION

The results of the present study suggest that the CPB scale can be utilized as a reliable and valid measure for choice actions within the SCCT framework with rural Appalachian students. In addition, this measure is also beneficial for uncovering which steps students are taking to plan for college. The CPB scale demonstrates good internal consistency for the first subscale (exploration); while the second and third subscales (concrete activities and supplemental activities) demonstrate acceptable internal consistency. Construct validity is reflected through the measure's relation to other SCCT (Lent et al., 1994) variables, which further validates the pathway of barriers through self-efficacy to choice actions. This finding indicates that students' perceptions of barriers may impact their self-efficacy, which may influence the actions they engage in to plan for post-secondary education.

Further, content validity is supported by the clear grounding of the scale items in the existing literature. Moreover, the three-factor structure was clear-cut: exploration, concrete activities, and supplemental activities. These categories are supported by prior literature, which suggests that there are a number of constructs involved in the college planning process, such as college knowledge and finances (Gibbons et al., 2006; Perna 2005, 2006). The first factor recognizes the importance of participating in exploratory research before taking steps to determine their post-secondary plans (e.g. "I have explored colleges on the computer"). The concrete behaviors construct involves activities that require students to take some kind of preparatory action (e.g. "I have taken math beyond Algebra II"). Finally, the supplemental activities construct recognizes that the

behaviors falling into this category are not necessary to the planning process, but they certainly help individuals who are able to engage in them by making them more competitive for the college application process. These items may require time, resources, or other types of privilege for participation (e.g. “I have visited a college campus”). The three subscales cover a range of specific behaviors without redundancy, and it provides SCCT researchers with a measure for choice actions.

CPB as an Indicator of Choice Actions

Consistent with the SCCT model (Lent et al., 1994), and thus supporting the validity of using the CPB as an indicator of choice actions in this population, students who reported fewer barriers, greater college outcome expectations, and higher college-going self-efficacy also reported engaging in more college planning behaviors. These findings can be useful for both SCCT researchers, as well as career educators. This scale provides a new, more reliable approach for assessing college-going choice actions, as well as a measure for differentiating between goals and actions within the SCCT framework. Intentions or persistence have long been used as proxies for choice actions (Borrego et al., 2018; Fouad & Smith, 1996; Lent et al., 2003; Turner et al., 2019); however, intentions are not behaviors and thus are not choice actions. In addition, although persistence (e.g., in a degree program) can be construed as behavioral choice actions leading to attainment of the degree, these are more downstream actions. Researchers interested in initial post-secondary educational choices need measures of earlier choice actions, such as planning behaviors.

Moreover, our results indicate a fully mediated path from barriers through college-going self-efficacy to choice actions. This is consistent with the path that Lent

and colleagues (2003) also found when studying engineering students' persistence. Self-efficacy has also been demonstrated to be a strong predictor for intentions or persistence in other studies (Borrego et al., 2018; Fouad & Smith, 1996; Rogers & Creed, 2011; Turner et al., 2019). Although initial correlations within our study show that college outcome expectations and choice actions are related, which is hypothesized within SCCT, we found that this relationship was not significant when self-efficacy was included in the model. Turner and colleagues (2019) found similar results, in which barriers did not predict outcome expectations, and thus did not predict choice actions. It is possible that there is not a strong relationship between barriers and choice actions through college outcome expectations because an individual's belief about their own abilities (self-efficacy) is much stronger than their belief about the outcomes of a situation. These results, however, provide stronger support for the relationship between self-efficacy and choice actions.

Our findings also demonstrate a direct link between barriers and choice actions. This is consistent with results from prior research conducted with engineering students' intentions to enroll in graduate school (Borrego et al., 2018). Fewer perceived barriers are linked with more choice actions within the present study. Indeed, it has been suggested that students are more likely to enroll in college when they perceive fewer barriers (Chenoweth & Galliher, 2004). The path in the present study from barriers to choice actions, mediated by self-efficacy, provides more evidence for the important role self-efficacy plays in students' educational choices.

Between Groups Differences

Our findings suggest that there are some statistically significant differences based on generation status, gender, and grade level. Previous research has found that a high number of PFGCSs intend to enroll in college and that intentions vary between PFGCSs and continuing-generation students (Chenoweth & Galliher, 2004). We found that students whose parents have at least some college experience engage in more college planning behaviors than PFGCSs and students who are unsure about their caretakers' educational backgrounds. More specifically, we found that continuing-generation students perform more behaviors within the exploration factor and the supplemental activities factor, whereas, there were no differences based on generation status for the concrete behaviors factor. Perhaps continuing-generation students are more likely to engage in exploration because they may have more access to information from their caretakers about college, or they may have more conversations about the college-going process within the household than PFGCSs or students who are unsure about their caretakers' educational backgrounds. It is understandable that students who are continuing-generation students may be more involved in supplemental activities because their families may have more access to the time and resources required to engage in some of these behaviors (e.g. "I have completed a college tour"). It may be likely that there are no differences among generation status within the concrete behaviors factor because some of these items are requirements for all students in Tennessee (e.g. "I have taken the PSAT"). Further, some of these items might be acknowledged as more important for the planning process (e.g. "I have completed the FAFSA"), which might lead a higher

number of PFGCSs being more aware that they should complete these activities as a result of guidance from their school counselors or teachers.

We also found that young women engaged in more college planning behaviors than young men. This is in accordance with the rates of college-going within the United States, where women enroll in college at higher rates (69.8%) than men (62%; BLS, 2019). This difference was found only in the total mean score of the CPB scale and the first factor, exploration. It seems that young women are more likely to engage in exploratory behaviors than young men, but there are consistent results among both young men and young women on the concrete behaviors and supplemental activities subscales. Additionally, students in 11th grade performed more behaviors within the second factor (concrete activities). It seems as though students may not perform concrete planning behaviors until they are farther along in their high school education, which may be especially helpful for school counselors and career educators who want to assess their students' planning behaviors. This is consistent with research on timing of college planning (Royster et al., 2015) and might further highlight the need for researchers and career educators to work with students at an earlier stage of their career development.

Limitations and Future Directions

Despite evidence supporting the psychometrics and utility of the final 45-item CPB in this population, future researchers could consider whether the scale could potentially be revised. One survey item that researchers might consider removing or re-writing is #29 ("I have enrolled in a college prep curriculum program at my high school"). In retrospect, some students may not know what "college prep curriculum" entails, and not all high schools may offer such curricula. It might be more beneficial to

re-word this item as a more specific college preparation course (e.g. ACT/SAT prep, specific AP courses, dual enrollment courses, etc.). Additionally, some of the items related to finances might be rated differently in other regions. In the rural Appalachian region, research has demonstrated that students from this area may have an unrealistic understanding of college-going finances (Gibbons et al., 2019). Also, this region is characterized by strong economic inequities and disadvantages, which may have influenced the ways students understood and responded to items about financial-related planning (Items #3 and #40). Furthermore, future uses of the scale might exclude the three cross-loading items (#1, #46, and #49). Although we kept these items after a review of the literature and fit with certain constructs, researchers may seek to remove these items.

Researchers should also be aware of low rates of engagement in behaviors on the concrete behaviors factor (factor two). We averaged responses, which indicate a percentage of endorsed behaviors (from 0 to 1). On factor two, students in both 10th and 11th grade had low average levels of completing these behaviors (e.g. 10% for 11th grade young men and 7% for 10th grade young men; Table 3). Although we found grade level differences within this factor, students were still endorsing a low number of items. Some of these items may be more appropriate for 12th grade students (e.g. "I have applied to college"). However, all of these items were important for the college planning process and loaded highly within the factor analysis. Future research might consider utilizing a sample of students who are currently engaging in the application process.

In the current study, we focused on the population of primarily rural high school students within a specific area of Appalachian east Tennessee. Future studies might seek to study

college planning behaviors with students from diverse backgrounds. For example, students in urban and suburban schools often have better access to advanced coursework and technology than students in rural schools (Gagnon & Mattingly, 2015; Sundeen & Sundeen, 2013). It may be possible that these advancements in other school systems allow students to engage in more college planning activities or may change the timing of these activities. In addition, some school systems may mandate particular college planning activities that are optional in others. For example, in Tennessee, all students must take the ACT during their 11th grade year, whereas in other regions, taking the ACT is optional. Thus, scores on the CPB and the timing of completion may vary across school districts, which in turn may affect the ways in which CPB scores correlate with other college-going variables.

The CPB scale provides researchers and practitioners flexibility in using some or all subscale scores or the total score. For example, a researcher may want to study specific concrete behaviors, rather than exploratory behaviors. Other researchers may only be interested in the total score, without differentiating among exploratory, concrete, and supplemental planning behaviors. In addition, it may be useful not only to assess which of these behaviors students are engaging in, but also how important students perceive these behaviors to be for college planning. Assessing perceived importance could help researchers and career educators identify reasons students may fail to engage in important planning behaviors, which can in turn inform education and intervention efforts.

The CPB scale is also likely to be a useful tool for school counselors and high school career educators. This scale can be used by school counselors to determine which

behaviors their students are already engaging in to plan for college. Then, the counselors can use the results of the survey to design classroom lesson plans or workshops based on activities that were completed less often. School counselors can isolate the items within each of the three factors in the CPB to help organize post-secondary preparation activities. School counselors may be interested in more exploratory behaviors or concrete behaviors that students are doing to prepare for college. Or, they might want to use the supplemental activities subscale for high-achieving students, specifically.

The factors and their definitions might help school counselors to determine which activities are most necessary to support their students' college-going development. School counselors and career educators can also divide the items into grade-specific activities that are more appropriate for their grade level (e.g., students do not usually start applying for colleges until 12th grade). Utilizing these items appropriately may help students better understand what activities are important to support their journey towards post-secondary education. It is also important to note that there were no specific identifiers for students who had learning disabilities (LD) or individual education plans (IEPs) that may have impacted the college planning behaviors in which they were able to participate. School counselors and career educators might consider this when utilizing the CPB survey.

The strong link between college-going self-efficacy and college planning behaviors is also crucial for school counselors, as they can recognize that building self-efficacy is very important for the college planning process. School counselors can format lesson plans, sessions, and workshops geared toward building college-going self-efficacy within their students. School counselors might implement the four sources of self-

efficacy, developed by Albert Bandura (1997) in their work with students. For example, they could implement vicarious experience by bringing back students who previously graduated from their high school to talk to students about their college-going successes. School counselors could also be more intentional about providing verbal persuasion by consistently reminding students of their own belief that every student can engage in planning behaviors and go on to enroll in college. Emotional cues can be addressed in small groups and individual sessions by helping students uncover the causes behind their stress and anxiety to help them become more confident in their ability to succeed. Finally, school counselors can continue to boost self-efficacy by reminding students about their successful past performances (e.g. passing difficult courses). These suggestions may help improve dynamics between school counselors and students and bolster students' self-efficacies to attend college. Knowing that college-going self-efficacy fully mediates the relation between barriers and choice actions highlights the importance of school counselors fostering college-going self-efficacy especially among those students who face the most barriers, such as PFGCSs and students from low-income backgrounds.

Lastly, when considering school counselors and career educators who practice within the Appalachian region of the United States, this study illuminates the college-planning process for students from these rural communities. There are few scales that center rural Appalachian high school students as the focus population and directly ask students about the specific steps they are taking to engage in the college planning process. School counselors and career educators may find the scale and the results of the validation study useful in developing, executing, and reinforcing systematic activities that support college and career readiness within their schools. The importance of college

planning is highlighted in this study, and the hope is that this scale can promote more college-going research and practice to help remove barriers and increase self-efficacy for high school students who hope to attend college.

LIST OF REFERENCES

Ali, S., & Menke, K. (2014). Rural Latino Youth Career Development: An Application of Social Cognitive Career Theory. *Career Development Quarterly*, *62*(2), 175–186. https://doi.org/10.1002/j.2161-0045.2014.00078.x

Appalachian Regional Commission. (2017). *The Appalachian region.* Retrieved from https://www.arc.gov/appalachian_region/TheAppalachianRegion.asp

Bandura, A. (1997) *Self-efficacy: The exercise of control*. H. Freeman, *New York, NY.*

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1999). Social cognitive theory of personality. *Handbook of personality*, *2*, 154-196.

Bennett, S. L. R. (2008). Contextual affordances of rural Appalachian individuals. *Journal of Career Development*, *34*(3), 241-262.

Borrego, M., Knight, D., Gibbs, K., & Crede, E. (2018). Pursuing Graduate Study: Factors Underlying Undergraduate Engineering Students' Decisions. *Journal of Engineering Education*, *107*(1), 140–163. https://doi.org/10.1002/jee.20185

Bureau of Labor Statistics (2019). *College enrollment and work activity of recent high school and college graduates*. Retrieved from https://www.bls.gov/news.release/pdf/hsgec.pdf

Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate behavioral research*, *1*(2), 245-276.

Chenoweth, E. & Galliher, R. (2004). Factors influencing college aspirations of rural West Virginia high school students. *Journal of Research in Rural Education, 19(2).*

Child, D. (2006). *The Essentials of Factor Analysis. 3rd edn.* New York: Continuum.

Colton, D., & Covert, R. W. (2007). *Designing and constructing instruments for social research and evaluation*. John Wiley & Sons.

Cliff, N. (1988). The eigenvalues-greater-than-one rule and the reliability of components. *Psychological Bulletin, 103*(2), 276–279. https://doi.org/10.1037/0033-2909.103.2.276

Engle, J. (2007). Postsecondary access and success for first-generation college students. *American Academic*, 3(1), 25-48.

Flores, L. Y., Navarro, R. L., & DeWitz, S. J. (2008). Mexican American high school students' postsecondary educational goals: Applying social cognitive career theory. *Journal of Career Assessment*, *16*(4), 489-501.

Fouad, N., & Smith, P. (1996). A test of a social cognitive model for middle school students: Math and science. *Journal of Counseling Psychology*, *43*(3), 338–346. https://doi.org/10.1037/0022-0167.43.3.338

Gagnon, D. J., & Mattingly, M. J. (2015). Limited access to AP courses for students in smaller and more isolated rural school districts.

Gibbons, M. M. (2005). College-going beliefs of prospective first-generation college students: Perceived barriers, social supports, self-efficacy, and outcome expectations (Doctoral dissertation). Retrieved from NC Docks https://libres.uncg.edu/ir/uncg/f/umi-uncg-1049.pdf

Gibbons, M. M., Borders, L. D., Wiles, M. E., Stephan, J. B., & Davis, P. E. (2006). Career and college planning needs of ninth graders–as reported by ninth graders. *Professional School Counseling*, *10*(2), 2156759X0601000207.

Gibbons, M. M., & Borders, L. D. (2010). Prospective first-generation college students: A social-cognitive perspective. *The Career Development Quarterly*, *58*(3), 194-208.

Gibbons, M. M., Taylor, A. L., Brown, E., Daniels, S. K., Hardin, E. E., & Manring, S. (2019). Assessing Postsecondary Barriers for Rural Appalachian High School Students. *Journal of Career Assessment*. https://doi.org/10.1177/1069072719845329

Glockner-Rist, A., & Hoijtink, H. (2003). The best of both worlds: Factor analysis of dichotomous data using item response theory and structural equation modeling. *Structural Equation Modeling*, *10*(4), 544-565.

Gonzalez, L. M. (2012). College-Level Choice of Latino High School Students: A Social-Cognitive Approach. *Journal of Multicultural Counseling and Development*, *40*(3), 144-155.

Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment*, *68*(3), 532-560.

Hand, C., & Payne, E. M. (2008). First-generation college students: A study of Appalachian student success. *Journal of Developmental Education*, *32*(1), 4.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.

Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational research methods*, *7*(2), 191-205.

Hoffman, L., Reindl, T., & Bearer-Friend, J. (2011). Complete to Compete: Improving postsecondary attainment among adults. *NGA Center for Best Practices*.

Horn, L., & Nunez, A. (2000). Mapping the road to college: First-generation students' math track, planning strategies, and context of support. *Education Statistics Quarterly*, *2*(1), 81-86.

Johnson, T. (2015). *Education planning guide for Minneapolis Indian education students and families.* Retrieved from https://indianed.mpls.k12.mn.us/uploads/education_checklist_for_native_students_and_families.pdf

Kantamneni, N., Mccain, M., Shada, N., Hellwege, M., & Tate, J. (2018). Contextual factors in the career development of prospective first-generation college students: An application of social cognitive career theory. *Journal of Career Assessment*, 26(1), 183-196.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45(1),* 79-122.

Lent, R. W., Hackett, G., & Brown, S. D. (1999). A social cognitive view of school-to-work transition. *The career development quarterly*, *47*(4), 297-311.

Lent, R., Brown, S., Schmidt, J., Brenner, B., Lyons, H., & Treistman, D. (2003). Relation of contextual supports and barriers to choice behavior in engineering majors: Test of alternative social cognitive models. *Journal of Counseling Psychology, 50*(4), 458-465.

McWhirter, E. H., Rasheed, S., & Crothers, M. (2000). The effects of high school career education on social-cognitive variables. *Journal of Counseling Psychology, 47,* 330-341. https://doi.org/10.1037/0022-0167.47.3.330

Meade, A., & Craig, S. (2012). Identifying careless responses in data. *Psychological Methods, 17 (3),* 437 - 455.

Millis, L. (2007a). *College-Prep-101: Sophomore year checklist.* Retrieved from www.collegeprep101.com

Millis, L. (2007b). *College-Prep-101: Junior year checklist*. Retrieved from www.collegeprep101.com

Millis, L. (2007c). *College-Prep-101: Senior year checklist*. Retrieved from www.collegeprep101.com

Osborne, J. W., & Costello, A. B. (2004). Sample size and subject to item ratio in principal components analysis. *Practical Assessment, Research, and Evaluation*, *9*(1), 11.

Perna, L. W. (2005). A gap in the literature: The influence of the design, operations, and marketing of student aid programs on college-going plans and behaviors: *Journal of Student Financial Aid, 35*(3), 7-15.

Perna, L. W. (2006) Studying college access and choice: A proposed conceptual model. In J. C. Smart (ed). *Higher Education: Handbook of Theory and Research* (Vol. XXI). Springer

Preacher, K., & Hayes, A. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891.

Radunzel, J. & Noble, J. (2015). *Informing educational planning and advising for students from at-risk demographic groups*. Iowa City, IA. Retrieved from http://www.act.org/research/policymakers/pdf/Informing-Ed-Planning-Report.pdf

Rasheed Ali, S., & Saunders, J. L. (2009). The career aspirations of rural Appalachian high school students. *Journal of Career Assessment*, *17*(2), 172–188. https://doi.org/10.1177/1069072708328897

Raque-Bogdan, T., & Lucas, M. (2016). Career aspirations and the first generation student: Unraveling the layers with Social Cognitive Career Theory. *Journal of College Student Development*, *57*(3), 248–262. https://doi.org/10.1353/csd.2016.0026

Rogers, M., & Creed, P. (2011). A longitudinal examination of adolescent career planning and exploration using a social cognitive career theory framework. *Journal of Adolescence*, *34*(1), 163–172. https://doi.org/10.1016/j.adolescence.2009.12.010

Rosecrance, P. H., Graham, D., Manring, S., Cook, K. D., Hardin, E. E., & Gibbons, M. M. (2019). Snapshot of rural Appalachian high school students' college-going and STEMM perceptions. *Career Development Quarterly*, 67(4), 327-342, DOI:10.1002/cdq.12202

Royster, P., Gross, J., & Hochbein, C. (2015). Timing is everything: Getting students back on track to college readiness in high school. *The High School Journal, 98*(3), 208-225.

Shaw, T.C., DeYoung, A.J., & Rademacher, E. (2004). Educational attainment in Appalachia: Growing with the nation, but challenges remain. *Journal of Appalachian Studies, 10(3),* 307-329.

Sundeen, T. H., & Sundeen, D. M. (2013). Instructional technology for rural schools: Access and acquisition. *Rural Special Education Quarterly*, *32*(2), 8–14. https://doi.org/10.1177/875687051303200203

Turner, S., Joeng, J., Sims, M., Dade, S., & Reid, M. (2019). SES, Gender, and STEM Career Interests, Goals, and Actions: A Test of SCCT. *Journal of Career Assessment*, *27*(1), 134–150. https://doi.org/10.1177/1069072717748665

Wettersten, K., Guilmino, A., Herrick, C., Hunter, P., Kim, G., Jagow, D., McCormick, J. (2005). Predicting educational and vocational attitudes among rural high school students. *Journal of Counseling Psychology, 52*(4), 658-663.

Wiggins, B. C. (2000). Detecting and dealing with outliers in univariate and multivariate contexts. Paper presented at the annual meeting of the mid-south educational research association, Bowling Green, KY.

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis and recommendations for best practices. *The Counseling Psychologist*, *34*(6), 806-838.

YouthTruth (2017). *Learning from student voice: College & career readiness*. Retrieved from https://youthtruthsurvey.org/college-career-readiness-2017/

APPENDIX

Tables

Table 1

Factor Loadings and Communalities Based on an Exploratory Factor Analysis with Promax Rotation for 45 items from the College Planning Behaviors Scale (CPB; N = 503)

Item No.	Item	Exploration	Concrete Activities	Supplemental Activities	Communality
6	I have researched the education or training required for my careers of interest	**.79**	-.08	-.02	.56
7	I have researched colleges that provide training for my career of interest	**.79**	-.07	.00	.58
25	I have researched what programs of study are available in college	**.78**	.04	-.07	.57
31	I have researched information about a career	**.75**	-.30	.20	.67
8	I have reviewed college admissions requirements	**.70**	.20	-.10	.57
42	I have compared the costs of different colleges	**.70**	.16	-.02	.59
35	I have identified the steps I need to get the career I want	**.68**	.04	.03	.51
33	I have figured out my career interests and abilities	**.66**	-.13	.09	.46
24	I have explored colleges on the computer	**.66**	.04	-.03	.44
19	I have identified steps to reach my educational goals	**.63**	-.05	.17	.52
9	I have researched how to apply for college	**.62**	.27	-.06	.55
15	I have found out how much it would cost to attend college	**.61**	.23	-.12	.46
30	I have started exploring careers	**.61**	-.23	.38	.41
20	I have talked with my family about what I want to do after high school	**.56**	-.18	.21	.44
27	I have learned the difference between grants and loans	**.49**	.05	.15	.23
34	I have taken/ am currently taking classes related to my career interests	**.48**	-.02	.15	.32
13	I have researched how to apply for financial aid	**.45**	.28	-.05	.36
11	I have talked with my family about how to pay for college	**.45**	.05	.15	.36
46	I have talked with friends about what they want to do after high school	**.39**	-.23	.38	.43
41	I have searched for scholarships	**.38**	.31	.06	.37
29	I have enrolled in a college prep curriculum program at my high school	**.36**	.30	-.12	.26
44	I have talked with a college representative or admissions counselor	**.35**	.27	.00	.27
3	I have a plan to pay for college	**.32**	.21	.09	.26
12	I have completed the FAFSA	-.22	**.82**	.06	.58
37	I have made a list of college application deadlines	.19	**.73**	-.13	.66
26	I have attended a financial aid workshop or scholarship night	-.08	**.73**	.10	.66
2	I have applied to college	.11	**.73**	-.02	.61
38	I have gathered applications for the colleges I am considering	.15	**.72**	-.17	.60
1	I have taken the ACT and/or SAT	-0.43	**.70**	.18	.39
5	I have sent my ACT and/ or SAT scores to colleges where I plan to apply	.15	**.68**	.08	.60
10	I have requested that my transcript be sent to the colleges where I have been applying	-.10	**.60**	-.02	.32

Table continues on next page

Table 1, cont'd.

Item No.	Item	Exploration	Concrete Activities	Supplemental Activities	Communality
39	Someone has reviewed my college application materials for errors	.26	**.64**	-.14	.57
17	I have taken the PSAT	-.10	**.60**	-.02	.32
18	I have taken math beyond Algebra II	.09	**.46**	-.04	.25
21	I have identified someone who can write a recommendation letter for me	.25	**.35**	.18	.35
36	I complete my homework regularly	.02	-.18	**.62**	.40
47	I have (or do now) volunteered or participate in community service	-.04	.10	**.61**	.36
45	I have participated/ currently participate in an extracurricular club or sport	.05	-.08	**.60**	.38
16	I study hard to do well in school	.22	-.18	**.56**	.48
49	I have run for a leadership position in a club or sport	-.15	.34	**.56**	.35
23	I have visited a college campus	.02	.07	**.54**	.33
22	I have completed a college tour	-.04	.22	**.52**	.31
48	I have talked with my parents or other adults about their jobs	.29	-.20	**.34**	.29
14	I have found someone who can answer my questions about college	.27	.08	**.29**	.28
40	I/ my family have started saving for college	.23	.20	**.28**	.29

Table 2

Correlations Among SCCT Variables

Variable	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*M*	*SD*
1. Barriers	-							2.04	0.55
2. CGSES	-0.47**	-						2.90	0.60
3. COE	-0.31**	0.61**	-					7.62	1.40
4. CPB	-0.24**	0.53**	0.33**	-				0.40	0.16
5. Factor 1	-.20**	.44**	.30**	.94**	-			0.51	0.23
6. Factor 2	-.02	.09	.01	.37**	.21**	-		0.06	0.10
7. Factor 3	-.30**	.53**	-.30**	.72**	.51**	.10*	-	0.58	0.23

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

Table 3

Means and Standard Deviations for Measures in Regard to Gender, Prospective First-Generation College Student (PFGCS) Status, and Grade Level

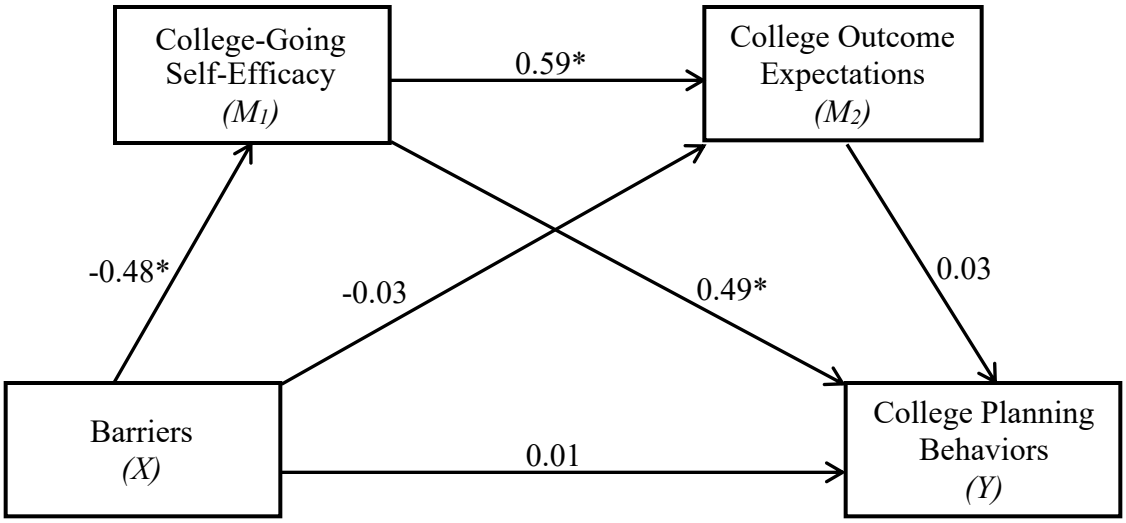
Measure	Gender	Grade Level	Non- PFGCS (N = 337)	PFGCS (N = 127)	Unsure (N = 39)	Total (*N* = 503)
CPB- Total Mean Score	Young Men	10th Grade	.40(.16)	.32(.15)	.32(.20)	.37(.16)
		11th Grade	.47(.18)	.32(.12)	.27(.22)	.42(.18)
	Young Women	10th Grade	.43(.15)	.42(.14)	.27(.22)	.42(.14)
		11th Grade	.57(.13)	.48(.12)	.36(.25)	.53(.15)
	Total	(N = 503)	.44(.16)	.38(.15)	.34(.16)	.51(.14)
CPB- Exploration	Young Men	10th Grade	.50(.22)	.41(.24)	.43(.28)	.47(.23)
		11th Grade	.62(.25)	.40(.18)	.28(.34)	.55(.26)
	Young Women	10th Grade	.55(.22)	.55(.20)	.48(.23)	.54(.21)
		11th Grade	.76(.17)	.66(.16)	.50(.33)	.71(.19)
	Total	(N = 503)	.56(.23)	.50(.23)	.44(.24)	.54(.24)
CPB- Concrete Activities	Young Men	10th Grade	.07(.13)	.05(.09)	.05(.06)	.06(.12)
		11th Grade	.10(.10)	.06(.07)	.08(.12)	.07(.08)
	Young Women	10th Grade	.05(.09)	.06(.09)	.05(.08)	.05(.09)
		11th Grade	.16(.13)	.12(.16)	.06(.08)	.14(.14)
	Total	(N = 503)	.07(.12)	.06(.10)	.05(.07)	.07(.11)
CPB- Supplemental Activities	Young Men	10th Grade	.59(.23)	.46(.21)	.45(.26)	.55(.24)
		11th Grade	.56(.23)	.43(.15)	.50(.14)	.53(.21)
	Young Women	10th Grade	.65(.21)	.58(.19)	.47(.22)	.62(.21)
		11th Grade	.63(.19)	.54(.17)	.48(.33)	.59(.20)
	Total	(N = 503)	.62(.22)	.52(.20)	.46(.24)	.58(.22)
Barriers	Young Men	10th Grade	1.92(.57)	2.07(.38)	2.29(.62)	2.00(.55)
	Young Women	10th Grade	2.02(.57)	2.11(.54)	2.23(.45)	2.06(.56)
	Total	(N = 404)	1.97(.57)	2.11(.49)	2.26(.53)	2.04(.55)
CGSES	Young Men	10th Grade	2.99(.55)	2.52(.62)	2.51(.65)	2.82(.61)
	Young Women	10th Grade	3.05(.57)	2.96(.47)	2.68(.70)	2.99(.56)
	Total	(N = 404)	3.02(.56)	2.74(.58)	2.61(.67)	2.91(.60)
COE	Young Men	10th Grade	7.72(1.27)	7.24(1.51)	7.33(1.46)	7.57(1.41)
	Young Women	10th Grade	7.82(1.30)	7.57(1.41)	7.36(1.25)	7.71(1.33)
	Total	(N = 404)	7.76(1.30)	7.40(1.45)	7.34(1.61)	7.63(1.38)

Note. CPB = College Planning Behaviors; CGSES = College-Going Self-Efficacy Scale; COE = College Outcome Expectations

Table 4

Frequency of Item Endorsement Based on Prospective First-Generation College Student (PFGCS) Status

Item	Cont. Gen	PFGCS	Unsure	Item	Cont. Gen	PFGCS	Unsure
1	13.8%	11.0%	11.9%	25	56.3%	48.8%	45.2%
2	2.1%	0.0%	0.0%	26	4.2%	3.1%	2.4%
3	45.8%	27.6%	26.2%	27	54.5%	44.9%	52.4%
5	3.0%	0.8%	2.4%	29	21.9%	20.5%	11.9%
6	71.3%	68.5%	57.1%	30	75.4%	71.7%	64.3%
7	62.6%	57.5%	47.6%	31	85.0%	79.5%	64.3%
8	39.8%	36.2%	23.8%	33	76.0%	66.1%	64.3%
9	37.1%	28.3%	23.8%	34	62.0%	52.8%	52.4%
10	3.9%	3.9%	4.8%	35	59.0%	58.3%	54.8%
11	57.8%	43.3%	40.5%	36	83.8%	86.6%	83.3%
12	1.5%	1.6%	2.4%	37	3.9%	3.1%	0.0%
13	14.7%	9.4%	11.9%	38	4.8%	6.3%	2.4%
14	59.6%	45.7%	50.0%	39	3.9%	1.6%	2.4%
15	50.6%	46.5%	40.5%	40	47.3%	23.6%	21.4%
16	86.2%	84.3%	78.6%	41	24.0%	17.3%	16.7%
17	5.1%	7.9%	2.4%	42	42.5%	35.4%	28.6%
18	12.6%	11.0%	7.1%	44	16.8%	11.8%	14.3%
19	65.3%	55.9%	57.1%	45	70.7%	56.7%	50.0%
20	88.9%	86.6%	73.8%	46	88.0%	85.8%	61.9%
21	30.2%	23.6%	26.2%	47	41.6%	26.0%	28.6%
22	36.2%	38.6%	26.2%	48	84.4%	76.4%	66.7%
23	69.8%	55.9%	50.0%	49	32.9%	20.5%	16.7%
24	56.6%	53.5%	47.6%				



**p < .001*

Figure 1

Standardized Regression Coefficients for the Relationship Between Perception of Barriers and College Planning Behaviors as Mediated by College-Going Self-Efficacy and College Outcome Expectations

VITA

Katie Cook was born in Bell Buckle, Tennessee to the parents of Chris and Kelly Cook. She has three siblings: Shelby, Shawn, and Dylan. She graduated from Cascade High School in 2014. Soon after graduation, she moved to Knoxville, Tennessee to attend the University of Tennessee to pursue a bachelor's degree in psychology, with minors in women, gender, and sexuality, as well as sociology. As an undergraduate, she worked for Possibilities in Postsecondary Education and Science, a five-year NIH grant project, and served as a research assistant for Dr. Erin Hardin and Dr. Melinda Gibbons. She is currently pursuing a PhD in Counseling Psychology at the University of Tennessee under the guidance of Dr. Erin Hardin.