Seton Hall University
eRepository @ Seton Hall

Seton Hall University Dissertations and Theses (ETDs)

Seton Hall University Dissertations and Theses

Spring 2011

Evaluating Focus-2's Effectiveness in Enhancing First-Year College Students' Social Cognitive Career Development

David M. Tirpak
Seton Hall University

Follow this and additional works at: https://scholarship.shu.edu/dissertations

Part of the Cognitive Psychology Commons, Counseling Psychology Commons, and the Educational Psychology Commons

EVALUATING FOCUS-2'S EFFECTIVENESS IN ENHANCING FIRST-YEAR

COLLEGE STUDENTS' SOCIAL COGNITIVE CAREER DEVELOPMENT

BY

DAVID M. TIRPAK

Dissertation Committee

Lewis Z. Schlosser, Ph.D., ABPP, Mentor
Pamela F. Foley, Ph.D., ABPP, Chair
Peggy Brady-Amoon, Ph.D.
Tracy Gottlieb, Ph.D.
Nancy A. Borkowski, Ed.D.

Submitted in Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy in Counseling Psychology
Seton Hall University
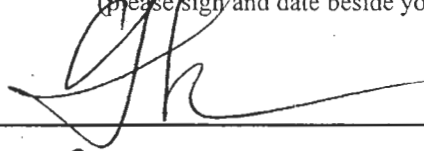
2011

APPROVAL FOR SUCCESSFUL DEFENSE

Doctoral Candidate, **David M. Tirpak,** has successfully defended and made the required

modifications to the text of the doctoral dissertation for the **Ph.D.** during this **Spring**

Semester 2011.

DISSERTATION COMMITTEE
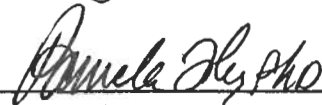(please sign and date beside your name)

Mentor:
Dr. Lewis Schlosser _____ 4/26/11
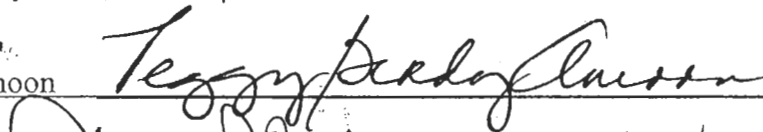
Committee Member:
Dr. Pamela F. Foley _____ 4/12/11
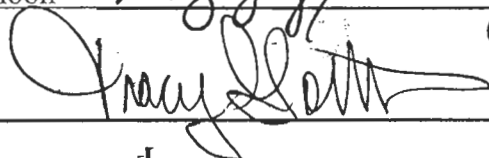
Committee Member:
Dr. Peggy Brady-Amoon _____ 4/12/11

Committee Member:
Dr. Tracy Gottlieb _____ 4/12/11

External Reader:
Dr. Nancy Borkowski _____ 4/12/11

The mentor and any other committee members who wish to review revisions will sign
and date this document only when revisions have been completed. Please return this
form to the Office of Graduate Studies, where it will be placed in the candidate's file and
submit a copy with your final dissertation to be bound as page number two.

Abstract

This study examined the effectiveness of the computer-assisted career guidance system, FOCUS-2, on first-year college students' social cognitive career development. Specifically, career decision self-efficacy (CDSE) and assessment of attributions for career decision-making (AACDM) was assessed using repeated measures ANOVAs with a sample of 420 first-year coll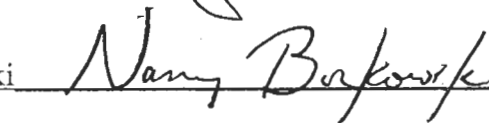ege students. Results demonstrated that FOCUS-2 increased participants' confidence in their ability to make career decisions and altered their assessment of attributions to a less optimistic style for career decision-making. Results also revealed that the amount of time spent using FOCUS-2 was not significantly related to CDSE and AACDM. Furthermore, no gender differences were found for CDSE; however, women had adopted a more optimistic attributional style for career decision-making than men after using FOCUS-2. African American participants also reported significantly greater CDSE and more optimistic AACDM in comparison to Asian American participants after using FOCUS-2. Lastly, participants with declared majors had significantly greater CDSE than those participants who were undecided about their academic major, and those who indicated that they had a declared major, but were uncertain in their choice of major. There were no significant differences found for academic major and AACDM in this study. Implications for counseling and career professionals are discussed.

DEDICATION

To my life partner, Sanam Soheilian, my family, my mentor, Lew Schlosser, my

dissertation committee, and the staff at the Career Center at Seton Hall University.

Thank you all for your support.

TABLE OF CONTENTS

LIST OF TABLES

vi

Chapter I

INTRODUCTION

The examination of the career development process has long stimulated the minds of vocational researchers. Because college is a key time for career decision-making, traditional aged college students have been a focus for career development researchers (e.g., Albaugh & Nauta, 2005; Betz & Borgen, 2009; Brown & Lavish, 2006; Duffy & Klingaman, 2009; Nauta & Kahn, 2007; Scott & Ciani, 2008). Throughout history, one's race and gender (e.g., African American, Latino/a, women) have served as obstacles to the attainment of a college education (Gelber, 2007). Fortunately, such oppressing scenarios are gradually changing at the institutional level, such that the demographics of individuals entering college are becoming more diverse (Hurtado, Griffin, Arellano, & Cuellar, 2008). In a similar vein, the resources available to assist college students with their career development and career decision-making are constantly evolving, particularly because of new theoretical discoveries in conjunction with advances in technology. Hence, it is important to renew the examination of this population in light of such transformations and developments. In this chapter, I further examined this issue, proposed research questions and hypotheses, provided a rationale for the significance of this investigation, and defined important terms.

Statement of the Problem

There is compelling evidence that supports the value of career-related interventions among college students (Whiston & Rahardja, 2008), yet a frequent challenge among academic institutions and career counseling centers is connecting students to available resources that assist with career decision-making (Ludwikowski,

Vogel, & Armstrong, 2009). For many college students, making a career decision and selecting an academic major is not a straightforward, unwavering process. In fact, Gordon and Steele (2003) estimate that between 20% and 50% of college students enter their first-year undecided about their academic major and ultimately their future career. Further, Gordon and Steele indicate that between 50% and 70% of all undergraduates will ultimately change their academic major and future career plans at least once during college.

In addition to the large percentage of college students reporting uncertainty in relation to their academic major and projected profession, students do not appear to take full advantage of services aimed to facilitate vocational development. For example, one study found that approximately half of 694 surveyed college students were aware of individual career counseling services at their respective career center and only 6% reported to utilize said individual career counseling services (Fouad, et al., 2006). Fouad and colleague's undergraduate college sample consisted of 38% men, 62% women, 25% first-year students, 22% second-year students, 23% third-year students, and 26% fourth-year students from a large midwestern university. The majority of participants (77%) identified as White/Caucasian, while 12% identified as Asian/Pacific Islander, 3% as African American, and less than 3% identified as Native American, Hispanic/Latino, multiracial, or they declined to provide their race/ethnicity. Despite the low percentage of students within this sample that reported to utilize individual career counseling services, participants did report to make use of other career services at a relatively greater occurrence, such that 13.1% of participants attended career fairs, 15.2% searched through job postings, and 11.8% explored their school's respective career center website.

Additional resources and interventions to aid in career development are necessary to meet the vocational needs of college students, particularly if utilization of career services is overlooked or insufficiently utilized. Traditionally, career services at colleges and universities encompass individual and group career counseling, career workshops, and the administration and interpretation of various career-related assessments. Because traditional aged college students are increasingly oriented towards using the Internet as a tool for research, recreation, and decision-making (Robinson, Meyer, Prince, McLean, & Low, 2000), it is prudent among academic institutions and university career centers to offer services congruent with the lifestyle and practices of their students. Generating career center resources that are accessible through the use of computers and the Internet may be one avenue to bridge the gap between college students and career development resources.

Computer-assisted career guidance (CACG) systems. Computer-assisted career guidance (CACG) systems have emerged to aid career counselors and university career centers with providing hi-tech career guidance to interested clients. From an economical and efficiency standpoint, a meta-analysis of career intervention research revealed that CACG systems are the most cost-effective of all career interventions and second only to individual counseling in relation to effectiveness per unit of time (Whiston, Sexton, & Lasoff, 1998). Aside from CACG systems' attractiveness for university administrators and career counselors, CACG systems promote several advantages to its consumers. For example, CACG system users can autonomously engage in career-related tasks designed for self-discovery and career exploration at their own desired time, location, and pace. Other advantages of CACG systems include a

centralized location for career information (Davidson, 2001) and an interactive and visually pleasing career planning experience (Robinson et al., 2000).

However, CACG systems are not a brand new occurrence. In fact, the first CACG systems were used during the 1960's (Harris-Bowlsbey & Sampson, 2001; Watts, 1993) and popular systems like SIGI (Katz, 1973) and DISCOVER (Rayman & Harris-Bowlsby, 1977) emerged commerically over 30 years ago. Since CACG systems' induction, there has been an increase in the utilization of CACG systems for both high school and college students (Pyle, 1984; Sampson, Shahnasarian & Reardon, 1987). Nearly 25 years ago, Johnston, Buescher, and Heppner (1988) described that CACG systems were thriving, and the majority of college career centers offered at least one CACG system for its students. The majority of research on CACG systems has focused primarily on DISCOVER (Rayman & Harris-Bowlsby, 1977) and SIGI (Katz, 1973); only recently have researchers begun to consider other CACG systems commonly used among college career centers (e.g., Betz & Borgen, 2009).

Previous limitations identified within the existing CACG system literature include a (a) focus on user satisfaction rather than career-related gains, (b) failure to examine potential differential effects of CACG systems associated with gender, ethnicity, and socioeconomic status (SES), and (c) reliance on small, convenient samples (Fowkes & McWhirter, 2007). More specifically, two of the major comparative outcome studies (Kapes, Borman, & Frazier, 1989; Peterson, Ryan-Jones, Sampson, Reardon, & Shahnasarian, 1994) assessed user satisfaction instead of career-related variables as the major outcome variable. In regard to gender, Taber and Luzzo (1999) asserted that only 16 of 26 studies involving DISCOVER's effectiveness reported participant gender, less

than 40% reported information on ethnicity, and none of the 26 studies explored differential effects across ethnic or socioeconomic groups. These findings are alarming given the well-established research indicating that gender, ethnicity, and SES play significant roles in shaping one's career development and attainment (e.g., Blustein, 2006; Garcia & Plansker, 1990; Gati, Osipow, & Givon, 1995; Hinkelman & Luzzo, 1997; Krieshok, 1998; Trusty, Ng, & Plata, 2000).

Another glaring omission from the existing CACG system literature is an examination of how the amount of time spent using a system affects the user (Cairo, 1983). Further, in Taber and Luzzo's (1999) review of one CACG system (i.e., DISCOVER), it was noted that researchers are not consistent in reporting which modules within the CACG system were used by participants, as well as the duration for which they were used. Careful reporting of the components used and the amount of time spent would provide precise information concerning the best practices of CACG systems. Taber and Luzzo also noted that researchers should also account for exposure to additional career services, such as talking with a career counselor prior to, concurrent with, or subsequent to using a CACG system. Without considering this information, it is difficult to directly attribute changes in vocational outcomes to a CACG system as an intervention.

In general, published studies involving CACG systems rarely report the average time participants spent on the CACG system, moreover, it is more seldom that researchers report the effect or relationship that time spent with a CACG system has on various vocational outcomes. A study performed by Myers, Lindeman, Thompson, and Patrick (1975) indicated that with a sample of 792 10th grade students who utilized a

CACG system, Education and Career Exploration System (ECES; Myers, Lindeman, Thompson, & Patrick, 1975), the more time students used ECES, the more they reported to benefit in terms of their vocational maturity (i.e., planning orientation and resources for occupational exploration). On the other hand, Garis and Niles (1990) noted that the amount of time spent using distinct CACG systems (i.e., SIGI Plus and DISCOVER) was not related to career decidedness, vocational identity, information needs, perceived barriers, or satisfaction with the system. As a result, it is unclear the relationship that time spent on a CACG system has on important vocational outcomes. Additional and more current research is warranted to assess the relationship of important career development variables with the time spent with a CACG system.

CACG systems are frequently revised programs constantly evolving, such that research publications are often obsolete (Gati, 1994). Theoretical and technological advances, changing consumer needs, and market competition all appear to guide CACG system updates (Sampson, Reardon, Humphreys, Peterson, Evans, & Domkowski, 1990). In spite of these frequent system updates, Tinsley (2000) described that there may be little intrinsic incentive for CACG system developers to generate evaluative data for CACG systems because evaluative data is not necessary for generating product sales. Because systems are frequently updated without always employing efficacy efforts, there is a strong need for CACG systems to be investigated to ensure quality assurance to their consumers (e.g., CACG system users, career center administrators).

One recently developed CACG system is FOCUS-2 (Career Dimensions, Inc., 2009; 2010). FOCUS-2 is an updated version of FOCUS (Career Dimensions, Inc., 2007), which was a modified version of the original CACG system, the Education and

Career Exploration System (ECES; Myers, Lindeman, Thompson, & Patrick, 1975). The ECES was initially developed by the IBM Corporation and designed with consultation from Donald Super, Roger Myers, David Tiedeman, David Campbell, and Frank Minor (Career Dimensions, Inc., 2010). According to promotional material presented on FOCUS-2's website (Career Dimensions, Inc., 2009), FOCUS-2 is an easy to use, affordable, comprehensive program, which ranks as one of the top three most frequently used computer-assisted career guidance systems. Despite FOCUS-2's advertised accolades, only one known study has investigated its effectiveness (Betz & Borgen, 2009). However, this particular study utilized the original version of FOCUS, and thus research on the revised, FOCUS-2, remains vacant among the published vocational psychology literature.

CACG systems, like FOCUS-2, hold promise to offer individuals an individualized experience, by which users have the opportunity to be in personal command of career-related tasks linked to their career development. Maples and Luzzo (2005) in their evaluation of DISCOVER, posit that comparable CACG systems may grant a rewarding experience, providing a sense of personal achievement and empowerment concerning future career-related activities supporting career decision-making. On the other hand, interaction with a CACG system might also give rise to vocational confusion or a sense of feeling overwhelmed by the vast array of career information presented within the system. Typically, individuals offer explanations related to events in their lives based on a set of general personal beliefs and an assessment of particular circumstances (Bell-Dolan & Anderson, 1999). For that reason,

it is likely that first-year students' utilizing FOCUS-2 may begin to consider their personal attributions toward career decision-making.

Assessment of attributions for career decision-making (AACDM). The process of making a career decision is likely to be a new occurrence for many college students. According to Weiner's (1979, 1985, 1986) attribution theory, individuals are likely to offer explanations about various outcomes and events in their lives that are perceived as significant or novel. Understanding and assessing causality seems to be pivotal to the overall human experience (Weiner, 1986), such that psychologists and philosophers (e.g., Hempel, 1966) have long espoused an interest in people's desire to understand the world and the events around them. These causal attributions (i.e., explanations) are hypothesized to directly influence the subsequent cognitions and emotions of an individual (Perry, Hechter, Menec, & Weinberg, 1993). Perry and colleagues also note that the defined properties of an attribution are considered to have an influence on individuals' motivation and behavior related to future events.

Attributional styles are typically classified as either optimistic or pessimistic (Weiner, 1986). According to Maples and Luzzo's (2005) application of attribution theory to career decision-making, someone who believes that career decision-making is susceptible to internal, dynamic, and controllable forces is likely to believe that career-related events and decisions are the outcome of internal factors within his or her control that can be changed with varying degrees of effort (i.e., optimistic attributional style). On the other hand, a person who believes that the career decision-making process is the result of external, fixed, and uncontrollable forces will tend to believe that career

decisions are out of his or her control and cannot be altered by increased efforts (i.e., pessimistic attributional style) (Maples & Luzzo, 2005).

Specifically, in relation to career development, an optimistic attributional style has been found to be positively related to work satisfaction, job performance, job tenure, motivation, career exploratory behavior, career decisiveness, and career commitment (Colarelli & Bishop, 1990; Fuqua, Blum, & Hartman, 1988; Spector, 1982, 1988; Trice, Haire, & Elliot, 1989). Research (e.g., Perry et al., 1993) has also shown that techniques aimed at generating an optimistic attributional style (i.e., attributional retraining) is an effective practice for college students in recognizing that certain events are within one's control and can be altered through increased effort. Therefore, implementing a positive outlook on causality regarding one's career development appears to be an important aspect of career success for college students.

The majority of attributional retraining studies within the career development domain have relied mostly on testimonials. For example, college students have viewed videotapes that depict male and female college students or graduates verbally persuading viewers to essentially change their career decision-making attributional orientation from a more negative to a more positive orientation (Luzzo, Funk, & Strang, 1996; Luzzo & Taylor, 1994). Only one known study has considered a CACG system, DISCOVER, as a technique for attributional retraining (Maples & Luzzo, 2005). In their study, Maples and Luzzo found that the CACG system was effective in enhancing one component of an attributional style (i.e., sense of control regarding the career decision-making process) in comparison to individuals who did not utilize the CACG system. To date, no known

research has evaluated the effectiveness of other CACG systems as an intervention for modifying one's attributional style.

In terms of important multicultural variables and assessment of attributions for career decision-making there appears to be a dearth of cited data. In relation to gender, Luzzo and Jenkins-Smith (1998) in their initial development of the AACDM, reported that no gender or racial/ethnic differences were found on their construction of the AACDM measure. Research on locus of control, however, which is related to the controllability component of AACDM, has indicated that women tend to report a more internal locus of control than men (Lease, 2004). Regarding locus of control, White individuals have also been shown to demonstrate a more internal locus of control than individuals of color (Lease, 2004). Research warrants increased attention to the influence of these important variables (i.e., gender and race/ethnicity) in regard to assessment of attributions for career decision-making. Further, no known studies have assessed the impact of one's academic major on their attributional style toward making career decisions.

The assignment of an optimistic attributional style for career decision-making as one that is inclined to internal, dynamic, and controllable forces appears to be a largely Western cultural concept. In fact, Weisz, Rothbaum, and Blackburn (1984) indicated that personal control is regularly emphasized in Western cultures, often with the purpose to convey, enhance, or sustain individualism and personal autonomy. Considering differences between individualistic and collectivistic cultures, Moghaddam, Taylor, and Wright (1993) described that individualistic cultures put great emphasis on the individual and collectivistic cultures place increased importance on situational factors and

contextual qualifiers when making attributions. Waterman (1981) asserted that individualistic values typically involve personal qualities such as identity, self-actualization, internal locus of control, and autonomy. On the other hand, a collectivistic culture tends to place emphasis on the goals of the group and defines the self in relation to others (Triandis, 1995). Therefore, an external locus of control may actually be more favored in non-Western cultures and may not necessarily be related to a "pessimistic" style of decision-making for all cultures, despite the operational label derived from Weiner's (1986) theory. Sue and Sue (1990) also posit that racial minority members might possess a worldview representing an external locus of control based on experiences of oppression or discrimination.

Closely related to attributional style for career decision-making is another social cognitive component of career decision-making, that being assessing how confident an individual is that he or she can perform various career-related tasks (i.e., career decision self-efficacy). Taylor and Popma (1990) found a moderate negative relationship between locus of control and career decision self-efficacy, such that, the more external a person's locus of control, the less confident he or she will be in terms of performing career decision-making tasks. A person's level of self-efficacy (i.e., confidence) about making career decisions is an important precursor to the likelihood of engaging in favorable career-related behaviors. By understanding a person's assurance in relation to various tasks, career counselors can more effectively understand whether individuals are likely to approach or avoid certain career-related behaviors (Maples & Luzzo, 2005), which in turn impact the likelihood of engaging in new experiences and learning opportunities to develop career interests (Betz & Borgen, 2000). Interventions designed to increase

confidence in the area of making a career decision are useful because they may increase an individual's likelihood of adopting a positive disposition toward choosing a career or college major (Maples & Luzzo, 2005).

Career decision self-efficacy (CDSE). Research on self-efficacy is quite common; in fact, Gore (2006) noted that 11% of all articles published between 2001 and 2006 in *Journal of Career Assessment, Journal of Counseling Psychology,* and the *Journal of Vocational Behavior* included a reference to self-efficacy in their titles and abstracts. Although different forms of self-efficacy exist, career decision self-efficacy (CDSE) appears to be the most commonly investigated construct among vocational psychology (Chung, 2002). Specifically, career decision self-efficacy assesses an individual's confidence in relation to the successful competition of tasks necessary to making career decisions (Betz & Taylor, 2005).

Hackett and Betz (1981) initially introduced the applicability of the self-efficacy theory to the understanding of the career development process, in particular, women's career development process in their theoretical publication 30 years ago. In their empirical study, Betz and Hackett (1981) revealed gender differences in self-efficacy for traditional and nontraditional career options among 134 female and 101 male undergraduate students. The findings suggested that educational requirements and job responsibilities of the traditionally female occupations yielded significantly greater self-efficacy among women, and educational requirements and job responsibilities of the traditionally male dominated occupations produced greater self-efficacy among men. This finding suggested that how "traditional" a career may be perceived could be an important factor affecting self-efficacy expectations. However, a significant limitation of

this study was that self-efficacy was investigated with regard to only 20 occupational titles and failed to assess specific career-related tasks or behaviors.

Subsequent studies have been unsuccessful in demonstrating a consistent relationship between gender and career decision self-efficacy, yielding mixed results. Many studies have found either minimal differences or no differences in CDSE between gender, both in the college population and in younger samples (e.g., Chung, 2002; Creed, Patton, & Prideaux, 2006; Luzzo & Ward, 1995; Taylor & Betz, 1983; Taylor & Popma, 1990). Specifically, Taylor and Betz (1983) reported gender similarities, rather than differences, for the CDSE total score and for all subscales on a measure of career decision self-efficacy, except Planning and Goal Selection (where women scored higher) in a small college sample.

Additional research suggests that gender differences seem to vary across domains, with women scoring higher on traditionally female domains (e.g., helping), but lower in traditionally male-dominated domains (e.g., mechanical) (Betz & Rottinghaus, 2006). Tirpak and Schlosser (2009) noted that first-year female college students reported greater career decision self-efficacy than male first-year college students in a private, northeastern university. Further, Betz and Borgen (2009) indicated that women demonstrated significantly greater gains than men in career decision self-efficacy after completion of the CACG system, CAPA. In general, studies assessing CDSE and gender have produced inconsistent findings both in relation to the total score of career decision self-efficacy and within specific subscales.

Increasingly career-related studies are attending to multicultural issues, such as ethnicity. According to Duffy and Klingaman (2009), among a sample of 2,432 first-year

college students, for individuals of color, correlational analyses revealed significant correlations between higher levels of ethnic identity achievement and career decidedness, choice comfort, indecisiveness, and choice importance. Within this sample, 48% of participants were men, 52% were women and the ethnic composition consisted of 64% White, 12% Black, 13% Asian American, and 6% Latino/a participants. Within this study, the racial group was found to moderate the relation between ethnic identity achievement and career decidedness. Specifically, for Black and Asian American students, those with higher levels of ethnic identity achievement were found to have significantly greater levels of career decidedness, whereas ethnic identity achievement had no significant relation with the decidedness of White and Latina/o students. Duffy and Klingaman contend that because White students are typically part of the majority culture, their ethnicity is often minimized and less personal exploration takes place (McDermott & Samson, 2005; Quintana, 2007).

A study by Rollins and Valdez (2006) provided additional support that ethnic identity is an important factor in the development of career self-efficacy beliefs. In their study of 85 male and female African American 11th- and 12th-grade high school students, the authors found that ethnic identity achievement was related to greater career decision-making self-efficacy. This finding is not surprising given the literature on ethnic identity and its importance in the development of self-esteem and psychological adjustment in ethnic minority adolescents and young adults (Chapell & Overton, 2002; Phinney & Alipuria, 1990; Smith & Brookins, 1997).

It is important to note that for some cultures, one's confidence in his or her ability to make a career decision may not be of sole importance in relation to one's career

decision-making and may include other contextual factors. Asian Americans, for example, have been described as placing high values on collectivism, interdependence, family accord, and high admiration to individuals of authority and of a greater age (Moy, 1992). More specifically, one study noted that Asian American students were found to report parental pressure as one of the main factors influencing their career choice (Singaravelu, White, & Bringaze, 2005). Further, Asian Americans have also been found to demonstrate higher levels of dependent decision-making styles as well as lower levels of vocational identity and career maturity than their White American counterparts (Leong, 1991). Therefore, while the United States culture conceptualizes career choice as a form of self-actualization, individualism, and personal confidence, other cultures may perceive this decision in a different fashion; as mutually beneficial for both themselves and their families (Tang, Fouad, & Smith, 1999).

Taylor and Popma (1990) reported that undecided students reported lower career decision self-efficacy than students with a declared major or students tentative in their major choice. The role of selection of an academic major, however, requires more research. Based on an appraisal of the relevant vocational literature involving computer-assisted career guidance systems, assessment of attributions for career decision-making, and career decision self-efficacy, further research in these interconnected areas is warranted. Specifically, virtually no published research has investigated the role of academic major on assessment of attributions for career decision-making. For the purposes of this study, several research questions and corresponding hypotheses are outlined herein.

Research Questions

Research Question 1. For first-year college students, will there be a significant difference between pre- and post-test scores for career decision self-efficacy and assessment of attributions for career decision-making, after completion of the computer-assisted career guidance system intervention, FOCUS-2?

Research Question 2. What is the relationship between the self-reported amount of time spent using FOCUS-2 and level of career decision self-efficacy for first-year college students?

Research Question 3. What is the relationship between the self-reported amount of time spent using FOCUS-2 and assessment of attributions for career decision-making for first-year college students?

Research Question 4. What is the effect of gender on how much first-year college students benefit from using FOCUS-2 in terms of career decision self-efficacy and assessment of attributions for career decision-making?

Research Question 5. What is the effect of race/ethnicity on how much first-year college students benefit from using FOCUS-2 in terms of career decision self-efficacy and assessment of attributions for career decision-making?

Research Question 6. What is the effect of academic major on how much first-year college students benefit from using FOCUS-2 in terms of career decision self-efficacy and assessment of attributions for career decision-making?

Research Hypotheses

Research Hypothesis 1. Based on the results of Maples and Luzzo's (2005) study, whereby the CACG system, DISCOVER was found to enhance career decision

self-efficacy and the controllability component of attributional style for career decision-making, I hypothesized that participants in this study would report a significant increase in scores for career decision self-efficacy and adopt a more optimistic attributional style for career decision-making after using the CACG system, FOCUS-2.

Research Hypothesis 2. No known study investigated the relationship between the self-reported amount of time spent with a CACG system and career decision self-efficacy. However, a study involving a similar vocational construct (i.e., vocational maturity) and an earlier version of FOCUS-2 (i.e., ECES) reported that the more time individuals used ECES, the more gains they reported in terms of their vocational maturity (Myers et al., 1975). Career decision self-efficacy is based on Crites' (1978) model of career maturity, namely self-appraisal, gathering occupational information, goal selection, planning, and problem solving. Further, Patton and Creed (2001) described a positive relationship between career decision self-efficacy and vocational maturity. Thus, based on the findings of these previously mentioned studies, I hypothesized that there would be a positive relationship between the self-reported amount of time spent using FOCUS-2 and increased career decision self-efficacy for first-year college students.

Research Hypothesis 3. No known study reported findings on the self-reported amount of time spent with a CACG system and assessment of attributions for career decision-making. Thus, this research hypothesis was exploratory in nature. However, based on the components of attributions based on the work of Weiner (1986) (i.e., causality, stability, controllability), I hypothesized that if individuals were exposed to the CACG system, they would likely to adopt an increased sense of controllability in relation to their career decision-making, thus affecting their assessment of attributions for career

decision-making. Therefore, I expected that there would be a positive relationship between the self-reported amount of time spent using FOCUS-2 and an optimistic attributional style for career decision-making among first-year college students.

Research Hypothesis 4. Based on the work of Tirpak and Schlosser (2009), female first-year college students were found to possess greater career decision self-efficacy than male first-year college students. Further, Betz and Borgen (2009) indicated for a comparison study of two CACG systems (CAPA and FOCUS), the CACG system CAPA was found to be more effective for women than men in regard to increases in career decision self-efficacy. For men, there was no interaction as both CACG systems (CAPA and FOCUS) were found to be comparably effective for male students in terms of career decision self-efficacy. In regard to assessment of attributions for career decision-making, despite findings by Luzzo and Jenkins-Smith (1998) that no AACDM gender differences were found on the AACDM, research on one similar component within this construct (i.e., locus of control) has indicated that women tend to report a more internal locus of control than men (Lease, 2004). Therefore based on these findings, I hypothesized FOCUS-2 would be more effective for women in terms of increasing their career decision self-efficacy and adopting a more optimistic style for career decision-making in comparison to men.

Research Hypothesis 5. Based on Borgen and Betz's (2009) study involving two distinct CACG systems, CAPA and FOCUS, all three racial/ethnic groups assessed in the study (i.e., White, African American, and Asian American) were shown to demonstrate significant increases in CDSE after completion of a CACG system. Regarding locus of control, White individuals typically demonstrate a more internal locus of control than

individuals of color (Lease, 2004). Luzzo and Jenkins-Smith (1998) also indicated that AACDM scores did not discriminate by racial/ethnic groups. Within this study, I hypothesized that FOCUS-2 would be more beneficial for White students in regard to greater career decision self-efficacy and adoption of a more optimistic attributional style for career decision-making in contrast to individuals of color.

Research Hypothesis 6. Taylor and Popma (1990) reported that undecided students reported lower career decision self-efficacy than individuals with a declared major or tentative major choice. No known research was found to assess academic major and assessment of attributions for career decision-making. For the purpose of this study each participant's academic major was self-reported. It was hypothesized that students with a declared major would benefit more from FOCUS-2 as evidenced by greater career decision self-efficacy and a more optimistic attributional style for career decision-making than first-year college students who were undecided, tracking a major (i.e., students with an intention to declare a certain academic major, but have not yet been admitted to the specific program), and those participants that declared their major, but were uncertain within their choice of academic major.

Definition of Terms

Self-efficacy. Self-efficacy is defined by Bandura (1977, 1986) as people's judgments of their abilities to initiate, organize, and execute courses of action required to achieve a particular performance. In addition, Bandura stated that self-efficacy expectations are an individual's estimation of his or her confidence in the ability to accomplish behaviorally specific tasks.

Career decision self-efficacy. Betz and Hackett (1986) used the term career self-efficacy to employ the notion that self-efficacy expectations related to various aspects of

career behavior (i.e., decision-making) may influence career development and choice of actions. Specifically, career decision self-efficacy refers to a person's confidence in her or his ability to engage in and successfully complete career decision-making tasks (Taylor & Betz, 1983). For the purposes of this study, career decision self-efficacy (CDSE) was measured by use of the Career Decision Self-Efficacy Scale – Short Form (CDSE-SF; Betz, Klein, & Taylor, 1996).

Attributional style for career decision-making. Attributional style for career decision-making involves the explanations individuals draw on for the causality, controllability, and stability of career-related outcomes. Attributing career decisions to uncontrollable, external, and stable factors generate a pessimistic attributional style for career decision-making, whereby attributing career decisions to controllable, internal, and unstable factors (e.g., dynamic, changing over time) create an optimistic attributional style for career decision-making (Luzzo & Jenkins-Smith, 1998). For the purposes of this study, attributional style for career decision-making was measured by use of the Assessment of Attributions for Career Decision-Making (AACDM; Luzzo & Jenkins-Smith, 1998).

Attributional retraining. Attributional retraining is a cognitive treatment based on Weiner's (1979, 1985, 1986) attribution theory, such that individuals learn and adopt a set of durable skills to reformulate their less effective attributional style and utilize more adaptive causal attributions (Szabo, 2006).

Computer-assisted career guidance (CACG) systems. Computer-assisted career guidance (CACG) systems are defined as interactive guidance programs available on computers that can be operated independently by career clients to retrieve information

useful for self-assessment and exploration regarding one's career development (Brown, 2003). For the purposes of this study, FOCUS-2 (Career Dimensions, Inc., 2009) was the computer-assisted career guidance system of interest and was utilized as an intervention to ultimately assess effectiveness in enhancing social cognitive career development for first-year college students.

Significance of Study

Social cognitive components of career decision-making, such as career decision self-efficacy and career decision-making attributional style have received sizable attention supporting the relevance of these concepts to career counseling (Betz & Luzzo, 1996; Lent & Hackett, 1987; Maples & Luzzo, 2005). However, only a few studies have evaluated the effectiveness of career interventions for helping clients become more self-efficacious regarding their career decision-making or more optimistic in their attributional explanations for career-related events (e.g., Foltz & Luzzo, 1998; Fukuyama, Probert, Neimeyer, Nevill, & Metzler, 1988; Luzzo & Day, 1999; Luzzo, Funk, & Strang, 1996; Luzzo & Taylor, 1994). One understudied intervention has been the effectiveness of CACG systems, which are often utilized as a form of career guidance. Prior research has indicated that CACG system interventions may have benefits beyond increasing confidence in researching and choosing a career (Fukuyama et al., 1988). It is important to investigate newly revised CACG systems, considering the large number of colleges and universities that implement them, consequently having an effect on the future career development of a large number of college students.

Traditional aged college students appear to use technology in higher proportions than older age groups, and make use of the Internet as a recreational and resourceful site

(Robinson et al., 2000). More and more, career centers on university and college campuses are adapting to use these technologically advanced guidance systems to assist their students with myriad career-related needs. From an administrator's standpoint, CACG systems also have the potential to drastically modify career centers' staffing needs, rate of student appointments, and perhaps most importantly, positive vocational outcomes for the students who make use of CACG systems.

The extent to which CACG systems can attract and maintain the interest of their users is important. However, if CACG systems are to be a static component among career and personal counseling services, evaluations of their impact must go beyond assessing variables such as user satisfaction. A much more important question is how CACG systems affect specific aspects of individuals' career development. Specifically, a popular theoretical approach to career decision-making involves the social cognitive aspect of individuals (Lent, Brown, & Hackett, 1994). Only one known study performed by Maples and Luzzo (2005) has considered a CACG system (i.e., DISCOVER) the social cognitive career variables, career decision self-efficacy and assessment of attributions for career decision-making. After performing their study, Maples and Luzzo highlighted the need to evaluate the efficacy of other CACG systems.

Additional research is needed to assess the effectiveness of CACG systems in relevant areas to college students' career development. Relative efficacy data would be of practical utility for college administrators and career centers at colleges and universities. If low-cost computer-administered interventions were found to be effective, then the cost-benefit analysis of computer-assisted career guidance systems could be substantial. As such, a newly modified CACG system, FOCUS-2, could be considered

effective if it assists students in becoming more self-efficacious in their career decision-making and more optimistic in their attributional explanations for career-related events. Because first-year college students are expected to ascertain a decision regarding their future career, such students would benefit from resources to assist with this focal decision.

Purpose of Study

The specific purpose of this study involved the influence of a recently revised CACG system (i.e., FOCUS-2) on the career decision self-efficacy and assessment of attributions for career decision-making of first-year college students. Specifically, career decision self-efficacy and attributional style for career decision-making was assessed before and after completion of FOCUS-2. The goal of this study was to assess the effectiveness of FOCUS-2 on said social cognitive career variables. This study was also designed to assess the amount of time that participants reported to use FOCUS-2 in relation to CDSE and AACDM, as well as potential differences in gender, race/ethnicity, and the status of selection of an academic major on CDSE and AACDM. Lastly, this study also collected descriptive data regarding other career-related tasks and interventions that took place in conjunction with the completion of FOCUS-2 to provide additional information about the sample.

<center>**Chapter II**</center>

<center>**REVIEW OF LITERATURE**</center>

Introduction

In this chapter, I outline the foundation for this research and review the empirical literature germane to this study. I organized the review of the literature in the following sections: (a) theoretical rationale – social cognitive career theory; (b) assessment of attributions for career decision-making; (c) self-efficacy; (d) career decision self-efficacy; (e) interventions to increase career decision self-efficacy; and (f) computer-assisted career guidance systems.

Theoretical Rationale – Social Cognitive Career Theory (SCCT)

Lent and colleagues (1994) are widely recognized for the development of social cognitive career theory (SCCT). The derivation of SCCT has emerged through a combination of various perspectives of career investigation that have evolved from Bandura's (1982, 1986, 1989) social-cognitive theory. Conceptually, the work of Hackett and Betz (1981) has been most clearly associated with SCCT (Lent et al., 1994), which applied the construct of self-efficacy to the career development of women. In addition, Lent and colleagues have linked SCCT to Krumboltz's social learning theory of career decision-making (Krumboltz, 1979; Krumboltz, Mitchell, & Jones, 1976; Mitchell & Krumboltz, 1996). However, Lent and colleagues differentiate social learning theory and SCCT, in that SCCT reflects an increased emphasis on cognitive, motivational processes that extend beyond basic issues of learning.

SCCT (Lent et al., 1994) puts forth the notion that individuals play an active role in their career development and career decision process. The theory suggests that

individuals use personal agency (i.e., self-direction), which is affected by a complex interaction among important social cognitive aspects. These important aspects (i.e., self-efficacy beliefs, outcome expectations, and personal goals) function together to influence self-direction, predominately concerning one's career decision-making and career development (Lent et al., 1994, Lent, Brown, & Hackett, 1996).

A more thorough description of social cognitive career theory's critical components is explained herein. Self-efficacy beliefs refer to one's confidence to successfully complete a given task. More specifically, self-efficacy involves a person's judgment about his or her capabilities to organize and execute required courses of action to perform a certain behavior (Bandura, 1986). Self-efficacy, which has been cited as the most critical defining element of personal agency (Albert & Luzzo, 1999), stems from four main sources of information: performance accomplishments, vicarious learning, verbal persuasion, and physiological arousal (Bandura, 1986). These sources of information aid to form a dynamic set of self-beliefs that are exclusive to particular performance domains. These self-beliefs ultimately interact with various behaviors, the external environment, human interactions, and other contextual factors (Albert & Luzzo, 1999).

Outcome expectations refer to an individual's beliefs about the probable result of a given behavior (Bandura, 1989). These expectations involve the imagined or anticipated consequences of performing a certain behavior. Thus, outcome expectations provide a rationale for performing certain behaviors. The personal expectations to perform a given behavior include various types of beliefs, including beliefs about extrinsic reinforcement, self-directed consequences, and the overall outcome for

performing a certain behavior (Albert & Luzzo, 1999). Within SCCT, therefore, the expectations an individual has about a given career are then linked to the conceivable outcomes of career decisions and other career-related behaviors (Ali, McWhirter, & Chronister, 2005).

Personal goals refer to people's intentions to engage in a given task (Bandura, 1989). Hence, personal goals are an individual's driving purpose to engage in a particular behavior or activity. By setting goals, individuals aim to plan, organize, guide, and ultimately carry out their behavior. Bandura (1997) noted that the application of personal goals is an important aspect through which individuals are able to apply their personal agency (i.e., self-direction). In fact, Albert and Luzzo (1999) found that when individuals were able to employ forethought (i.e., set goals) they were able to self-regulate themselves, even in the absence of external reinforcements. In relation to the three major components of SCCT (i.e., self-efficacy, outcome expectations, and goal setting), individuals are likely to persist in goal-directed behavior for which they possess high levels of self-efficacy, if they anticipate valued outcomes as a result of their behaviors, and if they have a driving motivation to successfully execute requisite tasks (Lent et al., 1994). In addition to one's cognitions regarding their career, how one attributes making a career decision is also an important social-cognitive topic to explore.

Assessment of Attributions for Career Decision-Making (AACDM)

For many college students, to make a career decision or to choose an academic major is considered to be a novel, notheworthy event. With that stated, it is likely that individuals will reflect upon this event and seek to understand their career-related outcomes. According to Weiner's (1979, 1985, 1986) attribution theory, individuals are

likely to attribute reasons for outcomes and events in their lives that are perceived as new or important. The fundamental explanations are theorized to directly influence ensuing cognitions and emotions, ultimately impacting individuals' motivation and behavior associated with future events (Perry, Hechter, Menec, & Weinberg, 1993). Thus, Weiner's theory asserts that the underlying beliefs individuals hold about their successes and failures have important consequences for their ensuing feelings, expectations, and behavior.

Weiner (1986) proposed a three-dimensional categorization for classifying all attributions. The first dimension involves the locus of *causality*, which characterizes the locality of a cause as either internal (e.g., effort) or external (e.g., luck) to the individual. The *stability* dimension alludes to whether a cause is constant or varying over time. The *controllability* dimension refers to whether a cause is prone to one's own volitional influence. As depicted by Weiner, these three dimensions all point to whether attributional styles are classified as either optimistic or pessimistic. An optimistic attributional disposition is characterized by those that are internally caused, controllable, and changeable (i.e., unstable). This optimistic stance is more often associated with positive expectations for the future than a pessimistic disposition, which attributes outcomes to uncontrollable, unchanging, external causes (Abramson, Seligman, & Teasdale, 1978; Spector, 1988; Weiner, 1985).

Weiner's (1986) attribution theory has been applied to the domain of career decision. When applied, this theory has shed important light as to the explanations individuals draw on for the controllability, causality, and stability one offers toward career-related outcomes. Specifically, research has shown that an optimistic attributional

style has been found to be positively associated with work satisfaction, motivation, job performance, job tenure, career exploratory behavior, career decisiveness, and career commitment (Colarelli & Bishop, 1990; Fuqua, Blum, & Hartman, 1988; Luzzo & Jenkins-Smith, 1998; Spector, 1982, 1988; Trice, Haire, & Elliot, 1989).

Maples and Luzzo (2005) proposed that individuals who believed that their career decision-making was prone to internal, dynamic, and controllable forces were likely to believe that career-related events and decisions were the result of internal factors within their control that could be changed with varying degrees of effort (i.e., an optimistic attributional style). These individuals were likely to consider strategies aimed at coping with and overcoming perceived barriers as useful ways to increase opportunities for career success and satisfaction. On the other hand, individuals who believed that the career decision-making process was the result of external, fixed, and uncontrollable forces (i.e., a pessimistic attributional style) tended to believe that career-related events and decisions were the result of external factors that were out of their control and unable to be modified by increased effort. Individuals who possess a pessimistic attributional style for career decision-making are likely to believe that they will "end up" in a particular career and that their personal efforts are far less instrumental in career decision-making (Luzzo & Jenkins-Smith, 1998).

Cultural considerations for AACDM. It is important to consider that despite research findings on AACDM, this construct appears to be mainly from a Western, individualistic perspective. Living in the United States, the collective majority may operate from an individualistic and autonomous perspective; however, not all individuals will adopt this framework, for example because of differences in cultural beliefs or level

of acculturation. Bond (1983) asserted that the most evident variable by which to investigate the influence of culture on attribution is locus of control. Based on cultural differences, it is important to take into consideration the belief systems and values associated with a given culture. For example, Moghaddam, Taylor, and Wright (1993) reported that individualistic cultures tend to place great emphasis on the individual and collectivistic cultures place increased importance on situational factors and contextual qualifiers when making attributions.

Sue and Sue (1990) described that members of racial minority groups may have a perspective which displays an external locus of control due to experiences of oppression or discrimination. In a study performed by Duffy and Sedlacek (2007), the researchers sought to investigate what incoming first-year college students considered to be most important to their long-term career decision. The sample consisted of approximately 31,731 first-year students, split almost evenly between men and women surveyed from 1995 to 2004. Sixty-eight percent of the participants were White, 10% were Asian American, 9% were African American, 4% were Latino/Latina, 4% were biracial, less than 1% identified as Native American, and the remaining 4% of participants did not report their race/ethnicity. The results revealed that White students placed a greater emphasis on having independence and intrinsic values, whereby African American and Asian American participants promoted higher extrinsic work values. Lease (2004) asserted that racial and ethnic minorities may be likely to experience an external locus of career control and greater career decision-making concerns resulting from limited exposure to mentors or other sources of career information.

Self-Efficacy

Self-efficacy expectations refer to beliefs concerning one's ability to successfully perform a given task or behavior. Betz and Hackett (2006) emphasized that self-efficacy is a cognitive appraisal or judgment of future performance capabilities, not a trait concept. According to Bandura (1986) self-efficacy expectations are considered to be primary mediators of behavior and behavior change, determining whether a given behavior will be initiated, how much effort will be expended, and how long the behavior will be sustained in the event of obstacles. Low self-efficacy expectations regarding a specific behavior are considered to lead to avoidance of those behaviors, poorer performance, and a tendency to give up at initial indicators of difficulty.

Bandura (1977) also specified four sources of information through which self-efficacy expectations are learned and by which they can be modified. These sources of information include: (a) performance accomplishments (i.e., successfully performing specific behaviors); (b) vicarious learning (i.e., modeling); (c) verbal persuasion (i.e., support from others); and (d) lower levels of emotional arousal (i.e., anxiety in connection with the behavior). Of the four sources of self-efficacy information, performance accomplishments have been hypothesized (Bandura, 1982, 1986, 1997) and later demonstrated (Lopez & Lent, 1992) to be the most influential source with regard to self-efficacy. Thus, successful experiences increase self-efficacy, whereas repeated failures decrease self-efficacy. Because self-efficacy involves a dynamic set of self-beliefs, as opposed to a unitary, fixed, or global trait (Lent, 2005), individuals have the potential to modify their self-efficacy in relation to given tasks, or behaviors. One

popular area of self-efficacy involves the assessment of confidence in individual's ability to perform tasks to make career decisions.

Career Decision Self-Efficacy (CDSE)

The introduction of Bandura's (1977, 1997, 2006) self-efficacy theory to the realm of vocational psychology has been one of the most frequently studied and applied novelties in the history of vocational psychology (Gore, 2006). With the assimilation of the construct of self-efficacy into SCCT (Lent, Brown, & Hackett, 1994, 2000), self-efficacy has been widely accepted as a principal attribute of vocational behavior (Betz & Hackett, 2006). Hackett and Betz (1981) originally suggested that self-efficacy could facilitate the comprehension of women's career development. These scholars' work suggested that the differences in occupational status of women and men might reflect differences in career self-efficacy. Further support for Hackett and Betz's assertions were supported in the demonstration of gender differences in career self-efficacy (Betz & Hackett, 1981; Betz & Hackett, 1986; Post-Kammer & Smith, 1985), with women demonstrating higher efficacy expectations than men for traditionally female occupations and men showing greater self-efficacy toward traditionally male occupations.

One reason individuals might have difficulty making a career decision may be because they lack adequate levels of career decision self-efficacy. The concept of career decision self-efficacy refers to a person's confidence in her or his ability to engage in career decision-making tasks (Taylor & Betz, 1983). Those individuals with low self-efficacy may avoid engaging in career exploration or firmly committing to a career path (Taylor & Betz, 1983); as a result, they experience limited opportunities for achievement (Bandura, 1986). Empirically, career decision self-efficacy has been linked to greater

career maturity (Creed & Patton, 2003), greater career decidedness (Srsic & Walsh, 2001), lower career indecision (Taylor & Betz, 1983), and greater career stability (Gianakos, 1999). Furthermore, career decision self-efficacy has been studied in relation to self-knowledge, interests, career maturity, ability, vocational identity, career commitment, and career indecision (Betz & Voyten, 1997; Taylor & Popma, 1990). Career decision-making self-efficacy has been shown to be associated with a wide range of other important career-related constructs, including occupational interests (Feehan & Johnston, 1999; Lapan, Boggs, & Morrill, 1989), career exploration (Blustein, 1989), career barriers (McWhirter, Rasheed, & Crothers, 2000), and career maturity (Patton & Creed, 2001).

Career decision self-efficacy has been shown to be inversely related to career indecision (e.g., Bergeron & Romano, 1994; Betz, Klein, & Taylor, 1996). Career decision self-efficacy has also been related to more adaptive career beliefs (Luzzo & Day, 1999). Peterson (1993a, 1993b) found that career decision self-efficacy was related to academic persistence versus academic withdrawal in college students. Due to the established importance of career decision self-efficacy in regard to one's career decision-making process, vocational researchers have expended efforts to increase this confidence through a variety of interventions.

Interventions to Increase CDSE

One approach to assist individuals with their career development process, particularly those who are at risk for vocational difficulties, is to enhance their career decision-making self-efficacy (O'Brien, Dukstein, Jackson, Tomlinson, & Kamatuka, 1999). Increasing an individual's confidence in relation to making a career decision is an

important requisite in pursuing other successive career-related tasks, now, or in the near future. Regardless of the existing level of career decision self-efficacy, it is critical to have interventions in place that attend to increasing individual's confidence in domains relevant to career decision-making.

Uffelman, Subich, Diegelman, Wagner, and Bardash (2004) chose to investigate career assessments (i.e., Strong Interest Inventory [SII; Harmon, Hansen, Borgen, & Hammer, 1994] and Self-Directed Search [SDS; Holland, 1970]) as a means of increasing career decision self-efficacy. Participants within this study were 81 college students, 47% first-year students, consisting of 69% women and 31% men. Within this sample, 79% identified as White/Caucasian, 15% as Black/African American, 5% as Asian American/Pacific Islander, and 1% as biracial. In this study, participants were randomly assigned to four groups: (a) completion of the Strong Interest Inventory followed by a counselor interpretation session, (b) completion of the Self-Directed Search independently followed by a counselor interpretation session, (c) completion of the Self-Directed Search with the counselor and receiving an interpretation by the counselor, and (d) a no-treatment control group.

Results of Uffelman and colleagues' (2004) study demonstrated increases in career decision self-efficacy for all intervention groups, but no statistically significant differences among the distinct intervention groups. However, upon further investigation of the CDSE scores, participants who completed the SDS alone reported a greater increase in CDSE, whereas those who completed the SII reported the smallest amount of increase in career decision self-efficacy. The authors noted that the participants who completed the self-guided, Self-Directed Search independently had a greater opportunity

to increase one aspect of Bandura's (1986) components of self-efficacy (i.e., performance accomplishments), such that there was a greater likelihood that the learning that took place was attributed to the client's own actions because of the individual attention and autonomy that the career assessment required.

Luzzo, Funk, and Strang (1996) performed a study with 60 undergraduates (41 women and 19 men) that examined the effects of a brief career intervention on both locus of control and career decision self-efficacy. The majority of participants (83%) were in their first or second year of college. The racial/ethnic composition of this sample included 53 Caucasian/White, 4 Hispanic/Latino/a, and 3 African American participants. The intention of the intervention was to modify participants' attributions by exhibiting a video that emphasized the role that individual's play in career development planning. The results illustrated that for students with an initially internal locus of control, there was no change in CDSE from pre-intervention to post-intervention. However, for students who initially exemplified an external locus of control, there was a significant increase in CDSE (Luzzo et al., 1996). The authors hypothesized that as participants began to internalize their own personal role in their career decision process they then, began to be strengthen their confidence in making a career decision.

Using Bandura's (1986) components of self-efficacy as a framework, Sullivan and Mahalik (2000) designed an intervention to increase career decision self-efficacy for women. The authors put into practice a 6-week group career-counseling intervention designed explicitly using the four sources of efficacy information (i.e., performance accomplishment, vicarious learning, physiological arousal, and verbal persuasion). For each source of efficacy information, there were specific interventions that were part of

the treatment program. The sample included 61 women with a median age of 21 enrolled in three universities within the New England area. There were 31 women in the treatment group consisting of 81% whom identified as European American, 13% as Asian American, and as 6% as international students from European and Asian countries. Of these participants, 29% were second-year students, 26% were graduate students, 13% were nontraditional students, 13% were fourth-year students, 10% were third-year students, and 10% were first-year undergraduate students. Regarding participants' level of career decisiveness, 13% disclosed being undecided or undeclared concerning an academic major.

Within Sullivan and Mahalik's (2000) study, the control group consisted of 30 participants, 87% were European American, 7% were African American, 3% were Asian American, and 3% were Hispanic or Latino/a. The median age within the control group was 20 years, and 56% were second-year students, 37% were third-year students, and 7% were fourth-year undergraduate students. In this group of participants, 28% reported being undecided or undeclared about their major. Results of this study indicated that there were significant increases in CDSE in the treated groups but not in the no-treatment control groups. In addition, a follow-up 6 weeks after the posttest indicated that the gains in career decision self-efficacy had been maintained in the treatment group participants. This study paid special attention to theorized components of self-efficacy, which in turn, demonstrated empirical effectiveness in increasing career decision self-efficacy.

Foltz and Luzzo (1998) implemented a career planning workshop that also incorporated the four sources of self-efficacy expectations, this time with a different population of interest. Sixty-six nontraditional college students ranging in age from 26 to

54 years were randomly assigned to a treatment group or delayed treatment control group. The results illustrated that regardless of age, gender, year in college, or family income, participation in the 2-hour session workshop generated increased career decision self-efficacy. Students who participated in the delayed-treatment control group also reported greater CDSE, but not as favorable as the first treatment group.

For many years, course-based career interventions have been a popular approach for universities to assist college students in their career development process (Borow, 1960). The justification for such courses includes, but is not limited to, efforts to increase student retention and provide successful job placement (Gimmestad, 1984). One indication that courses tailored to career exploration have grown in popularity is the recent literature (e.g., published textbooks) based on career courses taught at respective universities (e.g., Appleby, 1997; Landrum, Davis, & Landrum, 2000). More recently, Scott and Ciani (2008) have assessed the effect of a career exploration course on career decision self-efficacy and vocational identity during an academic semester. Their results revealed that individuals enrolled in the course reported significantly more adaptive self-efficacy beliefs after the completion of the course.

In a study assessing the effect of a career development college course aimed to help undecided students with career decision-making, Reese and Miller (2006) assessed the effects of a college course on the career decision-making self-efficacy of 96 college students. A pre-test-post-test nonequivalent group design compared students who completed the course ($n = 30$) with a quasi-control group of students who were enrolled in an introductory psychology course ($n = 66$). The students enrolled in the career development course were 12 men and 18 women, the majority, 26 were White, 2 were

African American, and 2 were Hispanic/Latino/a. Within this study, 40% of the participants were first-year students and 53.3% were undecided about a major. The students enrolled in the introductory psychology course were 27 men and 39 women, 75.8% were White, 6.1% were African American, 10.6% were Hispanic/Latino/a, 1.5% were Asian, 4.5% indicated international status, and 1.5% did not report their ethnicity. This group consisted of 66.7% first-year students and 22.7% were undecided on an academic major. The results indicated that students who completed the career course demonstrated increased career decision-making self-efficacy overall, specifically in the areas of obtaining occupational information, setting career goals, and career planning. The career course also appeared to reduce perceived career decision difficulties.

Fouad, Cotter, and Kantamneni (2009) examined the effectiveness of a college career course intended to increase confidence in career decision and the facilitation of career exploration. Their sample consisted of 73 college students from a large midwestern university, 65.6% were women and 34.4% were men. The racial and ethnic composition of this sample consisted of predominately individuals who identified as White/European American (i.e., 83.6%), 6.8% as Black/African American, 2.7% as Asian American/Pacific Islanders, 2.7% as Hispanic or Latino/Latina, 2.7% as Native American/American Indians, and 1.4% as Other. The sample consisted of 78% first-year students, 19% as second-year students, and 3% as fourth-year undergraduate students. In general, it was found that career decision-making difficulties decreased. The college course consisted of in-class activities of discussions, trainings, and career assessments, which focused on interests, values, skills and encouraging students to explore various majors and careers. The authors attributed successful improvements in career decision

self-efficacy to Bandura's (1997) social cognitive theory, as the course utilized four sources of self-efficacy (i.e., performance accomplishment, vicarious learning, verbal persuasion, and emotional response).

Programmatic interventions for first-year college students. An individual's first year of college is a critical period for a young adults' career and personal development. Often it is the first time students are away from home and expected to make important decisions independently without the physical presence and social support from friends and family (Hull-Blanks, Kurpius, Befort, Sollenberger, Nicpon, & Huser, 2005; Rice, 2002). Levitz and Noel (1989) assert that in addition to their career and personal changes, first-year students also have the increased challenge of academic work, which is often more demanding and voluminous than the work they performed in high school. The National Center for Educational Statistics (as cited in Brandburn & Caroll, 2002) indicated that approximately one-third of incoming college students depart higher education without completing a degree, with the majority departing during their first-year. Providing resources and interventions assisting with career development for first-year college students may serve as one protective barrier to assist students when facing obstacles during this transitional time period.

Luzzo and Taylor (1994) evaluated the effects of verbal persuasion on the career decision self-efficacy of first-year college students. A total of 88 first-year students participated in a pre- and post-test intervention involving random assignment to a control group or a treatment group. The treatment group involved completion of a career inventory assessing abilities, interests, and personality. These results of these inventories were matched to corresponding occupations and were directly followed by a meeting

with a career counselor. During the feedback session, the counselor attempted to verbally persuade the first-year college students reinforcing that the students possessed sufficient skills and opportunities to engage in effective career decision-making activities. The individuals randomly assigned to the control group, completed the same career inventory, but did not receive any verbal persuasion from a career counselor. The results of the post-test measures demonstrated significant gains for the group that received the verbal persuasion treatment in terms of their confidence in their ability to make career decisions, whereas the control group scores pre- and post-test were unaffected.

A study performed by Heck and Weible (1978) involved 20 first-year college students enrolled in a 10-week exploratory field-based career experience for approximately 16 hours each week. The sample consisted of 12 female and 8 male first-year college students. The objective of the experience was to assist participants in making informed career choices, which focused on two components grounded in Super's (1951) theory of vocational guidance: knowledge of self and knowledge of careers. Activities included personal seminars focusing on awareness, appreciation, self-acceptance, decision-making skills, goal-setting skills, and exploration of interests, needs, and values. The results of this study illustrated a stronger need for similar forms of exploratory career programming to assist first-year college students in increasing confidence in making career decisions, as this intervention was effective in assisting students to answer questions involving career choice, whether it was for or against various occupations.

Career choice and theory – predating CACG systems. According to Brown (2002), the foundation of career development theory began with Frank Parsons (1909)

with his conceptual framework that career choice involved an understanding of oneself, a knowledge of requirements and opportunities within different career fields, and a thorough analysis in this procedure to find a good fit. According to Brewer (1942), aptitude testing was prevalent in the personal selection of individuals with music talent and mechanical ability. Zytowski and Luzzo (2002) described that aptitude testing was also used for assistance in placement within the military, such with as the Armed Services Vocational Aptitude Battery (U.S. Department of Defense, 1992).

Aside from objective testing of abilities or aptitude, Holland focused on self-reported abilities and skills during his conversion of the Vocational Preference Inventory (VPI; Holland, 1958) to the Self-Directed Search (SDS; Holland, 1970), which included competency statements and ability self-appraisals. Spokane and Cruza-Guet (2004) noted that the emphasis on the VPI and SDS generated a shift in the vocational psychologist's emphasis from formulating vocational choice theory back to evaluating optimally useful career assessments and interventions. Holland's (1997) theory remains prevalent today, which postulates that individuals interact with their environments and the individual and the environmental characteristics generate vocational choice and individual adjustment.

The impact of these aforementioned studies in addition to progress in technology and career theory urge career counselors to approach the process of career development in creative and nontraditional ways that go beyond assessment of interests and skills. Given the focus on technology within today's society in conjunction with advances in career theory, a review of computer-assisted career guidance systems will be reviewed herein.

Computer-Assisted Career Guidance (CACG) Systems

The use of computers by mental health professionals and vocational psychologists is not a new phenomenon. Computers have contributed to the mental health arena in many different ways since their induction to the general population. For example, in regard to psychological research, using computers for complex statistical analyses has been common for nearly five decades (Gore & Leuwerke, 2000). Gore and Leuwerke highlighted that the launch of personal computers in the late 1970s, led to the production of several automated psychological assessments and various programs which, in turn, enhanced the ability to better manage client information. The prevalence of computers has also benefited the realm of vocational psychology, in that large-scale computer-assisted career guidance systems have served consumers both within the United States and internationally since the 1960's (Harris-Bowlsbey & Sampson, 2001; Watts, 1993).

Computer-assisted career guidance systems are classified as interactive guidance programs that can be operated independently to retrieve information useful for self-assessment and exploration regarding one's career development (Brown, 2003). In college counseling centers and career centers, CACG systems have been put into service to meet the appeal of students interested in assistance with career choice and career planning (Barnes & Herr, 1998). CACG systems are capable of providing individualized feedback to a large number of individuals in a time efficient manner (Fowkes & McWhirter, 2007). CACG systems have achieved a high level of popularity, given their fairly recent introduction. In fact, nearly a quarter of a century ago, Johnston, Buescher, and Heppner (1988) reported that most college career centers had at least one interactive computer-assisted career guidance system.

CACG systems can be conceived as a technologically advanced method of self-help. CACG systems provide users with a self-guided experience whereby individuals have the opportunity to conveniently utilize the system at their own leisure. However, like CACG systems, self-guided forms of career assistance are not a new occurence. Spokane (1990) traced the origin of self-help career guidance to a publication nearly 85 years ago, *Vocational Self-Guidance: Planning Your Life Work* (Fryer, 1925). Within this publication, Fryer strongly advocated for a self-help approach to vocational guidance rather than one influenced by a counselor. Other forms of user-friendly, self-guided career tools within the realm of career development became more common in the 1970's. The most notable self-help career tools, at that time, were John Holland's Self-Directed Search (SDS) (1970) and Richard Bolles's *What Color Is Your Parachute?* (1970), which are still utilized today among the field of vocational psychology and career counseling.

Within traditional vocational psychology, early advocates of self-help career assessment were initially met with opposition and skepticism (Crites, 1978; Spokane, 1990). Few published studies of self-help tools, aside from those relating to the well-liked Self-Directed Search, were evident in the literature through the year 2000 (Spokane & Catalano, 2000). Nonetheless, the demand for self-help career tools among customers continued to cultivate. In fact, Prince, Most, and Silver (2003) noted that many bookstores devoted large sections of their space specially for self-help books for career development. Prince and colleagues also indicated that Web sites offering online career tools were also becoming increasingly popular.

Using external resources (e.g., books, the Internet) for any form of guidance requires certain requisites. In particular, using the Internet for assistance requires that

reliable and valid "self-diagnostic" instruments are available (Offer & Sampson, 1999). Among CACG systems, it is customary that various career development theories and occupational classification systems are applied. For example, one CACG system, DISCOVER, incorporated the work of Donald Super's developmental stages, Tiedeman and O'Hara's decision-making model, the data-people-things orientation of the Dictionary of Occupational Titles (DOT), and the ACT World-of-Work Map, based on Holland's work (Barnes & Herr, 1998). According to Robinson and colleagues (2000), CACG systems vary somewhat in how they host occupational information, but all seem to contain databases extracted from print-based sources or independent research.

In order to understand the background and the development of CACG systems, it is worthy to mention other popular guidance systems both predating FOCUS-2 and coexisting as current competitors of FOCUS-2. There is a strong need for CACG systems to be updated regularly because they contain assessment inventories and occupational databases. Because of the rapidly changing landscape of various occupations in conjunction with advances in technology, new occupations are being created and occupations that are current now may not exist in future years. Most CACG systems offer assessment modules to help users identify important aspects of self-assessment (e.g., interests, values, skills) as well as an option to view career information directly without needing to complete career assessments (Robinson et al., 2000). A brief, introduction and description are provided herein on the following systems: Computerized Self-Directed Search, DISCOVER, System for Interactive Guidance Information (SIGI), System for Interactive Guidance Information – Plus (SIGI-Plus), and the Kuder Career Planning System (KCPS).

Computerized Self-Directed Search. Based on the initial Self-Directed Search (SDS; Holland, 1970), a computerized version was created aimed to reduce administration and scoring time and reduce the possibility of hand-scored arithmetic errors. The Computerized Self-Directed Search (Schinka, 1988) like the original SDS, is an assessment of vocational interests and personality developed by Robert Reardon and Psychological Assessment Resources. The SDS was also created as an online version constructed on an independent Web site, enabling participants to access the self-guided assessment at their own leisure. With the online format, respondents completed the SDS questionnaire and then, after a few seconds, received a personalized message on the computer screen. The message contained a standard explanation of the nature of the results, the participant's three-letter Holland code, as well as a detailed explanation of the code (Barak & Cohen, 2002).

DISCOVER. The CACG system DISCOVER integrated Super's developmental stages, Tiedeman and O'Hara's decision-making model, the data-people-things orientation of the Dictionary of Occupational Titles (DOT), and the ACT World-of-Work Map based on Holland's work (Barnes & Herr, 1998). DISCOVER includes self-assessment inventories, a presentation of academic and occupational information, as well as information to assist individuals who are actively seeking employment. DISCOVER's modules include career inventories, information on occupations, majors, schools, and the job search. Further, DISCOVER offers a personal portfolio, in which users can neatly organize pertinent information discovered within the CACG system (Gore & Hitch, 2005).

System for Interactive Guidance Information (SIGI). The original version of SIGI was developed by Martin Katz with the intent to help students identify occupations based on an assessment of their values and skills. SIGI is also a branded product of the Educational Testing Service. The purpose of SIGI, like other CACG systems, is to assist college students to clarify their values, identify and explore occupations, and master strategies to make informed and rational career decisions. Users of SIGI interact with the program in such a manner as to examine aspects of his or herself and explore both educational and occupational information. The focus within SIGI tends to be more on the process of decision, as opposed to the content of the decisions (Katz, 1973).

System for Interactive Guidance Information Plus (SIGI Plus). SIGI Plus has a self-assessment section with inventories including values, interests, and skills confidence. This CACG system also has a section for coping, to assist individuals to consider issues related to preparing, or changing a career. SIGI Plus also includes a "Next Steps" section whereby users can acquire additional information including assistance on creating a resume or applying for occupations. As with most CACG systems, users of SIGI Plus have their information saved and are able to revisit for subsequent visits. Research has supported the efficacy of the SIGI Plus system, particularly with favorable user ratings (Kivlighan, Johnston, Hogan, & Mauer, 1994; Peterson et al., 1994). However, Gore and Hitch (2005) note that very little documentation exists on the psychometric properties of the self-assessment inventories that assess interests, values, and skills. Gore and Hitch also recognized that information is lacking regarding the computer algorithms that are used to make recommendations for users based on their career assessment results. Reardon, Lenz and Strausberger (1996)

cite that in contrast to SIGI, SIGI Plus generates a more diverse set of self-assessment options, has more flexibility in terms of user control of system functioning, and makes better use of color graphics.

Kuder Career Planning System. Kuder assessments have long been a part of career assessment. Further, various assessments (e.g., Kuder Skills Assessment, Kuder Career Porfolio, Kuder Career Search with Person Match) have surfaced over the years with upgrades and modifications over time. For the purposes of this paper, only one Kuder system will be briefly described, The Kuder Career Planning System. This system offers three different systems based on age and educational attainment (i.e., Kuder Galaxy, Kuder Navigator, and Kuder Journey). Kuder's website (Kuder, 2009; http://www.kuder.com/solutions/kuder-career-planning-system.html) is transparent in terms of providing research findings, validity, reliability, and normative information, more so than previously described systems. Specifically, several scholarly articles are available and easily accessible on Kuder's promotional website.

Effectiveness of CACG systems. According to Davidson (2001), career counselors have a certain level of responsibility in ensuring that individuals are achieving positive effects from retrieving career information online. Unfortunately, the preponderance of previous research has focused on the user satisfaction of CACG systems as a means of assessing CACG systems' value and effectiveness. For example, Fowkes and McWhirter (2007) noted that user satisfaction was frequently evaluated (e.g., Kapes, Borman, & Frazier, 1989; Offer & Sampson, 1999; Peterson et al., 1994) and CACG system users reported to be generally satisfied with their CACG system

experiences. Aside from user satisfaction, an exploration of key career development variables is clearly warranted.

Despite the prevalence of CACG systems, there have been only a modest number of studies that assess the effectiveness of CACG systems (Bloch, 2006; Hinkelman & Luzzo, 1997; Sampson & Lumsden, 2000). In general, studies that assess the effectiveness of the use of computers in career counseling are generally positive (Fukuyama, Probert, Neimeyer, Nevill, & Metzler, 1988; Peterson et al., 1994; Pinder & Fitzgerald, 1984). However, previous research on CACG systems is not immune to considerable limitations. For example, Betz and Borgen (2009) highlighted that the majority of CACG system research has focused primarily on the large-scale systems supported by major testing companies and have disregarded other frequently utilized CACG systems.

Fukuyama and colleagues (1988) pioneered one of the studies involving the effects of a popular CACG system (i.e., DISCOVER) on the career self-efficacy and decision-making of college undergraduates. Their sample consisted of 77 undeclared undergraduate students, whereby the majority of students were enrolled in their first or second years of college. The participants involved in the study were 74% White, 12% Black, 9% Hispanic, 4% Asian American, and 1% identified as Other. The results demonstrated that DISCOVER had a positive effect on the career self-efficacy and career decision-making for participants. The findings suggest that the computer-assisted career guidance systems may play a role in assisting students with their career choice process. Yet, the generalizability of Fukuyama and colleague's findings are questionable given the

small sample size, the relative focus on first and second year students without a declared major, and a failure to sample actual clients seeking career counseling.

Drawing from one of the limitations described above, Maples and Luzzo (2005) sampled college students who sought career counseling services. The authors compared a career counseling intervention (i.e., a single, 45- to 50-minute counseling session) with the CACG system, DISCOVER with 20 women and 14 men enrolled in a large southern university. The ethnic demographics of the participants were comprised of 79% Caucasian, 12% African American, and 3% Latino/a, Asian American, and Native American. Participants included 35% first-year students, 47% second-year students, and 18% third-year undergraduate students. Results demonstrated that students who worked with DISCOVER for approximately 1 hour demonstrated significant gains in their sense of control over the career decision-making process compared with participants who did not complete DISCOVER. Results of the investigation offered partial support to the notion that the CACG system enhanced participants' career decision self-efficacy and overall sense of control of the career decision-making process. Several limitations were present within this study, including a small sample size and a lack of representation from racial and ethnic minorities, given that only 1 participant was represented in the groups assessing Latino/a, Asian American, and Native American participants. Furthermore, the CACG system group was compared to a group that only received a single, brief counseling session. Thus, it is difficult to ascertain if one career counseling session provided sufficient opportunities to facilitate considerable favorable career outcomes in comparison to the abundance of resources readily accessible within a CACG system.

Unlike the majority of studies that utilized convenience sampling and quasi-experimental design, Chapman, Katz, Norris, and Pears (1977) created a more traditional experimental approach when investigating a popular CACG system (i.e., SIGI). The authors selected representative samples of approximately 200 students at six colleges or junior colleges and then randomly assigned them to experimental and control groups. A multitude of techniques were used to collect data about the impact of the CACG system, including interviews and questionnaires for student users, recorders of students' interactions with the system, and questionnaires designed to elicit counselors' reactions. Overall results indicated that the CACG system had a positive impact on numerous dimensions of career decision-making (e.g., better understanding of values and career goals, more knowledge about sources of satisfaction from a job, more detail and accurate information about occupations, more definite overall career plans, and more confidence in their decision-making).

Cochran, Hoffman, Strand, and Warren (1977) evaluated the influence of a CACG system (i.e., SIGI) on the career decision-making processes of 72 undergraduate college students. The sample consisted of primarily first-year and second-year undergraduate students; however, gender and ethnicity were not reported. The authors hypothesized that CACG system users would display greater change toward a higher decision-making stage and toward an internal locus of control than members of the control group. Using a pre-test post-test design, CACG system users demonstrated significant positive changes on measures of decision-making related to college major, but not on measures of decision-making related to occupations. Further, no significant differences were found pre- and post-test related to locus of control. The authors asserted

that even a brief exposure to a CACG system can have positive effects in relation to the selection of a college major for college students.

To address the glaring gap in the literature regarding the concentration of only large-scale CACG systems supported by major testing companies, Betz and Borgen (2009) compared the effectiveness of two contemporary and understudied CACG systems [i.e., Computer and Personality Assessments (CAPA) and FOCUS]. The authors evaluated the effectiveness of the CACG systems in increasing the career decision self-efficacy and decidedness of 960 first-year undecided undergraduate students. Paired CDSE scores were available for 866 participants. A total of 555 participants completed CAPA and 324 completed FOCUS. Of the CAPA participants, 257 were men, 298 were women, 85% identified as White, 6% as African American, and 5% as Asian American. For FOCUS, 151 participants were men, 160 were women, 81% identified as White, 6% as African American, and 5% as Asian American.

Results of Betz and Borgen's (2009) study indicated that both online systems led to significant increases in career decision self-efficacy. The study also investigated the effectiveness of the CACG system as a function of both gender and ethnicity. Results indicated that both systems led to significant increase in CDSE for White, African American, and Asian American participants. Further, analyses by gender indicated that the CAPA system was to some extent more effective, comparatively speaking with female than male participants. Thus, this study forged new ground related to comparative outcome research and shed important light on important multicultural factors within the realm of vocational psychology and CACG systems. Further, their large sample size also promoted better generalizability of their results.

Whiston, Sexton, and Lasoff's (1998) meta-analysis of career intervention research suggested that CACG systems were the most cost-effective of all career interventions and were second only to individual counseling in effectiveness per unit of time. However, inconclusive results exist regarding various outcomes for different CACG systems. For example, DISCOVER (e.g., Luzzo & Pierce, 1996) and Educational and Career Exploration System (ECES; Myers, Lindeman, Thompson, & Patrick, 1975) were found to enhance career decision-making and career maturity. Another study indicated that there were no significant differences in career maturity or decision-making between users of DISCOVER alone, DISCOVER in conjunction with group counseling, recipients of group counseling alone, or a control group of students (Glaize & Myrick, 1984). These studies reflect the reality that our understanding of CACG systems' effectiveness requires further investigation.

Comparative research with CACG systems. The available comparative outcome research on CACG systems is sparse, and what there is mostly concerns the large-scale systems (i.e., SIGI and DISCOVER). Peterson and colleagues (1994) compared SIGI, SIGI Plus, and DISCOVER with 126 college students randomly assigned across three treatments. The results indicated that there were no practical differences in how the participants rated the three systems. Kapes and colleagues (1989) examined 92 college students who had used either SIGI or DISCOVER and 36 counselors in training who had taken both systems. Gender and ethnicity was not reported within Kapes and colleagues' study; however, results demonstrated that both systems were highly rated. Further, Garis and Niles (1990) found that both SIGI Plus ($n = 64$) and DISCOVER ($n = 48$) led to increases on career planning measures in comparison to a psychology or

business course only for pre-screened first and second-year college students needing assistance with career planning. Thus, research supports that CACG systems appear to be successful; however, the effectiveness of CACG systems do not appear to discriminate among different systems.

Advantages of CACG systems. Nearly a quarter of a century ago, Cairo (1983) performed a literature review of the effects of CACG systems. Cairo qualified his review and stated that his "conclusions" were the results of only a limited number of studies. To date, Cairo's findings still appear relevant. First, he acknowledged that CACG systems promote a greater awareness of the need for career planning. Second, Cairo noted that CACG system users learn more about career exploration resources. He also described that CACG system users have the opportunity to acquire pertinent information about educational and occupational alternatives. Cairo stated that CACG systems also assist to increase the number of occupational alternatives for individuals. The author noted that CACG system users, in turn, discovered a better fit for their occupational preferences, making them more congruent with personal attributes. Cairo also described that the majority of counselors welcomed CACG systems as an additional tool for clients. Lastly, in his review, Cairo noted that CACG system users reported that CACG systems are understandable, helpful in facilitating career development, and satisfying to use.

More recently, the advantages of CACG systems are largely due to advances in technology. The overarching advantage, Davidson (2001) noted, is convenience – personal computers and the Internet are available 24 hours a day, 7 days a week. Thus, individuals can access career information at their own pace, particularly when career services or college counseling centers are closed, or individual appointments are full.

Another advantage, similar to the first, is that the information can be accessed from anywhere in the world where there is a computer with an Internet connection. The Internet also provides consumers with quick searching capabilities so that career information is discovered with ease, all in one centralized location. Another advantage of CACG systems is in relation to the environment, whereby CACG systems drastically reduce the use of paper. CACG systems may also create a sense of empowerment among individuals, providing them a sense of personal achievement and ownership in relation to their career development process.

Other advantages have been recognized in relation to the use of computers within psychological research. For example, when researchers assessed adolescents' sexual behavior, drug use, and violence, they professed that many individuals may feel more comfortable disclosing personal information to an anonymous computer than to a human researcher (Turner, Ku, Rogers, Lindberg, & Pleck, 1998). Because CACG systems are self-administered and career counselors do not scrutinize individual items, individuals may generate more sincere responses, thus reducing error (Robinson et al., 2000). Robinson and colleagues also noted that CACG system users may find CACG systems more engaging than other forms of vocational guidance because CACG systems often offer an interactive and visually pleasing experience.

Disadvantages of CACG systems. Johnston and colleagues (1988) discussed computerized career information and CACG systems and emphasized that a counselor should always be viewed as part of the program; available to explain, interpret, troubleshoot, and evaluate the CACG system. Thus, it is important to consider whether CACG systems are upholding ethical responsibilities online. Considering the American

Psychological Association's (APA, 2002) ethical principles of beneficence and nonmaleficence, providers should strive to benefit those with whom they serve and take caution to do no harm.

It is important to consider that not all students are the same and not all students require the same career services (Davidson, 2001). Within CACG systems, individual users are essentially devoid of important cultural variables when taking part in online self-assessment with a computer. In addition, an intervention that may be beneficial for one career client might not be as helpful with another. Career counselors and vocational psychologists should always carefully consider the context of important multicultural variables prior to presenting and interpreting the results of any psychological or vocational assessment with the client. However, CACG systems are not standalone multiculturally competent instruments. Future developments should attend to important multicultural characteristics and how they can be technologically infused within future CACG systems.

Unfortunately, not all individuals have immediate access to computers and the Internet, let alone a computer-assisted career guidance system. Norris (2001) has extensively exposed a "digital divide" which occurs within our society. Norris describes that this divide occurs for economic, social, and cultural reasons. Thus, computer and Internet use is not equally available to all individuals and groups in a given society (Robinson et al., 2000). This imbalance of access subsequently means that different groups of society are receiving less exposure to online assessment (Sampson & Lumsden, 2000). Barak (2003) commented that this inequality is not only an ethical and a moral

issue, but it is also a practical problem because it reinforces certain social and economic gaps.

Summary

Overall, a review of vocational literature supports that attributional style for career decision-making and career decision self-efficacy play an important role in the career decision-making process. Several career interventions aim to assist individuals with their individualized career development process. One such intervention, a computer-assisted career guidance system, appears to be a progressive approach. Due to the self-guided nature and overall convenience of CACG systems, this intervention seems to support the favorable use of technology among traditional aged college students. Of great magnitude, however, is the question of whether CACG systems generate beneficial vocational gains for the significant number of CACG system users across various colleges and universities. After all, making career decisions is one of the main psychosocial tasks that college students encounter (Osborn, Howard, & Leierer, 2007).

Several different CACG systems are available, however, the majority of previous research has focused on only a few large-scale CACG systems (e.g., DISCOVER, SIGI) and have failed to investigate other commonly used CACG systems within university settings (Betz & Borgen, 2009). Other gaps in the literature include gathering more diverse samples (Hinkelman & Luzzo, 1997) and noting more specific information about system usage, such as time spent, specific modules used, activities users engaged in near the same time of the CACG system, as well as paying more attention to multicultural variables, such as gender and race (Fowkes & McWhirter, 2007; Hinkelman & Luzzo, 1997; Taber & Luzzo, 1999). The current study addresses these concerns in the

evaluation of FOCUS-2 on first-year college students' social cognitive career development (i.e., CDSE and AACDM). This study also takes into consideration the amount of time users spend using FOCUS-2, as well as the influence of their gender, race, and academic major on their career decision self-efficacy and assessment of attributions for career decision-making.

Chapter III

METHOD

Introduction

In this chapter, I discuss the method utilized within this study. First, the statistical analyses are reviewed and justification for their selection is provided. To ensure that there were a sufficient number of participants to test the hypotheses, a power analysis was conducted. In this chapter, I also describe the nature of the sample, the sampling strategy, the procedure used within this study, and the psychometric properties of each respective measure. All instruments were used with full permission.

Proposed Analyses

The first research question in this study involved whether there would be a significant difference between career decision self-efficacy and assessment of attributions for career decision-making for first-year college students, before and after completion of the computer-assisted career guidance system intervention, FOCUS-2. In order to test this hypothesis, a repeated measures analysis of variance (ANOVA) was conducted. Pre-test and post-test scores were obtained on the Career Decision Self-Efficacy Scale-Short Form (CDSE-SF) as well as the Assessment of Attributions for Career Decision-Making (AACDM). In between the pre- and post-test, all participants completed the intervention, FOCUS-2. The purpose of considering the repeated-measures ANOVA was to individually test differences in group means on the two dependent variables, CDSE and AACDM, across two distinct measurements.

The second research question involved the relationship between the self-reported amount of time that participants spent using FOCUS-2 and participants' level of career

decision self-efficacy. The third research question entailed the relationship between the self-reported amount of time spent using FOCUS-2 and participants' level of assessment of attributions for career decision-making. To assess the strength and direction of the relationship between time and said two distinct dependent variables, two separate Pearson correlations were conducted. This statistical method was employed to determine the direction and strength of the relationship. If a significant relationship was found, the self-reported amount of time spent on FOCUS-2 was intended to be used as a covariate in subsequent analyses to control for the potential confounding variable of time spent using FOCUS-2.

The fourth, fifth, and sixth research questions for this study involved the effects of gender, race/ethnicity, and academic major on how much first-year college students benefited from using FOCUS-2 in terms of career decision self-efficacy and assessment of attributions for career decision-making. For gender, groups included men and women. For race/ethnicity, groups included African American/Black, Asian American/Asian/Pacific Islander, Hispanic American/Latino/Latina, and European-American/White participants. Lastly, for academic major, groups include four categories that participants self-selected: Undecided, Declared major, Tracking a major, and Declared major, but uncertain. These three distinct research questions were analyzed by performing separate repeated measures ANOVAs.

Power Analysis

In order to ensure that a sufficient number of participants were available to test these hypotheses, a power analysis was conducted. Within this sample, a customary alpha of 0.05, power of 0.80, and an effect size of 0.25 were used as parameters in the

estimation of the number of participants required to avoid Type II error. A power analysis was conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) for an Analysis of Covariance (ANCOVA), in the event that time spent with FOCUS-2 was found to be significantly related to either career decision self-efficacy or assessment of attributions for career decision-making. This statistical analysis' power analysis is considered to be the most uncompromising, given that it provides the largest requirement of participants in order to achieve sufficient power. The results indicated that at least 259 total participants would be required to properly test the hypotheses.

Participants

Participants included 420 (M age = 18.08, SD = .31, range = 18-21) male (40%) and female (60%) first-year college students. Participants' race/ethnicity was comprised of 63.8% European American/White, 13.3% Hispanic American/Latino/Latina, 11.9% African American/Black, and 11.0% Asian American participants. All participants were enrolled as first-year students at a small, 4-year, private Catholic University in the northeast section of the United States. In terms of self-reported academic major, 262 (62.4%) identified as Declared, 64 (15.2%) identified as Undecided, 48 (11.4%) identified as Declared but uncertain, and 46 (11.0%) identified as Tracking a major. As noted previously, participants that selected "Tracking a major" have intention to declare a certain academic major, but have not yet been admitted to the specific program (e.g., wanting to declare a major as nursing, but have not yet been accepted to the school of nursing).

The stated descriptive statistics generally reflect the university population of interest. Specifically, the total population of first-year students who were at least 18

years of age, at the investigated university was comprised of 55% women and 45% men. Furthermore, the first-year student population self-identified as 56.7% White/European American, 16.7% Hispanic/Latino/Latina, 13.8% Black/African American, 9.2% Asian American, 2.1% Unknown, and 1.4% Native American students. Considering the total population ($N = 1,119$) of first-year students at the university who were 18 years or older at the beginning of the study, the response rate for this study was 37.5%.

Intervention

FOCUS-2. FOCUS-2 is a CACG system designed to assist users with personalized career and education exploration and planning services. The information portrayed herein was derived from the most recent technical report (Career Dimensions, Inc., 2010), which described FOCUS-2's model of career development, history, specific assessments and psychometric properties. FOCUS-2 enables its users a variety of career-related features. These features include self-assessment and an exploration of various career options. Within the self-assessment section, FOCUS-2 users are able to complete assessments involving their interests, personality, self-reported skills, values, and leisure activities. The results of these assessments are ultimately linked to corresponding occupations. Within the exploration of various career options module of FOCUS-2, users are able to search for specific aspects within more than 1,200 occupations by name or industry, perform a search about various academic majors and view important characteristics of two occupations side-by-side (e.g., salary, skills, educational requirements). To date, FOCUS-2 includes common academic majors congruent among colleges and universities and is able to be customized based on each college and

universities' offered majors. Furthermore, over 500 brief (1-2 minute) video clips are available that depict various work tasks within popular occupations.

In terms of credentials, FOCUS-2's technical report indicates that it is fully certified for meeting the standards and criteria established by the Association for Computer Based Career Information Systems (ACSCI). This standard incorporates certified standards in relation to the confidentiality of users' records. FOCUS-2 is also noted to meet the standards and guidelines of the National Career Development Association and the United States Department of Labor. Furthermore, FOCUS-2 includes the United States Department of Labor's O*NET Standard Occupational Classification (SOC) occupational codes, the Dictionary of Occupational Titles (DOT), and the O*NET skills structure in its occupational descriptions and search algorithms.

FOCUS-2 is a revised version of the original FOCUS system (Career Dimensions, Inc., 2007). However, prior to the creation of FOCUS, several different systems were created and revised over time by several prominent researchers. The primary director was Professor Donald E. Super of Teachers College, Columbia University. The system was first sponsored by IBM and the first design was the Education & Career Explorations System (ECES; Myers, Lindeman, Thompson, & Patrick, 1975) for use of students. Other team members over time included: Professor Roger A. Myers of Teachers College, Columbia University, Professor David Tiedeman of Harvard University, Professor David Campbell of the University of Minnesota, and Dr. Frank J. Minor, senior psychologist for the IBM Corporation. Career Dimensions was founded by Dr. Frank J. Minor, who obtained his Ph.D. in Industrial/Organizational Psychology in 1987. According to the technical report, FOCUS has been in use since 1990 in various colleges, universities,

technical institutions, community and state workforce and youth development agencies, and private career and life counseling firms.

FOCUS-2 is comprised of five standardized "Self-Assessments," with which users answer questions assessing specific personal qualities and attributes. FOCUS-2 has been normed on both college and university students (n = 2,788) and working adults (n = 2,469). FOCUS-2 is currently used at over 1,500 college and university campuses. Additional information regarding specific demographic normative data from the creators of FOCUS-2 is not available. For the purposes of this study, first-year college students were instructed to complete the self-assessment inventories as well as the section that allowed them to research various occupations. The self-assessment inventories consist of five different career dimensions and inventories: interests, personality, skills, values, and leisure activities. A description of each inventory is described herein.

The first of the self-assessment inventories include an assessment of the users' interests. The Interest assessment mimics the scales developed by John Holland (Realistic, Investigative, Artistic, Social, Enterprising, and Conventional; RIASEC) from the Strong Interest Inventory (SII; Harmon, Hansen, Borgen, & Hammer, 1994). A combination of a three letter Holland code is created based on an individual's responses to the Interest inventory. FOCUS-2 uses the three letter Holland code for matching Interest Profiles with various occupations. Results of the Interest inventory's factor analysis yielded 6 factor scales with 6 items per scale. A content validity analysis demonstrated that the factors were equivalent to the Holland RIASEC type factors. All factor analysis loads were above .67 on their respective factors. The reliability coefficients for all items reached or exceeded .85.

when needed." The Skills items were all drawn from the U.S. Department of Labor's Skills list.

The Values section is based upon the U.S. Department of Labor's O*NET Work Importance (Values) scales originally developed by Dr. Donald E. Super and Dr. Dorothy Nevill (1986). An assessment of Values enables individuals to focus on what is important to them in their work and their life. This section consists of 13 distinct values, in which, FOCUS-2 users self-select 3 that resonate most with their self-assessment of their principal values. After values are determined, FOCUS-2 assists users in identifying various occupations that they might find satisfying based on the similarity between their work values (e.g., helping others, independence, creativity) and the characteristics of certain occupations. The Values items are congruent with the U.S. Department of Labor's Value lists.

The Leisure Activities section is based on the work of Dr. Donald Super (1980, 1990). According to this theory, leisure is considered to be self-determined activities, free from time commitments in various roles (e.g., student, worker, citizen). Leisure activities may require an expenditure of effort (e.g., sports), or it may be deemed a restful activity. Leisure activities are intended to meet individual's personal needs and satisfy interests, abilities, and values. According to Super's work on "self-fulfillment," individuals engage in leisure activities and work activities that provide self-expression for one's interests, abilities and values. The FOCUS-2 system allows users to indicate the degree of satisfaction he or she would receive by performing various leisure activities. Next, scales akin to the Interest inventory (e.g., Social, Practical, Educational, Leading, Organizing, Artistic) are generated which correspond to various occupations. Item-scale

correlations and item-factor analysis were calculated and yielded 6 factor scales with 6 items per scale. A content validity analysis showed the factors to be equivalent to Holland's six RIASEC type factors. All items had factor analysis loadings above .66 on their respective factors. The reliability coefficients for all items reached or exceeded .85.

After completion of each inventory, users automatically receive their results with a list of matching occupations with the option to click on various occupations to explore more about each individual profession. The results of each inventory are solely through the lens of each career dimension (i.e., interests, personality, skills, values, leisure activities). However, FOCUS-2 users are also provided an opportunity to combine the results of up to five assessments to identify only those occupations that intersect with all chosen career dimensions. Therefore, users are able to independently select which career dimensions they wish to consider to view the results of their self-assessment inventories. FOCUS-2 also users have the opportunity to produce a list ranging from each individual self-assessment inventory to a refined list equally taking into consideration all five self-assessment inventories.

In relation to exploring various occupations, FOCUS-2 has an elaborate and structured approach for each of its 1,200 occupations. Once an occupation is selected, a photograph is depicted toward the right-hand side of the screen. On this occupational page, FOCUS-2 users are first provided a few brief paragraphs concerning the general overview of the specific occupation. Within this section, users are able to briefly scan the provided written information, or in some cases watch a video clip to assess whether it may be an appealing occupation for the CACG system user. On the left-hand side of the screen, there is a "menu" for each occupation, which is a permanent fixture where users

have the ability to further research a given career to increase their knowledge of a particular occupation.

More specifically, this easily accessible menu exists with hyperlinks where users can click on categories to obtain more information associated with a given occupation. These categories include expected duties, skills, and values associated with each occupation. Considering Holland's RIASEC, FOCUS-2 also includes a hyperlink entitled "Interest Profile," which ultimately creates a histogram comparing and contrasting individual results of each of the six Holland codes from the results of one's Interests assessment to a typical interest profile associated with the specific occupation.

In addition, FOCUS-2 provides additional hyperlinks within the menu section on the "homepage" of each occupation. For example, a prognosis for each occupation's outlook in the next five to ten years is provided for users to investigate. This menu also includes a section for gaining knowledge about typical earnings, where a monetary range is provided. A section is available to outline conditions that are critical within the specific occupation (e.g., manual dexterity, accuracy). FOCUS-2 also provides a link for further contact information if users are interested in visiting reputable websites, or writing to a provided address to request additional information associated with a specific occupation. Lastly, there is a section regarding "Areas of Study," which goes into detail about educational requirements and potential academic majors associated with a given career.

Measures

Demographic questionnaires. Participants completed two demographics questionnaires, one during the pre-test and one during the post-test administration of this

study. On the pre-test demographic questionnaire, I requested information regarding age, gender, year in college (student status), self-reported academic major, and race/ethnicity (see Appendix A). The demographic questionnaire for the post-test included specific questions concerning the amount of time spent using FOCUS-2, as well as other career-related activities performed between the time of completing FOCUS-2 to when participants completed the post-test measures (see Appendix B).

Assessment of Attributions for Career Decision-Making. The Assessment of Attributions for Career Decision-Making (AACDM; Luzzo & Jenkins-Smith, 1998) was used to measure participants' attributional style toward making career decisions. The AACDM is a nine-item questionnaire with a factor structure consistent with Weiner's (1979, 1985, 1986) three-dimensional taxonomy for classifying attributions: causality, stability, and controllability. There are three items per dimension, and each item was answered on a score continuum of 1 to 5. Higher scores on items represent more agreement with corresponding statements assessing each subscale (i.e., controllability, causality, stability). Therefore, higher scores indicate attributions that career decision-making are under a person's control, are the result of internal efforts, and are changeable over time (i.e., optimistic attributional style for career decision-making).

Luzzo and Jenkins-Smith (1998) reported the following internal reliability estimates: Controllability scale, .84; Causality scale, .89; Stability scale, .64; and Composite scale, .78. They also reported the 6-week, test-retest reliability coefficients of Controllability, .84; Causality, .89; Stability, .64; and Composite, .78. Items designed to measure the controllability domain include statements that focus on an individual's sense of control in relation to their career decision-making process (e.g., "The career decisions

that I make are under my control."). Items in regard to causality include statements that focus on the belief that forces within an individual are responsible for career decision-making outcomes (e.g., "If my career decisions lead to success, it will be because of my skills and abilities."). Lastly, items which aim to assess the stability domain include statements that evaluate a person's belief in the degree to which career decisions remain stable over time (e.g., "Career decisions often change over time."). Scores on each dimension can range from 3 to 15 with higher scores indicating more internal, controllable, and unstable perceptions of attributions for career decision-making (i.e., optimistic attributional style for career decision-making).

The total AACDM score, which is referred to as the AACDM composite score can range from 9 to 45, with higher scores reflecting an optimistic attributional style for career decision-making. An optimistic attributional style characterizes career decision-making as the result of internal, controllable, and unstable forces that can be modified with increased personal effort.

According to Luzzo (2001), the factor structure of the AACDM was based on an ethnically diverse high school sample ($n = 312$) and college student sample ($n = 149$). Principal-components factor analysis generated three factors consistent with the labels described above. The first factor, controllability, consisted of three items with factor loadings ranging from .48 to .87, accounting for 32% of the variance. The second factor, stability, also consisted of three items with factor loadings ranging from .63 to .81, accounting for 19% of the variance. The last factor was labeled causality, which consisted of three items with factor loadings ranging from .47 to .88, accounting for 13%

of the variance. The internal consistency for this sample for the pre-test was 0.51 and 0.59 for the post-test.

Career Decision Self-Efficacy Scale – Short Form. The short form of the Career Decision Self-Efficacy Scale (CDSE-SF; Betz, Klein, & Taylor, 1996) was used as a measure of self-efficacy expectations for successfully completing tasks requisite to making good career decisions. The CDSE-SF contains five subscales comprising 25 items measuring the five career choice competencies of Crites's (1978) model of career maturity: Self-Appraisal, Gathering Occupational Information, Goal Selection, Planning, and Problem Solving. Responses rate items on a 5-point scale ranging from *no confidence at all* (1) to *complete confidence* (5). A total score is computed by summing scores for the 25 items and dividing that number by 25; higher scores (e.g., 5) indicate greater levels of career decision self-efficacy.

Research (Betz, Klein, & Taylor, 1996; Betz & Luzzo, 1996) has shown that the 25-item CDSE-Short Form is nearly as reliable and is as valid as the original and lengthier Career Decision-Making Self-Efficacy Scale (CDMSE). The CDMSE contained 50 items and was normed on 346 college-age students, with a reported .97 internal consistency reliability coefficient for the total score (Taylor & Betz, 1983). Research by Betz and colleagues (1996) based their psychometric findings on three samples of college students totaling 1,832 participants. The internal consistency reliability of the short form ranged from .73 (Self-Appraisal) to .83 (Goal Selection) for the 5-item subscales and .94 for the 25-item total score (Betz et al., 1996). In a subsequent study, short form reliabilities ranged from .69 (Problem Solving) to .83 (Goal Selection) for the subscales and .93 for the total score (Betz & Klein, 1996). Betz,

Hammond, and Multon (2005) also reported that a 5-level response continuum provided scores as reliable and valid as those obtained with a 10-level response continuum. Criterion-related validity correlations with career indecision and vocational identity were comparable for the two response continua (Betz et al., 2005). Finally, there is also evidence for test-retest reliability (stability): Luzzo (1993a) reported a six-week test-retest coefficient of .83 for the CDSE total score.

Subsequent studies involving individuals of varying age, culture, and race/ethnicity (e.g., White college students, racial/ethnic minority college students, South African university students, Australian and South African high school students, lower socioeconomic status middle school students ages 12 to 15 years, and a Hebrew version) also reported similarly strong results (Taylor & Betz, 1983). According to Betz and Taylor (2005) the overall internal consistency reliability for the CDSE-SF was reported to be .94 for the 25 item total score. Betz and Taylor also cite evidence of concurrent validity established by virtue of strong correlations with the Career Decision Scale (Osipow, Carney, & Barak, 1976) and My Vocational Situation (Holland, Daiger, & Power, 1980). Construct validity also is evidenced by virtue of strong correlations with the Career Decision Scale and the Career Beliefs Inventory (Krumboltz, 1991). The internal consistency for this sample for the pre-test was 0.93 and 0.96 for the post-test.

Procedure

The Dean of Freshman Studies at a private, Catholic northeastern university granted permission to this researcher to investigate first-year college students. A promotional flyer (see Appendix G) was distributed to University Life course instructors within the Freshman Studies Department, a course that all first-year undergraduate

students were enrolled. This promotional flyer was electronically posted to Blackboard, an online database that includes information pertinent to corresponding academic courses. The promotional flyer included detailed information about the study, instructions for participation, as well as hyperlinks to access the pre-test survey, FOCUS-2, and the post-test survey. All potential participants had the option to voluntarily take part in the study. There was no penalty or coercion for not completing the research study and the decision to participate or not participate in the study was completely voluntary, without any incentive.

Within the promotional flyer, participants were alerted that they should use the same username throughout their participation in this study. Instructions clearly stated that all usernames must be a combination of letters and numbers and be at least six characters in length. Participants were encouraged to take note of their username to decrease the likelihood of participants providing distinct usernames across surveys, making it impossible to link pre- and post-test data. Once potential participants clicked on the intended hyperlink from the promotional flyer, they were prompted to enter their username before beginning each survey. Consent to participate was implied by clicking "Next" to enter the survey, which was outlined prior to the start of the surveys (see Appendices E and F).

For the pre-test survey, participants accessed the pre-test hyperlink and entered their unique username. Subsequently, participants completed three surveys (i.e., demographics questionnaire, the CDSE-SF, and AACDM). After participants answered all questions and clicked "submit," they received a reminder message as well as a linked hyperlink to register and complete the CACG system, FOCUS-2. As a precaution, the

promotional flyer also contained detailed instructions for how to access FOCUS-2 in the event that participants wished to complete FOCUS-2 at a later time.

In order to access FOCUS-2, potential participants clicked on the relevant hyperlink and registered for a FOCUS-2 account. They were asked to use the same username as when they completed the pre-test survey. When registering for FOCUS-2, participants were instructed to select the group, "Graduating 2014 – Study" to readily distinguish participants within FOCUS-2 from other system users (e.g., second-year students, alumni). Further instructions provided directions outlining the specific modules within FOCUS-2 that participants of the study were invited to complete. Specifically, participants were instructed to complete all five self-assessment inventories (i.e., interests, personality, skills, leisure activities, and values) under the "Self-Assessment" category. Participants were then able to explore the results of their assessments, in regard to careers that corresponded with their results. Next, participants were encouraged to examine the "Explore the Possibilities" module, which provided participants the ability to search by occupation name, search by industry, find out what people can do with a major in various academic majors, and compare two occupations side-by-side. Participants were informed that they did not necessarily need to complete all sections and modules of FOCUS-2 in one session and they could revisit FOCUS-2 at multiple points whenever they desired, using the provided hyperlink and entering their distinctive username for their FOCUS-2 account.

Once the participants utilized the FOCUS-2 intervention, participants completed the post-test survey. To remind participants to complete the post-test survey, within the FOCUS-2 assessment, there was a hyperlink within the Main Menu page listed under

"Recommended Tools and Websites." This hyperlink stated, "Complete This Survey

After Your Completion of FOCUS-2." This hyperlink electronically directed participants

to the post-test survey, which contained a questionnaire assessing the self-reported

amount of time spent within FOCUS-2, as well as other career-related activities

performed between completion of the pre- and post-test surveys, the CDSE-SF, and the

AACDM. As a safeguard to access the post-test, within the promotional flyer, the link

for the post-test was also available so participants were aware of the online location of

the post-test. Upon full completion of this study, participants successfully used the same

username to complete the pre-test, FOCUS-2, and the post-test.

Chapter IV

RESULTS

In this chapter, I present the results of the statistical analyses of this study. I have organized the results of data analyses in the corresponding sections of descriptive statistics, tests of hypotheses, and summary of findings.

Descriptive Statistics

Means and standard deviations across the Career Decision Self-Efficacy Scale-Short Form (CDSE) and Assessment of Attributions for Career Decision-Making (AACDM) for both the pre- and post-test are presented in Table 1. Increases in both the Total Score of career decision self-efficacy and corresponding factors are apparent from pre- to post-test. For AACDM, however, the overall, Composite Score decreased from pre- to post-test, with a particular decrease in relation to the Controllability and Causality subscales.

Table 1

Mean and Standard Deviation for Total Pre- and Post-test CDSE and AACDM Scores

	Pre-Test		Post-Test	
Measure	*M*	*SD*	*M*	*SD*
CDSE – Total Score	3.44	0.62	3.56	0.69
Self-Appraisal	20.00	3.00	20.72	3.21
Occupational Information	20.26	3.03	20.50	3.47
Goal Selection	19.72	3.30	20.47	3.52
Planning	19.10	3.50	19.62	3.65
Problem Solving	18.68	3.25	19.68	3.56
AACDM – Composite Score	36.58	3.45	36.18	4.00
Controllability	13.35	1.80	13.08	1.97
Stability	09.91	2.12	10.01	2.12
Causality	13.32	1.58	13.09	1.86

Note. CDSE = Career Decision Self-Efficacy; AACDM = Assessment of Attributions for Career Decision-Making

Table 2 outlines both the CDSE and AACDM pre- and post-test scores for the

variables of interest (i.e., gender, race, academic major) in this study.

Table 2

Means and Standard Deviations for CDSE and AACDM by Gender, Race, and Academic Major

	Pre-CDSE		Post-CDSE		Pre-AACDM		Post-AACDM	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender								
Men (*n* = 166)	3.42	.672	3.53	.693	36.10	3.56	35.22	3.90
Women (*n* = 254)	3.46	.580	3.58	.694	36.89	3.35	36.80	3.95
Race								
White (*n* = 268)	3.41	.621	3.54	.689	36.67	3.35	36.18	3.98
Asian (*n* = 46)	3.33	.598	3.37	.741	35.43	3.83	35.04	4.29
Latino/a (*n* = 56)	3.54	.571	3.63	.676	36.18	3.47	36.62	3.68
Black (*n* = 50)	3.60	.639	3.78	.648	37.58	3.38	36.74	4.14
Academic Major								
Declared Major (*n* = 262)	3.55	.615	3.68	.663	36.72	3.53	36.52	3.92
Declared Major, but Uncertain (*n* = 48)	3.10	.472	3.25	.565	36.19	3.66	35.44	4.12
Tracking a Major (*n* = 46)	3.43	.583	3.48	.658	36.91	2.81	35.70	4.27
Undecided (*n* = 64)	3.25	.617	3.34	.801	36.05	3.38	35.69	4.00
Total (*n* = 420)	3.44	.617	3.56	.693	36.58	3.45	36.18	4.01

Note. CDSE = Career Decision Self-Efficacy; AACDM = Assessment of Attributions for Career Decision-Making; Pre-CDSE = Pre-test for CDSE Total Score; Post-CDSE = Post-test for CDSE Total Score; Pre-AACDM = Pre-test for AACDM Composite Score; Post-AACDM = Post-test for AACDM Composite Score.

Notably, women's scores on both CDSE and AACDM were higher than men's scores, but they were not statistically significant for CDSE. Only the AACDM score was found to be statistically significantly different for gender, as women had adopted a more optimistic attributional style for career decision-making in comparison to men. Additionally, individuals who identified as African American/Black had statistically significantly higher scores than Asian Americans on both the CDSE and AACDM after using FOCUS-2.

The self-reported amount of time spent between pre-test and post-test was, on average, 3.67 days ($SD = 8.96$). The variance was 80.22 and the range was 0-48 days. There was no stringent stipulation placed on participants for this study, as the flexible pre-test and post-test dates were intended to allow participants the autonomy to spend as much time as they desired within FOCUS-2. Participants in this study indicated that on average they spent 1.80 ($SD = .91$) hours using FOCUS-2, with a 0.5 – 7.0 hour range.

Data were collected on the proportion of participants that completed specific assessments and modules within FOCUS-2 (see Table 3). The majority of participants (98.2%) completed all five of the available assessments within FOCUS-2; however, they were less apt to explore career occupations on their own accord. Furthermore, information in Table 3 shows that the sample within this study were more inclined to search more general modules, for example "What Can I do with a Major In…" and "Search by Industry," in comparison to more specific, and presumably more sophisticated modules; "Compare 2 Occupations Side By Side" and "Search by Occupation Name." Therefore, participants appeared to have engaged in self-assessment career activities more frequently as opposed to activities that involve exploration of various occupations.

Table 3

Proportion of Sample that Completed Specific Modules within FOCUS-2

Module	Completed	Did Not Complete
Self-Assessment		
Work Interest	416/420 = 99%	4/420 = 1%
Personality	415/420 = 99%	5/420 = 1%
Leisure Activities	409/420 = 97%	11/420 = 3%
Skills	412/420 = 98%	8/420 = 2%
Values	413/420 = 98%	7/420 = 2%
Career Exploration Activity		
Search by Occupation Name	107/420 = 25%	313/420 = 75%
Search by Industry	345/420 = 82%	75/420 = 18%
What Can I Do with a Major In...	379/420 = 90%	41/420 = 10%
Compare Two Occupations Side by Side	35/420 = 8%	385/420 = 92%

Data were collected for the activities that participants completed in between the pre-test and post-test to provide descriptive information concerning other activities participants took part in near their engagement with the FOCUS-2 system. The purpose of this data collection was to provide background information about the vocational activities individuals sought in conjunction with using FOCUS-2. It would be erroneous to make any casual statements about why participants performed certain activities, or if they were considered as a result of exposure to FOCUS-2; however, it is valuable to take into account what other resources first-year college students utilized during the time they completed this computer-assisted career guidance system.

The majority of the sample ($n = 289$, 69%) did not perform any activities in between the completion of the pre-and post-test measures. The 131 participants (31%) that took part in distinct activities between completion of the pre-test and post-test are represented in Table 4. It is important to note that participants were able to select as many activities as applicable. Nearly a quarter of participants indicated that they spoke

with faculty, friends, or family about careers, and 19% researched careers and majors, not through FOCUS-2, but by other means (e.g., books, Internet). Participants seemed much less inclined to seek formal assistance by scheduling an appointment with the university career center, or by attending a career workshop sponsored by the university career center. Although this data mention different career-related activities that participants were engaged in during the time of the study, it is unknown whether FOCUS-2 prompted these activities, or if these activities would have been performed regardless of completing FOCUS-2.

Table 4

Activities Completed Between Pre- and Post-Test

Activity in Between	Attended/Performed	Did Not Attend/Perform
Career Center Appointment	12/420 = 3%	408/420 = 97%
Career Center Group Appointment	3/420 = 1%	417/420 = 99%
Career Center Workshop	9/420 = 2%	411/420 = 98%
Spoke with Faculty/Friend/Family About Careers	98/420 = 23%	322/420 = 77%
Researched Careers/Majors not through FOCUS-2[a]	79/420 = 19%	341/420 = 81%
Other	3/420 = 1%	417/420 = 99%

Note. Other responses included: "internship at local newspaper, shadowed an occupational therapist, and university life class."
[a] = including websites and/or books

Statistically significant bivariate correlations were observed between the pre-test of the CDSE and AACDM, as well as for the post-test of the CDSE and AACDM. To better understand the relationship between these changes, a correlational analysis was conducted between the scales of each instruments. Table 5 displays the bivariate correlation matrix. The CDSE and AACDM pre-test and post-test results revealed statistically significant correlations of .26 and .33, respectively. The Stability subscale on

the AACDM showed less statistically significant relationships with many of the CDSE

scales on both the pre and post assessments. It seems that the Causality and

Controllability subscales on the AACDM seem to positively affect one's career decision

self-efficacy across all five of the CDSE scales, whereas the issue of whether one's career

is malleable (i.e., unstable) was less related to one's confidence in making career

decisions.

Table 5

Pre-test and Post-Test Bivariate Correlations of the CDSE and AACDM Scale Scores

	AACDM Pre-Test			
CDSE Pre-Test	Causality	Stability	Controllability	Composite
1. Self-Appraisal	.351**	-.213**	.301**	.187**
2. Occupational Information	.294**	-.131**	.272**	.196**
3. Goal Selection	.421**	-.237**	.364**	.238**
4. Planning	.349**	-.151**	.275**	.211**
5. Problem Solving	.324**	-.089	.335**	.269**
6. CDSE – Total	.360**	-.120*	.325**	.261**
	AACDM Post-Test			
CDSE Post-Test	Causality	Stability	Controllability	Composite
1. Self-Appraisal	.389**	-.126**	.480**	.351**
2. Occupational Information	.375**	-.072	.378**	.322**
3. Goal Selection	.433**	-.191**	.489**	.341**
4. Planning	.356**	-.087	.398**	.316**
5. Problem Solving	.357**	-.040	.450**	.367**
6. CDSE – Total	.350**	-.084	.432**	.331**

Note. CDSE = Career Decision Self-Efficacy; AACDM = Assessment of Attributions for Career Decision-Making.
*Correlation is statistically significant at the .05 level (two-tailed). **Correlation is statistically significant at the .01 level (two-tailed).

Tests of Hypotheses

Hypothesis 1. It was expected that participants in this study would report a

significant increase in their confidence for making career decisions and adopt a more

optimistic attributional style for career decision-making after using the CACG system, FOCUS-2. To test Hypothesis 1, a repeated measures Analysis of Variance (ANOVA) was conducted. Pre-test and post-test scores were acquired on the Career Decision Self-Efficacy Scale-Short Form (CDSE-SF), as well as the Assessment of Attributions for Career Decision-Making (AACDM) measure. In between completion of the pre- and post-test measures, all participants utilized the intervention, FOCUS-2. The purpose of the repeated-measures ANOVA was to test differences in group means on each of the two, separate dependent variables, CDSE and AACDM, across two different measurements (pre- and post-test).

Two separate repeated measures ANOVAs were conducted to assess whether there were significant differences in CDSE and AACDM after using the computer-assisted career guidance system FOCUS-2. See Table 6 for the tests of within-subjects contrasts for CDSE and AACDM. The dependent variable in each analysis was the CDSE total score and the AACDM composite score. The means and standard deviations for CDSE and AACDM scores are presented in Table 1. The results for the repeated measures ANOVA assessing changes in career decision self-efficacy indicated a significant effect for CDSE, Wilks's $\lambda = .96$, $F(1, 419) = 19.12$, $p < .001$. Accordingly, there was a significant increase in first-year college students' confidence in their ability to make career decisions after using the CACG system, FOCUS-2. The initial hypothesis, which expected an increase in CDSE, was supported.

Table 6

Tests of Within-Subjects Contrasts for CDSE and AACDM

		Type III Sum of Squares	df	Mean Square	F	Sig.
CDSE						
CDSE	Level 1 vs. Level 2	5.72	1	5.72	19.12	.000
Error([a])	Level 1 vs. Level 2	125.28	419	.299		
AACDM						
AACDM	Level 1 vs. Level 2	67.20	1	67.20	5.97	.015
Error([b])	Level 1 vs. Level 2	4718.80	419	11.26		

Note. [a] = CDSE and [b] = AACDM; CDSE = Career Decision Self-Efficacy; AACDM = Assessment of Attributions for Career Decision-Making.

In addition, to participants' overall confidence in their abilities to make career decisions, four of the five subscales on the CDSE-SF also increased; Self-Appraisal, $F(1, 419) = 38.64$, $p < .001$; Goal Selection, $F(1, 419) = 34.21$, $p < .001$; Planning, $F(1, 419) = 19.55$, $p < .001$; and Problem Solving, $F(1, 419) = 58.79$, $p < .001$. One subscale, which assessed one's confidence in gathering occupational information, $F(1, 419) = 3.80$, $p = .052$, was not significantly different from pre- to post-test.

The results for the repeated measures ANOVA assessing changes in assessment of attributions for career decision-making also indicated a significant effect for AACDM, Wilks's $\lambda = .99$, $F(1, 419) = 5.97$, $p < .05$. However, the scores from pre-test to post-test represent a significant decrease, as opposed to the hypothesized increase in AACDM. This finding indicates an adoption of a more pessimistic attributional style for career decision-making after using the CACG system, FOCUS-2. Therefore, the hypothesis was not fully supported, since participants adopted a more pessimistic attributional style for

career decision after using FOCUS-2 instead of the anticipated, more optimistic attributional style.

Regarding the specific subscales for the AACDM, for the Controllability subscale, $F(1, 419) = 10.01$, $p < .05$, there was a significant difference, in that, participants began to believe that career decisions were less under their control after using FOCUS-2. Also for the Causality subscale, $F(1, 419) = 8.29$, $p < .05$, participants believed that career decisions were caused by external factors. For the Stability subscale, $F(1, 419) = .894$ $p = .345$, there was no significant difference found, suggesting that there was no difference between the attribution that career decisions are inconsistent (i.e., unstable) after exposure to FOCUS-2.

Considering Weiner's (1986) classification system as a framework for attributional style, participants adopted a more pessimistic attributional style after interacting with the CACG system, FOCUS-2. Maples and Luzzo (2005) who are recognized for their application of attribution theory to career decision-making would assert that this study's participants believed that their career decision-making process was the result of external and uncontrollable forces after interaction with FOCUS-2. Thus, after using FOCUS-2, participants were more likely to believe that career decisions are not in their control and cannot be modified by increased efforts.

Hypothesis 2. It was anticipated that there would be a positive relationship between participants' self-reported amount of time spent using FOCUS-2 and increased career decision self-efficacy for first-year college students. To assess the strength and direction of the relationship between time and career decision-self-efficacy, a Pearson correlation was performed. This purpose of this statistical method was to determine the

magnitude and direction of the hypothesized relationship. If a significant relationship was to be found, self-reported amount of time spent on FOCUS-2 was intended to be used as a covariate in subsequent analyses to control for the potential confounding variable of amount of time spent on FOCUS-2.

The results indicated that the correlation between the self-reported amount of time spent using FOCUS-2 and the total score for career decision self-efficacy was not statistically significant, $r(418) = -.053$. Furthermore, each of the five subscales of the CDSE scale did not generate a significant relationship. The correlations between the amount of time spent using FOCUS-2 and the CDSE subscales were the following: Self-Appraisal, $r(418) = -.085$; Occupational Information, $r(418) = .013$; Goal Selection, $r(418) = -.066$; Planning $r(418) = -.063$; and Problem Solving $r(418) = -.047$. All correlations were not significant at the .05 alpha level. Therefore, the self-reported amount of time spent using FOCUS-2 was not used as a covariate to control for career decision self-efficacy in this study in corresponding analyses.

Hypothesis 3. It was expected that there would be a positive relationship between the self-reported amount of time spent using FOCUS-2 and a more optimistic attributional style for career decision-making among first-year college students. To assess the strength and direction of the relationship between time and assessment of attributions for career-decision making, a Pearson correlation was completed. This statistical approach determines the direction and strength of the relationship between two variables. If a significant relationship were to be found, self-reported amount of time spent on FOCUS-2 was intended to be used as a covariate in subsequent analyses to control for the potential confounding variable of time spent using FOCUS-2.

The results demonstrated that the initial hypothesis regarding time spent was not supported, since the correlation between the self-reported amount of time spent using FOCUS-2 and the total score for assessment of attributions for career decision-making was not statistically significant, $r(418) = .009$. Furthermore, each of the three subscales of the AACDM scale did not generate a significant relationship. More specifically, the correlations between the amount of time spent using FOCUS-2 and the corresponding subscales were the following: Controllability, $r(418) = -.052$; Causality, $r(418) = .004$; and Stability $r(418) = .062$. All correlations were not significant at the .05 alpha level. Therefore, regardless of the amount of time FOCUS-2 users utilized the system, time did not have a significant relationship on the social cognitive career variables of interest in this study (i.e., CDSE and AACDM).

Therefore, in both the cases of career decision self-efficacy and assessment of attributions for career decision-making, self-reported amount of time spent using FOCUS-2 was not used as a covariate in subsequent analyses to control for confounding variables. The purpose of assessing time spent using FOCUS-2 was to not only assess the relationship among time, CDSE, and AACDM, but also to control for a potential confounding variable for more uncontaminated, accurate analyses.

Hypothesis 4. It was expected that FOCUS-2 would be more effective for women in terms of increases in career decision self-efficacy and adoption of a more optimistic style for career decision-making. This research question was analyzed by performing two separate repeated measures ANOVAs for each variable of interest (i.e., CDSE and AACDM), taking into consideration a change over time from pre-test to post-test.

In regard to CDSE, there were no significant differences found between men and women, $F(1, 418) = .49$, $p = .48$. Therefore, the hypothesis was not fully supported since participant's gender was not a significant factor for the effectiveness of FOCUS-2 in terms of changes in career decision self-efficacy. The means for women on the pre-test (3.46, $SD = .58$) and post-test (3.58, $SD = .69$), and the means for men on the pre-test (3.42, $SD = .67$) and post-test (3.53, $SD = .69$) were very similar and did not generate statistically significant differences for career decision self-efficacy.

For assessment of attributions for career decision-making, it was expected that FOCUS-2 would be more effective for women in the adoption of a more optimistic style for career decision-making. This research question was analyzed by performing a repeated measures analysis of variance for AACDM and gender. There was a significant difference found between men and women, $F(1, 418) = 12.96$, $p < .001$; in the hypothesized direction. The grand mean for gender indicated that women (36.85) had a more optimistic assessment of attribution for career decision-making in comparison to men (35.66). However, the hypothesis was not entirely supported since there was no difference between women and men in the confidence in their ability to make career decisions (i.e., CDSE) and analyses only demonstrated significant changes in AACDM.

Hypothesis 5. It was hypothesized that FOCUS-2 would be more beneficial for White participants in regard to greater career decision self-efficacy and adoption of a more optimistic attributional style for career decision-making in contrast to individuals of color (i.e., Asian Americans, African Americans, and Hispanic/Latino/Latino Americans) in this study. This research question was analyzed by performing two separate repeated measures ANOVAs, one assessing CDSE and one assessing AACDM.

In regard to CDSE, a significant difference was found for race, $F(3, 416) = 3.22, p < .05$. A post-hoc Tukey honestly significant difference (HSD) was conducted and generated a finding that African American individuals reported significantly greater confidence in their ability to make career decisions (3.69) in comparison to Asian American participants (3.35). This finding was significant at the .05 alpha level. Therefore, participant's self-reported race was a significant factor for the effectiveness of FOCUS-2 in terms of changes in career decision self-efficacy; however, the initial hypothesis was not supported since White individuals did not report greater confidence in their ability to make career decisions in comparison to individuals of color. Instead, there was a significant difference found between African American and Asian American participants.

In regard to assessment of attributions for career decision-making, a significant difference was found for race, $F(3, 416) = 2.75, p < .05$. A post-hoc Tukey HSD was conducted and generated a finding that African American individuals (37.16) reported significantly more optimistic assessment of attributions for career decision-making than Asian American participants (35.24), which was significant at the .05 alpha level. Therefore, participant's self-reported race was a significant factor for the effectiveness of FOCUS-2 in terms of changes in their assessment of attributions for career decision-making; however, the original hypothesis was not supported since White individuals did not have more optimistic attributional style toward making career decisions than the participants of color. Rather, African American individuals in this study reported more optimistic assessment of their career decision making than Asian Americans, which was statistically significant.

Hypothesis 6. It was hypothesized that students with a declared major would benefit more from FOCUS-2 as evident by greater career decision self-efficacy and adoption of a more optimistic attributional style for career decision-making than first-year college students who identify as undecided, tracking a major, or have a declared major, but are uncertain about their academic major of choice. This research question was analyzed by performing two separate repeated measures ANOVAs for career decision self-efficacy and assessment of attributions for career decision-making.

For CDSE, there was a significant difference found for career decision self-efficacy and self-reported academic major, $F(3, 416) = 11.47, p < .001$. A post-hoc Tukey HSD was conducted and generated findings that participants with declared majors (3.62) had significantly more confidence ($p < .001$) in their abilities to make career decisions than those participants who indicated that they had a declared major, but were uncertain in their major (3.18). Furthermore, participants with declared majors (3.62) also had significantly more confidence ($p < .001$) in their abilities to make career decisions than undecided participants (3.30). Thus, participant's self-reported academic major was a significant factor for the effectiveness of FOCUS-2 in terms of changes in their career decision self-efficacy. Therefore, the initial hypothesis was partially supported because participants with declared majors reported significantly greater CDSE.

In regard to assessment of attributions for career decision-making, there were no significant difference found for academic major, $F(3, 416) = 1.423, p = .234$. Therefore, this hypothesis was not supported since participants with a declared major did not report a statistically significant difference in attributional style for career decision making in comparison to participants who indicated that they were undecided, tracking a major, or

had a declared major, but were uncertain about their academic major. Therefore, FOCUS-2 did not significantly change participants' assessment of attributions for career decision-making based on participants' self-reported academic major status.

Summary of Results

Results of the present study reveal that FOCUS-2, as a career intervention, led to significant differences for career decision self-efficacy and changes in assessment of attributions for career decision-making for first-year college students at a small, private university in the Northeast. It was anticipated that there would be a significant increase in career decision self-efficacy after exposure to FOCUS-2. This research hypothesis was supported in that there was a significant increase in the overall confidence in ability to make career decisions, as well as on the subscales of Self-Appraisal, Goal Selection, Planning, and Problem Solving after completion of FOCUS-2. A surprising finding was that the significant change in assessment of attributions for career decision-making variable was in an unexpected direction. After using FOCUS-2, there was an adoption of a more pessimistic, rather than the hypothesized optimistic style of career decision-making for first-year college students. Furthermore, there were significant differences on two subscales of the AACDM, indicating that after using FOCUS-2 participants believed that career decision-making was not under their control and was caused by external factors.

This study also revealed that the self-reported amount of time spent using FOCUS-2 did not significantly correlate with career decision self-efficacy and assessments of attribution for career decision-making. Furthermore, the amount of time using FOCUS-2 ($M = 1.80$ hours, $SD = .91$) did not significantly correlate with any of the

CDSE or AACDM subsequent subscales. Thus, this study suggests that spending more time on FOCUS-2, as hypothesized, does not necessary result in more positive social cognitive career gains. It is also important to note that participants did not fully utilize all modules within FOCUS-2 (see Table 3) and were more interested in modules involving career self-assessment than occupational exploration.

In regard to the independent variables of interest in this study (i.e., race, gender, academic major), there were several findings that are important to highlight. In regard to gender, there was no significant difference found for men and women for career decision self-efficacy. However, for assessment of attributional style for career decision-making, there was a significant difference found, in that, women were more optimistic than men in their attributions for career decision-making after utilizing FOCUS-2.

Concerning participants' race as a variable of interest in this study also yielded significant findings. The findings, however, were distinct from the initial hypotheses set forth in this study. For both CDSE and AACDM, there were significant differences found for race after completion of FOCUS-2. In this study, African Americans reported more confidence in their ability to make career decisions, and reported a more optimistic style in their career decision-making than Asian Americans. White participants were not significantly different than individuals of color for both CDSE and AACDM, which was initially hypothesized.

The self-reported academic major of participants also generated noteworthy results. Specifically for individuals' confidence in their ability to make career decisions, participants with declared majors reported significantly greater career decision self-efficacy than declared majors who indicated that they were uncertain in their choice of

major. Participants with declared majors also reported significantly more confidence in their ability to make career decisions in comparison to undecided students. This finding partially supported the initial hypothesis set forth in this study, however, for AACDM, no significant differences were found for academic major. This finding suggests that first-year college students' self-reported academic major (i.e., declared major, declared major, but uncertain, tracking a major, or undecided major) does not differentiate significant changes for attribution for career decision-making style after using the CACG system, FOCUS-2.

Chapter V

DISCUSSION

In this chapter, I summarize the findings of the current study, offer an explanation of the results, and provide an outline of the implications for counseling and career center professionals. I also explore relevant limitations of this study and suggest directions for future research.

Summary of Findings and Discussion of Results

Participants in this study reported to use FOCUS-2 for an average of 1.80 hours ($SD = .91$). This finding is similar to the 2 hour modal average of Taber and Luzzo's (1999) study assessing the CACG system, DISCOVER. In regard to the modules used within FOCUS-2, the majority of participants completed all five of the self-assessment inventories within FOCUS-2 (i.e., interests, skills, personality, leisure interests, and values). Participants were less apt to independently search for occupational information, and tended to use more general modules, as opposed to more specific career modules. This finding suggests that first-year college students may be more interested in self-appraisal than exploring information about specific occupations. This makes sense for the large majority of first-year students who are traditional aged – and thus see work as still temporally distant. Further, participants tended to be more interested in more global areas of careers (e.g., industry) and tended to focus more on academic majors than specific careers. Again, these results seem to be developmentally appropriate for the majority of traditional aged first-year college students who often desire opportunities for self-examination and may not yet know the exact career they wish to pursue.

The fact that FOCUS-2 users in this study did not use all modules to search for occupational information is also akin to the findings of Gati and Tikotzki (1989). Gati and Tikotzki found that CACG users pursued information on some, but not all, available modules within the CACG system. The results of this study also lend well to Gore, Bobek, Robbins, and Shayne's (2006) implication that CACG users may approach CACG systems both in linear fashions (i.e., completing self-assessments and then exploring occupations based on their assessment results) and nonlinear fashions.

Regarding the activities that participants engaged in between completing the pre-test and post-test measures, nearly a quarter of participants indicated that they spoke with a friend or family member about careers. It cannot be interpreted that participants spoke with family members as a result of using FOCUS-2; however, it is important to consider that CACG systems may serve as a catalyst for first-year students to further consider their career direction, by sharing their career findings with others (e.g., friends, family) during their engagement in FOCUS-2. Furthermore, 19% of participants indicated that they researched careers and academic majors outside of FOCUS-2 (e.g., books, Internet) after having used the CACG system.

Participants in this study seemed much less inclined to seek formal assistance by scheduling an appointment with the university career center, or scheduling an appointment to attend a career workshop sponsored by the university career center. This finding has important implications for students' willingness to seek career counseling, considering the possible reluctance to seek counseling due to a perceived stigma associated with asking for help (e.g., Sampson, 2000; Sampson & Lumsden, 2000). This finding may also be interpreted that FOCUS-2 users felt comfortable using and

interpreting their results independently and therefore, did not feel the need to further discuss their results with a career professional.

Career decision self-efficacy. Results for CDSE revealed significant increases in career decision self-efficacy over time for first-year college students after using FOCUS-2. In particular, there were significant increases on four of the five subscales of the CDSE-SF. Therefore, participants felt greater confidence in self-appraisal, in the selection career goals, in planning their career, and in solving problems related to careers after using FOCUS-2. The gathering occupational information subscale was not significantly significant; however, it is important to recall that the majority of participants did not thoroughly use many of the modules within FOCUS-2 that involve collecting occupational information. Specifically, only 25% of the participants in this study used the module entitled, "Search for Occupation by Name" within FOCUS-2. It is unknown whether a greater percentage of participants utilized this module, if statistical significant may have emerged on the gathering occupational information factor, yet this module appears to have high face validity for the gathering occupational information subscale within the CDSE-SF.

The findings of this study replicate previous research studies (Betz & Borgen, 2009; Fukuyama, Probert, Neimeyer, Nevill, & Metzler, 1988; Maples & Luzzo, 2005) that demonstrated increased confidence in engaging in career decision-making activities after using other CACG systems (i.e., CAPA, DISCOVER, FOCUS). Results of this study can now place FOCUS-2 in a comparable category to other CACG systems supported by major testing companies (e.g., DISCOVER, SIGI) after examining its effectiveness in increasing first-year college students' career decision self-efficacy. The

fact that there were increases in CDSE for first-year college students after using FOCUS-2 can be justified through Bandura's (1997) social cognitive theory, which posits that self-efficacy can be modified through tasks that involve personal performance accomplishments. Throughout the components of FOCUS-2, users were provided opportunities to complete self-assessments explore various vocational occupations. This procedure likely fostered personal performance accomplishments, thereby increasing career decision self-efficacy.

Assessment of attributions for career decision-making. By completing the available career-related modules, a FOCUS-2 user personally engages in and completes various career assessments and explores a range of occupations independently. After using FOCUS-2, it was expected that participants would attribute their career decision-making to more internal, controllable, and unstable factors (i.e., optimistic assessment of attribution for career decision-making). However, results of this study represented a significant decrease in AACDM, suggesting adoption of a more pessimistic attributional style for career decision-making for first-year college students after using FOCUS-2. Specifically, the results revealed that after using FOCUS-2, participants began to perceive that career decisions were less under their control and were more likely caused by external factors.

Possible reasons for this finding are discussed herein. To begin, it is important to consider the recession of our economic climate and the harsh vocational landscape of the United States. The distortion of industry and occupational boundaries; the upsurge of technological advances; and rapid globalization have all contributed to a new and different work context, which is largely unpredictable and erratic (Sullivan & Baruch,

2009). FOCUS-2 allows participants to acquire information on occupational salary, projected outlook, and the capability for job advancement. Thus, a cohort effect may have occurred where less assurance and controllability may be perceived by FOCUS-2 users; believing less that career decisions are a direct result of their efforts due to a greater awareness of recession and other uncontrollable factors. Consequently, they may feel less in control and may perceive their career decision to be the result of external forces (e.g., the economy).

It is also likely that FOCUS-2 users may have felt overwhelmed, or puzzled after using the CACG system. For instance, once career self-assessments are completed, FOCUS-2 does not rank-order specific occupations like other well established vocational assessments (e.g., The Strong Interest Inventory; Harmon, Hansen, Borgen, & Hammer, 1994). Instead, several corresponding careers are provided in alphabetical order for the user to peruse independently. This notion is related to Gelatt's (1989) stance that when too much information is gathered during one's decision-making process, many individuals may have difficulty processing it all effectively. This feeling of ambiguity may contribute to a perceived lack of control concerning one's career decisions, or lead to negative career thoughts (e.g., Paivandy, Bullock, Reardon, & Kelly, 2008) resulting in disinterest in the CACG system, or difficulties in the career decision-making process.

Additional explanations for the unexpected results of the AACDM include the necessity to approach AACDM with a multiculturally sensitive lens. For example, 40 years ago MacDonald (1971) considered *powerlessness* and *external locus of control* to be one in the same. However, we know that some cultures may genuinely operate more from an external locus of control. For example, Hamid (1994) found that individuals

from a collectivist society (e.g., Taiwan) are more likely to possess an external locus of control in comparison to individuals from an individualistic society (e.g., The United States). Collectivism places more emphasis on the goals of the group and defines the self in relation to others (Triandis, 1995). This suggests that an external locus of control may be more commonplace in different societies and not necessarily a sign of pessimism or weakness.

Due to cultural discrepancies in the assignment of either an optimistic or pessimistic attributional style for career decision-making, I purport that these classifications be substituted to "active" and "passive." A revision to these descriptors dilutes the notion that an optimistic style is ideal, while maintaining the discernment for different styles in attributions for career decision making. Despite dismantling Weiner's (1986) initial classification system, this construct is still applicable, yet respectfully renewed within a multiculturally sensitive framework. Therefore, I recommend a classification system which contends that an active attributional style for career decision-making is based on the notion that career decision-making is the product of internal, dynamic, and controllable forces that can be modified by personal efforts, and a passive attributional style for career decision-making is based on the idea that career decision-making is the result of external, fixed, and uncontrollable factors.

Moreover, considering Lease's (2004) study, which found that White individuals demonstrated a more internal locus of control in comparison to people of color, it is important to consider why this finding was not replicated. In this study, African American participants reported a more internal locus of control than Asian Americans and there were no significant differences found for the other racial groups assessed in this

study (i.e., White, Hispanic/Latino) for AACDM after using FOCUS-2. One possible explanation is that White individuals, who already are in a position of power as members of the dominant culture, may be less inclined to fully consider the role of causality in relation to their career because of White Privilege (e.g., McIntosh, 1988). For example, after interaction with FOCUS-2, White individuals may automatically assume that they will advance in their career and prevail given their unearned privileges, rather than based on their internal efforts, or external factors (e.g., luck). For instance, not everyone has family and friends at their convenience for networking purposes to provide employment opportunities (Elliott, 2000). In fact, research indicates that when using informal methods (e.g., personal contacts) for the employment and career exploration, African Americans are less successful in comparison to White Individuals (Braddock & McPartland, 1987; Neckerman & Kirschenman, 1991).

The happenstance learning theory (Krumboltz, 2009) is yet another possible explanation for the results of this study. This theory posits that it is implausible to foretell the destiny of individuals' careers since it is a byproduct of both planned and unplanned events. Unplanned events are equal to chance events, which imply the absence of control. Mitchell, Levin, and Krumboltz (1999) proposed that because of the rapid changes in the world of work, chance events should strongly be considered as part of the process of career counseling and both clients and career counselors should perceive the chance factor as both inevitable and desirable. Cabral and Salomone (1990) further asserted that it is unlikely for individuals to clearly define their career direction to perfection with complete certainty due to these unplanned circumstances.

Mitchell and colleagues warn that happenstance theory should not be mistaken for reliance on fate or superstition. In other words, individuals should not inertly wait for an opportunity to come to them without some degree of personal effort in finding opportunities and taking action toward opportunities for their career development. When considering Krumboltz's (2009) happenstance learning theory, a balance between remaining open to chance opportunities and actively engaging in one's career development is warranted. Thus, simply placing oneself in a new chance situation does not guarantee fortunate outcomes and meticulously planning one's career future does not always predict satisfaction with one's career. There is a key difference between an individual who solely relies on luck to solve problems and someone who is open to new and unforeseen opportunities and is also active in his or her search (Mitchell et al., 1999).

Amount of time spent using FOCUS-2. According to Cairo (1983), several studies on CACG systems fail to exam how the amount of time spent using a CACG system affects the user. Concerning the self-reported amount of time spent using FOCUS-2 in this study, there were no significant relationships found between the career decision self-efficacy total score and the five subscales, as well as the assessment of attributions for career decision-making composite score and the ensuing three subscales. These findings are similar to the findings of Reardon, Peterson, Sampson, Ryan-Jones, and Shahnasarian (1992), in that, Reardon and colleagues found that the amount of time spent using a CACG system was not related to other vocational variables, including career decidedness, vocational identity, information needs, perceived barriers, or user-satisfaction with the CACG system. While it is possible that no relationship exists between time spent using a CACG system and relevant outcomes, it is also possible that

students inaccurately (i.e., over or under) reported the amount of time they spent using the CACG system. Perhaps future research could employ the CACG system in keeping time – and improving accuracy of this construct.

Impact of gender. There were no significant differences found between men and women over time in regard to career decision self-efficacy after using FOCUS-2. This finding is similar to Kivlighan, Johnston, Hogan, and Mauer (1994), when these authors found that men and women did not vary in the amount of gains in vocational identity as a result of using the CACG system, SIGI Plus. This finding is also related to several studies that found either minimal differences or no differences in career decision self-efficacy between men and women within the college population (Chung, 2002; Luzzo & Ward, 1995; Taylor & Betz, 1983; Taylor & Popma, 1990).

For assessment of attributions for career decision-making, a significant difference was found in that women reported a more optimistic attributional style over time for career decision-making than men after using FOCUS-2. Therefore, the initial hypothesis was supported, which takes into account Lease's (2004) earlier finding that women possess a more internal locus of career control than men, which is related to the controllability component of assessment of attributions for career decision-making.

One possible explanation for differences in AACDM by gender is derived from a review of Gottfredson's (1981, 2002) theory of circumscription and the theory of identity foreclosure (Marcia, 1987, 1994a, 1994b) suggesting that women, because of their socialized gender roles, eliminate potential career opportunities in advance and end up with less-than-favorable career aspirations. These constricted gender stereotypes often limit women to occupations that are lower paid, have less prestige and status, and involve

larger responsibilities for the home and family (Betz, 1994; Cejka & Eagly, 1999; Fitzgerald, Fassinger, & Betz, 1995). After using FOCUS-2, women perceived a greater sense of optimism about career decision-making in comparison to men. This increased perception of internal controllability may be due to an expansion of their existing schemas about possible career options as a result of a multitude of results from both career assessments and the exploration of various careers. Thus, women may perceive a more open, dynamic job market, which makes them feel increased personal responsibility for their career decision-making.

Impact of race/ethnicity. For this study, a significant difference was not found between White participants and participants of color for career decision self-efficacy over time after using FOCUS-2. All four groups (i.e., White, African American, Asian, Latino/Latina) experienced increases in career decision self-efficacy much like Betz and Borgen's (2009) study, when both FOCUS and CAPA generated increases in CDSE for all three racial groups assessed in their study (i.e., White, African American, Asian American). However, this study did not mirror Gloria and Hird's (1999) findings that White college students had greater career decision self-efficacy than college students of color. In this study, African American participants reported significantly greater confidence in their ability to make career decisions in comparison to Asian American participants after using FOCUS-2.

Research indicates that Black, or African American students, are more likely to experience racism, and perceive prejudicial treatment and barriers to career development (Henry, Bardo, & Henry, 1992; Keller, Piotrowski, & McLeod, 1992; Luzzo, 1993b). Rollins and Valdez (2006) have found that increasing reports of perceived racism against

one's group has been associated with high career decision-making self-efficacy.

Furthermore, Black adolescents have also been cited as aspiring to prestigious occupations for which they may not be realistic. For example, Parmer (1993) reported that 32% of inner-city 11th and 12th graders thought they were likely to become professional athletes within 10 years, despite the fact that the actual probability of their doing so was approximately 1 in 50,000.

With regard to Asian Americans, research has established higher levels of dependent decision-making styles, less mature career attitudes, and lower levels of career vocational identity in comparison to White Americans (Hardin, Leong, & Osipow, 2001; Leong, 1991). Asian Americans, who are from a traditionally collectivistic culture, are likely to view career choice as important both for themselves and for their families. Yet, it important to consider the degree of acculturation since the results from the Hardin and colleagues study indicated that as Asian Americans became more acculturated, they tended to lose their traditional collectivistic orientation and to reveal more mature career choice attitudes.

In regard to AACDM, Luzzo and Jenkins-Smith (1998) have urged researchers to examine whether members of certain racial/ethnic groups have a more optimistic career decision-making attributional style relative to members of other cultural groups. For assessment of attributions for career decision-making and race/ethnicity, findings in this study did not reveal a significant difference between White participants and participants of color. Instead, African American participants reported significantly more optimistic assessment of attributions for career decision-making than Asian American participants after using FOCUS-2.

Like other cultures, African Americans have been cited as placing greater value on collectivism (Fouad & Bingham, 1995; Nobles, 1976), which has been previously cited as being more likely to possess an external locus of control than individuals from an individualistic culture (Hamid, 1994). However, Fouad and Bingham (1995) have suggested that the African American worldview might be characterized by an awareness of external barriers (e.g., racism), which may affect their career decision-making, but they may also possess a more internal, personal responsibility for selecting a career. Therefore, despite perceived or realistic barriers, African American individuals may be more resilient and perceive a sense of personal controllability surrounding their career decision-making.

Asian American students were cited in one study as reporting parental pressure to be one of the top five factors influencing their career choice (Singaravelu, White, & Bringaze, 2005). Yet, Leong, Hardin, and Gupta (2010) warn against not assuming that one's interests are necessary different from those important family members. Therefore, not only is it important for both researchers and clinicians to consider the interests of the family, but it is also important to not automatically assume that family and individual interests are dissimilar. Asian Americans are influenced by their traditional cultures, which are characterized by placing high values on collectivism, interdependence, deference paid to older people and authority, and conformity with social norms (Moy, 1992). FOCUS-2 does not incorporate questions about family, which may have discouraged participants who identify as Asian American.

Impact of academic major. In many colleges and universities students' career decision making is typically classified into one of two groups: "decided" or "undecided."

Historically, undecided students have received flak and negative connotations for not firmly committing to a choice of major, such as having low self-esteem, a dependence on others, and high anxiety (e.g., Ashby, Wall, & Osipow, 1966). Yet, Noel, Levitz, and Saluri (1985) estimated that approximately 75% of college students fall under a definition of "undecided" at some point in time. This study considered various subtypes to better categorize first-year students (i.e., undecided, declared major, tracking a major, and declared, but uncertain) based on the recommendations of previous studies.

In regard to academic major and career decision self-efficacy, results indicated that after using FOCUS-2 participants with declared majors reported significantly more confidence in their abilities to make career decisions than those participants who indicated that they had a declared major, but were uncertain in their major. Furthermore, participants with declared majors also reported significantly more confidence in their abilities to make career decisions than undecided participants after using FOCUS-2. This finding is similar to the findings of Gloria and Hird (1999). Gloria and Hird found that students who had a sense of efficacy with career decision-making were more likely to have made a decision about their career choice (i.e., declared major). Also the current study replicated Taylor and Popma's (1990) study, which found that undecided students reported lower career decision self-efficacy than individuals with a declared major or tentative choice of major.

Orndorff and Herr (1996) describe that many beginning undergraduate college students who are either declared or undeclared about their academic majors express uncertainty about their careers. This finding appears accurate, as 11% of participants in this study described their academic major as, "declared major, but uncertain."

Furthermore, this particular group experienced significantly less confidence in their ability to make career decisions in comparison to those participants with declared majors. Therefore, it is prudent to also consider career indecision as a developmental process, where uncertainty can be perceived as a normal, or healthy response for many college students. In other words, before haphazardly choosing an academic major, students should obtain adequate information about themselves and information about various majors and corresponding occupations to make an informed decision.

For academic major and assessment of attributions for career decision-making there were no significant differences found for academic major after using FOCUS-2. This hypothesis was exploratory in nature, as no published studies have assessed the impact of a CACG system on AACDM, while considering the role of participants' academic major. Previous research has suggested that the majority of college students, particularly first- and second-year students typically lack the knowledge and experience required to proficiently execute a decision concerning their choice of major and career direction (Tillar & Hutchins, 1979). Promisingly, Lewallen's (1993) study found that there was no evidence that undeclared students had a lesser chance of persisting in college than did decided students.

Implications for Counseling and Career Center Professionals

Based on the ethical concerns with the usage of CACG systems (e.g., Barak, 2003), it is strongly recommended for counseling and career professionals to offer feedback sessions to further discuss the results of the FOCUS-2 assessment. Within this study, the university career center had offered several workshops to focus on interpretation of their results after collecting data on the pre-test and post-test. University

Life Instructors were provided postcards to distribute to their students in class and during advising sessions to promote these services. Also, an advertisement was posted in the university newspaper to provide participants an outlet to have their results explained in more detail, or to provide clarification if students were uncertain about their results.

When presenting any assessment, it is the counselor's responsibility to determine the appropriateness of the assessment for the client. Career counselors and mental health professionals should not overlook their personal responsibility of ensuring accurate interpretation and understanding of results from CACG systems for the welfare of all clients. According to Sampson, Peterson, and Reardon (1989), it is the counselor's responsibility to assess the degree to which a client's needs are congruent with the goals of the CACG system, as well as assess the emotional, physical, and cognitive capacity of the client to effectively use the system. Future possibilities for research and practice may include supplementing additional resources to CACG systems, including videoconferences, podcasts, or an on-call counselor to discuss results.

The availability and accessibility of CACG systems allow individuals to utilize resources from afar (e.g., commuter students) and accommodates students with career concerns who may not be available for counseling appointments during regular business hours (e.g., nontraditional students, students with children, students with part-time, or full-time jobs). Furthermore, individuals who have been reluctant to seek services because of perceived stigma may also be attracted to CACG systems because of the anonymity offered (Sampson, 2000). In general, CACG systems have the capability to connect with a vast number of students at a very low cost; allowing professional and career counselors to attend to additional work responsibilities.

Research indicates that CACG systems are most effective when used in conjunction with competent counseling (Eveland, Conyne, & Blakney, 1998; Sampson, Peterson, Reardon, Lenz, Shahnasarian, & Ryan-Jones, 1992). Counselors are encouraged to prepare students for using CACG systems, monitor their use of the system, and engage students in processing the results of their CACG system exploration. Using CACG systems in combination with a counseling relationship is a stance prescribed by leading authors in the field (e.g., Reile & Harris-Bowlsbey, 2000; Sampson & Lumsden, 2000) and is also supported by empirical research (Whiston, Brecheisen, & Stephens, 2003).

According to Mitchell and colleagues (1999), career counseling has long been perceived as a process designed to eliminate chance, or risk from career decision making. Traditional career counseling interventions may not be sufficient to prepare clients to respond to career uncertainties. The rapid shifts of the occupational world in conjunction with constant changes in college students urge career counselors to adopt more openness to the exploration of the impact of unplanned, chance events (Mitchell et al., 1999). Incorporating the impact of happenstance on the career decision-making of college students is an important precaution to better prepare students for the inevitable unplanned events that will occur regarding their career.

Chance plays an important role in everyone's career. No one can accurately predict the future with a high probability. Mitchell and colleagues assert that in practically every job zone, job descriptions are changing, some occupations are becoming outmoded (e.g., Journalism), and unforeseen occupations are being created (e.g., Technology). Thus, it is important to recognize that careers are no longer following a

simple, straightforward, and logical path which is suitable to career planning. Blustein (1997) has also suggested that counselors should assist their clients to better tolerate ambiguity and to develop an exploratory attitude in regard to discovering their vocation. Counselors should also encourage clients to take unplanned action to generate more desirable chance events, such as taking different classes or attending new events (Mitchell, et al., 1999).

Lastly, vocational counselors need to consider the acculturation levels of their client and how cultural identity provides a context for understanding the presenting vocational difficulties of individuals (Leong, Hardin, & Gupta, 2010). Acculturation involves the changes in attitudes, values, beliefs, and norms that occur when individuals from one culture comes into contact with another culture (c.f., Leong et al., 2010). Career counselors should be aware, sensitive to, and knowledgeable regarding cultural factors (e.g., individualism, collectivism). These aspects clearly impact one's career development, whereby individualistic perspectives often emphasis the individual's goals, with less consideration toward the goals of others or the group. However, collectivism focuses to a higher degree on the interests, values, and goals of the group and a subordination of personal goals to be able to attain the goals of the group, or community (c. f., Leong et al., 2010).

Limitations of the Current Study

The following are limitations of the present study. To begin with, the measures are all self-report, and all participants are volunteers. The self-report nature of the instruments could increase the potential for social desirability factors, which may affect the participants' responses. One protective factor in relation to the fact that the measures

are self-report nature is that the study was anonymous, which may decrease the necessity for one to perceive that he or she needs to present in a socially desirable fashion. Also, this study did not use random assignment and did not include a control group to authenticate whether the changes observed in career decision and attributional style are due to FOCUS-2's activities or the student's maturation process. According to Fowkes and McWhirter (2007), random assignment to conditions is often not feasible in many settings due to the resources of a school or curricular structure. This study was no exception, in that the researchers did not want to deprive college students of available career resources.

There are several important contextual matters to consider when using CACG systems. For one, the online environment in which CACG system users accessed the system could significantly vary from user to user. For example, one user might use a CACG system in a quiet library free from distraction, whereas another user might be in a noisy residential hall. The latter scenario has the potential to impact the user's responses, ultimately affecting the CACG system's assessment results. Barak (2003) emphasized that that the environmental conditions under which a test is taken for many computerized assessments (e.g., social atmosphere, physical conditions, test taker's mood) characteristically is not standardized.

Participants' race/ethnicity was assessed within this study; however, this study did not measure the level of cultural identity or level of acculturation to which individuals identified with their particular racial/ethnic group. In other words, the personal meaning, opinions, and attitudes of one's racial/ethnic identity and the extent to which an individual engages in certain behaviors associated of his or her level group was not

comprehensively considered within this study. This may have influenced the results of both CDSE and AACDM, as Duffy and Klingaman (2009) found a relationship between higher levels of ethnic identity achievement and career decidedness, choice comfort, indecisiveness, and choice importance among students of color.

This study's sample consisted of first-year students enrolled in a private university. Traditionally, this particular sample has a strong emphasis of incorporating computer applications into teaching and learning. At this university, for example, students are provided a personal laptop computer and often instructed to complete course assignments and academic tasks via Internet databases. Together, these aspects limit the generalizability of the results to individuals who have chosen to pursue academia beyond high school who are enrolled in their first-year at a university with a commitment of incorporating technology throughout one's college experience in the northeast section of the United States. This study's sample also excluded other undergraduate students and transfer students who are in their second-year, third-year, and fourth-year of undergraduate studies, thus this study is not fully generalizable to all undergraduate college students.

Lastly, it is important to consider the brief amount of time that passed between completion of the pre- and post-test measures. Specifically, an average of 3.67 days (SD = 8.96) elapsed between completion of the pre-test and post-test in this study. Although this relatively short time span may have been useful to create a brief window to focus on the impact of FOCUS-2, it simultaneously may have impacted other aspects of the study, which is analogous to Gelso's (1979) "bubble hypothesis." With more time between completion of pre- and post-test, participants may have completed modules within

FOCUS-2 at a higher rate and spent more time with the CACG system. Furthermore, the brief time between pre- and post-test may have also influenced the low percentage of participants that engaged in other career-related activities outside of FOCUS-2 (e.g., only 12 participants sought formal career assistance at the university career center). Accordingly, all of the above scenarios have potential to influence the vocational gains experienced by participants in this study, which may have differed if more time elapsed between completion of the pre- and post-test measures in this study.

Future Directions for Research

Despite the limitations of this study, the results provide important information for researchers and practitioners in the realm of career development. Specifically, our findings lend further support to the notion that CDSE is a malleable construct that can increase based on interaction with a CACG system. In particular, FOCUS-2 was instrumental in increasing first-year college students' confidence in their ability to make career decisions. Moreover, the use of FOCUS-2 modified participants' beliefs that career decisions were less in their control and caused by external factors. More research is necessary to assess the multicultural appropriateness for the AACDM.

The results of this study give credence to the need to examine the usefulness of FOCUS-2 with other populations (e.g., advanced undergraduate students, graduate students, community college students). For instance, fourth-year undergraduate students are likely to be actively seeking employment and working toward crystallizing their occupational choice, which may align well with FOCUS-2's modules that emphasize specific occupations rather than academic majors. Therefore, while first-year college students are likely to ponder academic majors and might not be ready to consider specific

careers, more advanced undergraduate students may more readily connect with the available resources within FOCUS-2 given that they focus on their developmental needs (e.g., occupational exploration).

In addition, more research is warranted to assess the effectiveness of FOCUS-2 with other vocational constructs. Also, qualitative research may be one potential venue for intrigued researchers to assess more intimate information regarding users' perceptions of FOCUS-2 in conjunction with other vocational constructs. Future studies may also wish to monitor the lasting effects of CDSE and AACDM for longer-term follow-up studies.

Furthermore, future CACG systems and researchers should better take into account users' cultural background. Attributes of a certain profession, such as independence or teamwork, as "defined" by a CACG system, might differ from the users' interpretation of those attributes (Gati, 1996). In addition, a CACG system that does not ask questions about family background might be detrimental to users whose families play a significant part in their career development. Practitioners should discuss any possible discrepancies with students before inviting their use of the systems.

It is important to assess other constructs such as socioeconomic status (SES) and perceived career barriers. According to SCCT, SES is considered to be one of the personal variables that interacts with contextual factors (e.g., social support) to influence the development of career interests, the selection of career goals, and career behaviors. Also, results of several studies have steadily proclaimed that college students perceive a number of barriers to career goal attainment (Luzzo, 1993b, 1995; McWhirter, 1997; Swanson, Daniels, & Tokar, 1996). According to Swanson and colleagues (1996), these

perceived barriers may cause a person to compromise or fail to act on certain career goals. Therefore, even individuals with crystallized interests may not pursue a certain career path if they perceive realistic obstacles or substantial barriers (Brown & Lent, 1996).

In conclusion, CACG systems have been an important aspect of vocational counseling and assessment for the past fifty years. The future direction of CACG systems is largely unknown; however, it is anticipated that such systems will continue to be a significant component of vocational assessment. In fact, Tinsley (2000) hypothesizes that career assessment will become increasingly automated during the next 3 decades, and the gap between career scientists and career practitioners will progressively widen. Tinsley hypothesized that by the year 2030, the occupation of career counselor will be a tapering field as a result of advances in vocational resources such as CACG systems. Considering Tinsley's projection, there is certainly an abundance of additional research that needs to be performed to qualify if computer-assisted career guidance systems are to replace career counselors and vocational psychologists.

References

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87,* 49–74.

Albaugh, L. M., & Nauta, M. M. (2005). Career decision self-efficacy, career barriers, and college women's experiences of intimate partner violence. *Journal of Career Assessment, 13,* 288–306. doi:10.1177/1069072705274958

Albert, K. A., & Luzzo, D. A. (1999). The role of perceived barriers in career development: A social cognitive perspective. *Journal of Counseling & Development, 77,* 431–436.

Ali, S. R., McWhirter, E. H., & Chronister, K. M. (2005). Self-efficacy and vocational outcome expectations for adolescents of lower socioeconomic status: A pilot study. *Journal of Career Assessment, 13,* 40–58. doi:10.1177/1069072704270273

American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist, 57,* 1060–1073. doi:10.1037/0003-066X.57.12.1060

Appleby, D. (1997). *The handbook of psychology.* New York, NY: Longman.

Ashby, J. D., Wall, H. W., & Osipow, S. H. (1966). Vocational certainty and indecision in college freshmen. *Personnel and Guidance Journal, 44,* 1037–1041.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84,* 191–215. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1982). Human agency in social cognitive theory. *American Psychologist, 44,* 1175–1184. doi:10.1037/0003-066X.44.9.1175

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

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, *44*, 1175–1184. doi:10.1037/0003-066X.44.9.1175

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

Bandura, A. (2006). Toward a psychology of human agency. *Perspectives on Assessment, 8*, 205–222. doi:10.1111/j.1745-6916.2006.00011.x

Barak, A. (2003). Ethical and professional issues in career assessment on the Internet. *Journal of Career Assessment*, *11*, 3–21. doi:10.1177/106907202237457

Barak, A., & Cohen, L. (2002). Empirical examination of an online version of the Self-Directed Search. *Journal of Career Assessment, 10*, 387–400. doi:10.1177/1069072702238402

Barak, A., & English, N. (2002). Prospects and limitations of psychological testing on the Internet. *Journal of Technology in Human Services*, *19*(2/3), 65–89. doi:10.1300/J017v19n02 06

Barnes, J. A., & Herr, E. L. (1998). The effects of interventions on career progress. *Journal of Career Development, 24,* 179–193. doi: 10.1023/A:1025025617806

Bell-Dolan, D., & Anderson, C.A. (1999). Attributional processes: An integration of social and clinical psychology. In R.M. Kowalski & M.R. Leary (Eds.), *The social psychology of emotional and behavioral problems: Interfaces of social and clinical psychology* (pp. 37–67). Washington, DC: American Psychological Association.

Bergeron, L. M., & Romano, J. L. (1994). The relationships among career decision-making self-efficacy, educational indecision, vocational indecision, and gender. *Journal of College Student Development, 35,* 19–24.

Betz, N. E. (1994). Basic issues and concepts in career counseling for women. In W. B. Walsh & S. H. Osipow (Eds.), *Career counseling for women* (pp. 1-42). Hillsdale, NJ: Lawrence Erlbaum.

Betz, N. E., & Borgen, F. H. (2000). The future of career assessment: Integrating vocational interests with self-efficacy and personal styles. *Journal of Career Assessment, 8,* 329–338. doi:10.1177/106907270000800402

Betz, N. E., & Borgen, F. H. (2009). Comparative effectiveness of CAPA and FOCUS online: Career assessment systems with undecided college students. *Journal of Career Assessment, 17*, 351–366. doi:10.1177/1069072709334229

Betz, N. E., & Hackett, G. (1981). The relationship of career-related self-efficacy expectations to perceived career options in college women and men. *Journal of Counseling Psychology, 28*, 399–410. doi:10.1037/0022-0167.28.5.399

Betz, N. E., & Hackett, G. (1986). Applications of self-efficacy theory to understanding career choice behavior. *Journal of Social and Clinical Psychology, 4*, 279–289.

Betz, N. E., & Hackett, G. (2006). Career self-efficacy theory: Back to the future. *Journal of Career Assessment, 14,* 3–11. doi:10.1177/1069072705281347

Betz, N. E., Hammond, M. S., & Multon, K. D. (2005). Reliability and validity of five-level response continua for the career decision self-efficacy scale. *Journal of Career Assessment, 13*, 131–149. doi:10.1177/1069072704273123

Betz, N. E., & Klein, K. L. (1996). Relationships among measures of career self-efficacy, generalized self-efficacy, and global self-esteem. *Journal of Career Assessment, 4*, 285–298. doi:10.1177/106907279600400304

Betz, N. E., Klein, K., & Taylor, K. (1996). Evaluation of a short form of the Career Decision- Making Self-Efficacy Scale. *Journal of Career Assessment, 4,* 47–57. doi:10.1177/106907279600400103

Betz, N. E., & Luzzo, D. (1996). Career assessment and the Career Decision-Making Self Efficacy Scale. *Journal of Career Assessment, 4,* 313–328. doi:10.1177/106907279600400405

Betz, N. E., & Rottinghaus, P. J. (2006). Current research on parallel measures of interests and confidence for basic dimensions of vocational activity. *Journal of Career Assessment, 14,* 56–76. doi:10.1177/1069072705281348

Betz, N. E., & Taylor, K. M. (2005). *Manual for the Career Decision Self-Efficacy Scale and Career Decision Self-Efficacy Scale Short Form.* Columbus, OH: Ohio State University.

Betz, N. E., & Voyten, K. K. (1997). Efficacy and outcome expectations influence career exploration and decidedness. *Career Development Quarterly, 46,* 179–189.

Bloch, D. P. (2006). Using information and technology in career counseling. In D. Capuzzi & M. Stauffer (Eds.), *Career and life style planning: Theory and application* (pp. 152–177). Boston, MA: Allyn & Bacon.

Blustein, D. L. (1989). The role of goal instability and career self-efficacy in the career exploration process. *Journal of Vocational Behavior, 35,* 194–203. doi:10.1016/0001-8791(89)90040-7

Blustein, D. L. (1997). A context-rich perspective of career exploration across the life role. *The Career Development Quarterly, 45,* 260–274.

Blustein, D. L. (2006). *The psychology of working.* Mahwah, NJ: Lawrence Erlbaum.

Bolles, R. N. (1970). *What color is your parachute? A practical manual for job-hunters & career changers.* Berkeley, CA: Ten Speed.

Bond, M. H. (1983). A proposal for cross-cultural studies of attribution processes. In M. H. Hewstone (Ed.), *Attribution theory: Social and functional extensions* (pp. 144–157). Oxford, UK: Basil Blackwell.

Borow, H. (1960). College courses in vocational planning. *Vocational Guidance Quarterly, 9,* 75–80.

Bradburn, E. M., & Carroll, C. D. (2002). *Short-term enrollment in postsecondary education: Student background and institutional differences in reasons for early departure, 1996–1998.* (Report No. NCES 2003-153). Washington, DC: National Center for Educational Statistics, U.S Department of Education.

Braddock, J. H., & McPartland, J. M. (1987). How minorities continue to be excluded from equal employment opportunities: Research on labor market and institutional barriers. *Journal of Social Issues 43,* 5–39.

Brewer, J. M. (1942). *History of vocational guidance.* New York, NY: Harper & Brothers.

Briggs, K. C., & Myers, I. B. (1998). *Myers–Briggs Type Indicator.* Palo Alto, CA: Consulting Psychologists Press.

Brown, D. (2002). Introduction to theories of career development and choice: Origins, evolution, and current efforts. In D. Brown & Associates (Eds). *Career choice and development* (4th ed) (pp 3–23). San Francisco, CA: Jossey Bass.

Brown, D. (2003). *Career information, career counseling, and career development* (8th ed.). Boston, MA: Allyn & Bacon.

Brown, C., & Lavish, L. A. (2006). Career assessment with Native Americans: Role salience and career decision-making self-efficacy. *Journal of Career Assessment, 14*, 116–129. doi:10.1177/1069072705281368

Brown, S. D., & Lent, R. W. (1996). A social cognitive framework for career choice counseling. *The Career Development Quarterly, 44*, 354–366.

Cabral, A. C., & Salomone, P. R. (1990). Chance and careers: Normative versus contextual development. *The Career Development Quarterly, 39*, 5–17.

Cairo, P. C. (1983). Evaluating the effects of computer-assisted counseling systems: A selective review. *The Counseling Psychologist, 11*, 55–59. doi:10.1177/0011000083114007

Career Dimensions, Inc. (2007). *FOCUS*. Available from http://www.focuscareer2.com

Career Dimensions, Inc. (2009). *FOCUS-2*. Available from http://www.focuscareer2.com

Career Dimensions, Inc. (2010). FOCUS-2; The Online Career & Education Planning System for Students in Colleges & Universities. *Technical Report,* Center Harbor, NH.

Cejka, M. A., & Eagly, A. H. (1999). Gender-stereotypic images of occupations correspond to the sex segregation of employment. *Personality and Social Psychology Bulletin, 25*, 413–423. doi:10.1177/0146167299025004002

Chapell, M. S., & Overton, W. F. (2002). Development of logical reasoning and the school performance of African American adolescents in relation to socioeconomic status, ethnic identity, and self-esteem. *Journal of Black Psychology, 28*, 295–317. doi:10.1177/009579802237539

Chapman, W., Katz, M., Norris, L., & Pears, L. (1977). *SIGI: Field test and evaluation of a computer-based system of interactive guidance and information.* Princeton, NJ: Educational Testing Service.

Chung, Y. B. (2002). Career decision-making self-efficacy and career commitment: Gender and ethnic differences among college students. *Journal of Career Development, 28*, 277–284. doi:10.1023/A:1015146122546

Cochran, D., Hoffman, S., Strand, K., & Warren, P. (1977). Effects of client/computer on career decision-making processes. *Journal of Counseling Psychology, 24*, 308–312. doi:10.1037/0022-0167.24.4.308

Colarelli, S. M., & Bishop, R. C. (1990). Career commitment: Functions, correlates, and management. *Group and Organization Studies, 15*, 158–176. doi:10.1177/105960119001500203

Creed, P. A., & Patton, W. (2003). Predicting two components of career maturity in school based adolescents. *Journal of Career Development, 29*, 277–290. doi:10.1023/A:1022943613644

Creed, P., Patton, W., & Prideaux, L. (2006). Causal relationship between career indecision and career decision-making self-efficacy. *Journal of Career Development, 33*, 47–65. doi:10.1177/0894845306289535

Crites, J. O. (1978). Review of the Self-Directed Search. In O. K. Buros (Ed.), *Mental measurements yearbook* (8th ed.). Highland Park, NJ: Gryphon.

Davidson, M. M. (2001). The computerization of career services: Critical issues to consider. *Journal of Career Development, 27,* 217–228. doi:10.1177/089484530102700308

Duffy, R. D., & Klingaman, E. A. (2009). Ethnic identity and career development among first year college students. *Journal of Career Assessment, 17,* 286–297. doi:10.1177/1069072708330504

Duffy, R. D., & Sedlacek, W. E. (2007). What is most important to students' long-term career choices: Analyzing 10-year trends and group differences. *Journal of Career Development, 34,* 149–163. doi:10.1177/0894845307307472

Elliott, J. (2000). Class, race and job matching in contemporary urban labor markets. *Social Science Quarterly, 81,* 1036–1052.

Eveland, A. P., Conyne, R. K., & Blakney, V. L. (1998). University students and career decidedness: Effects of two computer-based career guidance interventions. *Computers in Human Behavior, 14,* 531–541. doi:10.1016/S0747-5632(98)00022-3

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191.

Feehan, P. F., & Johnston, J. A. (1999). The self-directed search and career self-efficacy. *Journal of Career Assessment, 7,* 145–160. doi:10.1177/106907279900700204

Fine, S. (1967). Nature of skill: Implications for education and training. *Proceedings of the Annual Convention of the American Psychological Association, 2,* 365–366.

Fitzgerald, L. F., Fassinger, R. E., & Betz, N. E. (1995). Theoretical advances in the study of women's career development. In W. B. Walsh & S. H. Osipow (Eds.), *Handbook of vocational psychology* (pp. 67–109). Northvale, NJ: Lawrence Erlbaum.

Foltz, B. M., & Luzzo, D. A. (1998). Increasing the career decision-making self-efficacy of nontraditional college students. *Journal of College Counseling, 1*, 35–44.

Fouad, N. A., & Bingham, R. P. (1995). Career counseling with racial and ethnic minorities. In W. B. Walsh & S. H. Osipow (Eds.), *Handbook of vocational psychology: Theory, research, and practice* (2nd ed., pp. 331–365). Hillsdale, NJ: Lawrence Erlbaum.

Fouad, N. A., Cotter, E., & Kantamneni, N. (2009). The effectiveness of a career course on career decision-making. *Journal of Career Assessment, 17*, 338–347.

Fouad, N. A., Guillen, A., Harris-Hodge, E., Henry, C., Novakovic, A., Terry, S., & Kantamneni, N. (2006). Need, awareness, and use of career services for college students. *Journal of Career Assessment, 14,* 407– 420. doi:10.1177/1069072706288928

Fowkes, K. M., & McWhirter, E. H. (2007). Evaluation of computer-assisted career guidance in middle and secondary education settings: Status, obstacles, and suggestions. *Journal of Career Assessment, 15*, 388–400. doi:10.1177/1069072707301234

Fryer, D. (1925). *Vocational self-guidance: Planning your life work.* Philadelphia, PA: J. B. Lippincott.

Fukuyama, M. A., Probert, B. S., Neimeyer, G. J., Nevill, D. D., & Metzler, A. E. (1988). Effects of DISCOVER on career self-efficacy and decision-making of undergraduates. *Career Development Quarterly, 37*, 56–62.

Fuqua, D. R., Blum, C. R., & Hartman, B. W. (1988). Empirical support for the differential diagnosis of career indecision. *The Career Development Quarterly, 36*, 364–373.

Garcia, G., Jr., & Plansker, C. M. (1990). A reaction to an analysis of nine computer-assisted career guidance systems. *Journal of Career Development, 17,* 113–117. doi:10.1007/BF01321699

Garis, J. W., & Niles, S. G. (1990). The separate and combined effects of SIGI and DISCOVER and a career planning course for undecided university students. *Career Development Quarterly, 38,* 261–274.

Gati, I. (1994). Computer-assisted career counseling: Dilemmas, problems, and possible solutions. *Journal of Counseling and Development, 73,* 51–56.

Gati, I. (1996). Computer-assisted career counseling: Challenges and prospects. In M. L. Savickas & W. B. Walsh (Eds.), *Handbook of career counseling theory and practice* (pp. 169–190). Palo Alto, CA: Davies-Black.

Gati, I., Osipow, S. H., & Givon, M. (1995). Gender differences in career decision making: The content and structure of preferences. *Journal of Counseling Psychology, 42*, 204–216. doi:10.1037/0022-0167.42.2.204

Gati, I., & Tikotzki, Y. (1989). Strategies for collection and processing of occupational information in making career decisions. *Journal of Counseling Psychology, 36*, 430–439. doi:10.1037/0022-0167.36.4.430

Gelatt, H. B. (1989). Positive uncertainty: A new decision-making framework for counseling. *Journal of Counseling Psychology, 36,* 252–256. doi:10.1037/0022-0167.36.2.252

Gelber, S. (2007). Pathways in the past: Historical perspectives on access to higher education. *Teachers College Record, 109,* 2252–2286.

Gelso, C. J. (1979). Research in counseling: Methodological and professional issues. *The Counseling Psychologist, 8,* 7–35.

Gianakos, I. (1999). Patterns of career choice and career decision-making self-efficacy. *Journal of Vocational Behavior, 54,* 244–258. doi:10.1006/jvbe.1998.1668

Gimmestad, M. J. (1984). Career planning through instruction. In H.D. Burck & R. C. Reardon (Eds.), *Career development interventions* (pp. 212–232). Springfield, Illinois: Charles C. Thomas.

Glaize, D. L., & Myrick, R. D. (1984). Interpersonal groups or computers? A study of career maturity and career decidedness. *Vocational Guidance Quarterly, 32,* 168–176.

Gloria, A. M., & Hird, J. S. (1999). Influences of ethnic and nonethnic variables on the career decision-making self-efficacy of college students. *Career Development Quarterly, 48,* 157–174.

Gordon, V. N., & Steele, G. E. (2003). Undecided first-year students: A 25-year longitudinal study. *Journal of the First-Year Experience & Students in Transition, 15,* 19–38.

Gore, P. A., Jr. (2006). Academic self-efficacy as a predictor of college outcomes. *Journal of Career Assessment, 14,* 92–115. doi:10.1177/1069072705281367

Gore, P. A., Bobek, B. L., Robbins, S. B., & Shayne, L. (2006). Computer-based career exploration: Usage patterns and a typology of users. *Journal of Career Assessment, 14,* 421–436. doi:10.1177/1069072706288939

Gore, P. A., Jr., & Hitch, J. L. (2005). Occupational classification and sources of occupational information. In S. D. Brown, & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 382–413). Hoboken, NJ: John Wiley & Sons.

Gore, P. A., Jr., & Leuwerke, W. C. (2000). Information technology for career assessment on the Internet. *Journal of Career Assessment, 8*, 3–19. doi:10.1177/106907270000800102

Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations. *Journal of Counseling Psychology Monograph, 28*, 545–579. doi:10.1037/0022-0167.28.6.545

Gottfredson, L. S. (2002). Gottfredson's theory of circumscription, compromise, and self creation. In D. Brown (Ed.), *Career choice and development* (4th ed., pp. 85–148). San Francisco, CA: Jossey-Bass.

Hackett, G., & Betz, N. E. (1981). A self-efficacy approach to the career development of women. *Journal of Vocational Behavior, 18*, 326–339. doi:10.1016/0001-8791(81)90019-1

Hamid, P.N. (1994), Self-monitoring, locus of control, and social encounters of Chinese and New Zealand students. *Journal of Cross-Cultural Psychology, 25,* 353–368. doi:10.1177/0022022194253004

Hardin, E. E., Leong, F. T. L., & Osipow, S. H. (2001). Cultural relativity in the conceptualization of career maturity. *Journal of Vocational Behavior, 58*, 36–52. doi:10.1006/jvbe.2000.1762

Harmon, L. W., Hansen, J. C., Borgen, F. H., & Hammer, A. L. (1994). *Applications and technical guide for the Strong Interest Inventory.* Palo Alto, CA: Consulting Psychologists Press.

Harris-Bowlsbey, J., & Sampson, J. P., Jr. (2001). Computer-based career planning systems: Dreams and realities. *Career Development Quarterly, 49*, 250–260.

Heck, S., & Weible, T. (1978). Study of first-year college students' perceptions of career choice based on exploratory field experiences. *Journal of Educational Research, 71,* 272–276.

Hempel, C. G. (1966). *Philosophy of natural science.* Englewood Cliffs, NJ: Prentice Hall.

Henry, P., Bardo, H. R., & Henry, C. A. (1992). The effectiveness of career development seminars on African American premedical students: A program evaluation using the medical career development inventory. *Journal of Multicultural Counseling and Development, 20*, 99–112.

Hinkelman, J. M., & Luzzo, D. A. (1997). Computer-assisted career guidance: Bridging the science-practitioner gap. *Career Planning and Adult Development Journal, 13*, 41–51.

Holland, J. L. (1958). A personality inventory employing occupational titles. *Journal of Applied Psychology, 42*, 336–342. doi:10.1037/h0047330

Holland, J. L. (1970). *The self-directed search.* Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa, FL: Psychological Assessment Resources.

Holland, J. L., Daiger, D. C., & Power, P. G. (1980). *My vocational situation*. Palo Alto, CA: Consulting Psychologists Press.

Hull-Blanks, E., Kurpius, S. E. R., Befort, C., Sollenberger, S., Nicpon, M. F., & Huser, L. (2005). Career goals and retention-related factors among college freshmen. *Journal of Career Development, 32*, 16–30. doi:10.1177/0894845305277037

Hurtado, S., Griffin, K.A., Arellano, L., & Cuellar, M. (2008). Assessing the value of climate assessments: Progress and future directions. *Journal of Diversity in Higher Education, 1*, 204–221. doi:10.1037/a0014009

Johnston, J. A., Buescher, K. L., & Heppner, M. J. (1988). Computerized career information and guidance systems: Caveat emptor. *Journal of Counseling and Development, 67*, 39–41.

Jung, C. G. (1971). *Collected works of C. G. Jung: Vol. 6. Psychological types* (H. G. Baynes, Trans., revised by R. F. C. Hull). Princeton, NJ: Princeton University Press. (Original work published 1921).

Kapes, J. T., Borman, C. A., & Frazier, N. (1989). An evaluation of the SIGI and DISCOVER microcomputer-based career guidance systems. *Measurement and Evaluation in Counseling and Development, 22*, 126–136.

Katz, M. R. (1973). Career decision making: A computer-based system of interactive guidance and information (SIGI). *Proceedings of the Invitational Conference on Testing Problems* (pp. 43–69). Princeton, NJ: Educational Testing Service.

Keller, J. W., Piortrowski, C., & McLeod, C. R. (1992). The evolution of a career development program. *Education, 112*, 470–473.

Kivlighan, D. J., Jr., Johnston, J. A., Hogan, R. S., & Mauer, E. (1994). Who benefits from computerized career counseling? *Journal of Counseling and Development, 72*, 289–292.

Krieshok, T. S. (1998). An anti-introspectivist view of career decision making. *Career Development Quarterly, 46*, 210–229.

Krumboltz, J. D. (1979). A social learning theory of career decision-making. In A. M. Mitchell, G. B. Jones, & J. D. Krumboltz (Eds.), *Social learning and career decision-making* (pp. 19–49). Cranston, RI: Carroll Press.

Krumboltz, J. D. (1991). *Career Beliefs Inventory*. Palo Alto, CA: Consulting Psychologists Press.

Krumboltz, J. D. (2009). The happenstance learning theory. *Journal of Career Assessment, 17*, 135–154. doi:10.1177/1069072708328861

Krumboltz, J. D., Mitchell, A. M., & Jones, G. B. (1976). A social learning theory of career selection. *The Counseling Psychologist, 6*(1), 71–81. doi:10.1177/001100007600600117

Kuder (2009). Kuder Career Planning System. Retrieved from http://www.kuder.com/solutions/kuder-career-planning-system.html

Landrum, E., Davis, S., & Landrum, T. A. (2000). *The psychology major: Career options and strategies for success.* Upper Saddle River, NJ: Prentice Hall.

Lapan, R. T., Boggs, K. R., & Morrill, W. H. (1989). Self-efficacy as a mediator of investigative and realistic general occupational themes in the Strong-Campbell

Interest Inventory. *Journal of Counseling Psychology, 36,* 176–182. doi:10.1037/0022-0167.36.2.176

Lease, S. H. (2004). Effect of locus of control, work knowledge, and mentoring on career decision-making difficulties: Testing the role of race and academic institution. *Journal of Career Assessment, 12,* 239–254. doi:10.1177/1069072703261537

Lease, S. H., & Dahlbeck, D. T. (2009). Parental influences, career decision-making attributions, and self-efficacy. *Journal of Career Development, 36,* 95–113. doi:10.1177/0894845309340794

Lent, R. W. (2005). A social cognitive view of career development and counseling. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 101–127). New York, NY: John Wiley.

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,* 79–122. doi:10.1006/jvbe.1994.1027

Lent, R. W., Brown, S. D., & Hackett, G. (1996). Career development from a social cognitive perspective. In D. Brown, L. Brooks, & Associates (Eds.), *Career choice and development* (3rd ed., pp. 373–421). San Francisco, CA: Jossey-Bass.

Lent, R. W., Brown, S. D., & Hackett, G. (2000). Contextual supports and barriers to career choice: A social cognitive analysis. *Journal of Counseling Psychology, 47,* 36–49. doi:10.1037/0022-0167.47.1.36

Lent, R. W., & Hackett, G. (1987). Career self-efficacy: Empirical status and future directions. *Journal of Vocational Behavior, 30,* 347–382. doi:10.1016/0001-8791(87)90010-8

Leong, F. T. L. (1991). Career development attributes and occupational values of Asian American and White American college students. *The Career Development Quarterly, 39*, 221–230.

Leong, F. T. L. (2001). The role of acculturation in the career adjustment of Asian American workers: A test of Leong and Chou's (1994) formulations. *Cultural Diversity and Ethnic Minority Psychology, 7*, 262–273. doi:10.1037/1099-9809.7.3.262

Leong, F. T. L., Hardin, E. E., & Gupta, A. (2010). A cultural formulation approach to career assessment and career counseling with Asian American clients. *Journal of Career Development, 37*, 465–486. doi:10.1177/0894845310363808

Levitz, R., & Noel, L. (1989). Connecting students to institutions: Keys to retention and success. In M. L. Upcraft, J. N. Gardner & Associates (Eds.), *The freshman year experience: Helping students survive and succeed in college* (pp. 65–81). San Francisco, CA: Jossey-Bass.

Lewallen, W. (1993). The impact of being "undecided" on college-student persistence. *Journal of College Student Development, 34*, 103–112.

Lopez, F. G., & Lent, R. W. (1992). Sources of mathematics self-efficacy in high school students. *Career Development Quarterly, 41*, 3–12.

Ludwikowski, W. M. A., Vogel, D. V. & Armstrong, P. I. (2009). Attitudes toward career counseling: The role of public and self-stigma. *The Journal of Counseling Psychology, 56*, 408–416. doi:10.1037/a0016180

Luzzo, D. A. (1993a). Value of career-decision-making self-efficacy in predicting career-decision-making attitudes and skills. *Journal of Counseling Psychology, 40,* 194–199. doi:10.1037/0022-0167.40.2.194

Luzzo, D. A. (1993b). Ethnic differences in college students' perception of barriers to career development. *Journal of Multicultural Counseling and Development, 21,* 227–236.

Luzzo, D. A. (1995). Gender differences in college students' career maturity and perceived barriers in career development. *Journal of Counseling & Development, 73,* 319–322.

Luzzo, D. A. (2001). *Manual for the Assessment of Attributions of Career Decision Making.* Clarksville, MD: Author.

Luzzo, D. A., & Day, M. A. (1999). Effects of Strong Interest Inventory feedback on career decision-making self-efficacy and social cognitive career beliefs. *Journal of Career Assessment, 7,* 1–17. doi:10.1177/106907279900700101

Luzzo, D. A., Funk, D. P., & Strang, J. (1996). Attributional retraining increases career decision-making self-efficacy. *Career Development Quarterly, 44,* 378–386.

Luzzo, D. A., & Jenkins-Smith, A. (1998). Development and initial validation of the assessment of attributions for career decision-making. *Journal of Vocational Behavior, 52,* 224–245. doi:10.1006/jvbe.1997.1582

Luzzo, D. A., & Pierce, G. (1996). Effects of DISCOVER on the career maturity of middle school students. *Career Development Quarterly, 45,* 170–172.

Luzzo, D. A., & Taylor, M. (1994). The effects of verbal persuasion on the career self-efficacy of college freshmen. *California Association for Counseling and Development Journal, 14,* 31–34.

Luzzo, D. A., & Ward, B. A. (1995). The relative contributions of self-efficacy and locus of control to the prediction of vocational congruence. *Journal of Career Development, 21,* 307–317. doi:10.1007/BF02106154

MacDonald, A. P. (1971). Internal-external locus of control: A promising rehabilitation variable. *Journal of Counseling Psychology, 18,* 111–116. doi:10.1037/h0030611

Maples, M. R., & Luzzo, D. A. (2005). Evaluating DISCOVER's effectiveness in enhancing college students' social cognitive career development. *The Career Development Quarterly, 53,* 274–285.

Marcia, J. E. (1987). The identity status approach to the study of ego identity development. In T. Honess, & K. Yardley (Eds.), *Self and identity: Perspectives across the lifespan* (pp. 161–171). New York, NY: Routledge.

Marcia, J. E. (1994a). The empirical study of ego identity. In H. A. Bosma, & T. L. G. Graafsma (Eds.), *Identity and development: An interdisciplinary approach* (pp. 67–80). Thousand Oaks, CA: Sage.

Marcia, J. E. (1994b). Identity and psychotherapy. In S. L. Archer (Ed.), *Interventions for adolescent identity development* (pp. 29–46). Thousand Oaks, CA: Sage.

McDermott, M., & Samson, F. L. (2005). White racial and ethnic identity in the United States. *Annual Review of Sociology, 31,* 245–261. doi:10.1146/annurev.soc.31.041304.122322

McIntosh, P. (1988). White privilege: Unpacking the invisible knapsack. In V. Cyrus (Ed.), *Experiencing race, class, and gender in the United States* (pp. 209–213). Mountain View, CA: Mayfield Publishing.

McWhirter, E. H. (1997). Perceived barriers to education and career. Ethnic and gender differences. *Journal of Vocational Behavior, 50*, 124–140. doi:10.1006/jvbe.1995.1536

McWhirter, E. H., Rasheed, S., & Crothers, M. (2000). The effects of high school career education on social cognitive variables. *Journal of Counseling Psychology, 47*(3), 330–341. doi:10.1037/0022-0167.47.3.330

Mitchell, L. K., & Krumboltz, J. D. (1996). Krumboltz's learning theory of career choice and counseling. In D. Brown, L. Brooks, & Associates, *Career choice and development* (3rd ed., pp. 233–280). San Francisco, CA: Jossey-Bass.

Mitchell, K. E., Levin, A. S., & Krumboltz, J. D. (1999). Planned happenstance: Constructing unexpected career opportunities. *Journal of Counseling & Development, 77*, 115–124.

Moghaddam, F. M., Taylor, D. M., & Wright, S. C. (1993). *Social psychology in cross-cultural perspective.* New York, NY: Freeman.

Moy, S. (1992). A culturally sensitive, psychoeducational model for understanding and treating Asian American clients. *Journal of Psychology and Christianity, 11*, 358–369.

Myers, R. A., Lindeman, R. H., Thompson, A. S., & Patrick, T. A. (1975). Effects of educational and career exploration system on vocational maturity. *Journal of Vocational Behavior, 6*, 245–254. doi:10.1016/0001-8791(75)90050-0

Nauta, M. M., & Kahn, J. H. (2007). Identity status, consistency and differentiation of interests and career decision self-efficacy. *Journal of Career Assessment, 15*, 55–65. doi:10.1177/1069072705283786

Neckerman, K., & Kirschenman, J. (1991). Hiring strategies, racial bias, and inner-city workers. *Social Problems, 38*, 433–447.

Nobles, W. W. (1976). Extended self: Rethinking the so-called Negro self-concept. *Journal of Black Psychology, 2*, 15–24.

Noel, L., Levitz, R., & Saluri, D. (1985). *Increasing student retention*. San Francisco, CA: Jossey-Bass.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Cambridge, MA: Cambridge University Press.

O'Brien, K. M., Dukstein, R. D., Jackson, S. L., Tomlinson, M. J., & Kamatuka, N. A. (1999). Broadening career horizons for students in at-risk environments. *Career Development Quarterly, 47*, 215–229.

Offer, M., & Sampson, J. P., Jr. (1999). Quality in the content and use of information and communications technology in guidance. *British Journal of Guidance and Counselling, 27*, 501–516. doi:10.1080/03069889900760421

Orndorff, R. M., & Herr, E. L. (1996). A comparative study of declared and undeclared college students on career uncertainty and involvement in career development activities. *Journal of Counseling & Development, 74*, 632–639.

Osborn, D. S., Howard, D. K., & Leierer, S. J. (2007). The effect of a career development course on the dysfunctional career thoughts of racially and ethnically diverse college freshmen. *The Career Development Quarterly, 55*, 365–377.

Osipow, S. H., Carney, C. G., & Barak, A. (1976). A scale of educational and vocational undecidedness: A typological approach. *Journal of Vocational Behavior*, *9*, 233–243. doi:10.1016/0001-8791(76)90081-6

Paivandy, S., Bullock, E. E., Reardon, R. C., & Kelly, D. F. (2008). The effects of decision-making style and cognitive thought patterns on negative career thoughts. *Journal of Career Assessment*, *16*, 474–488. doi:10.1177/1069072708318904

Parmer, T. (1993). The athletic dream: But what are the career dreams of the African American urban high school students? *Journal of Career Development*, *20*, 131–145. doi:10.1007/BF02110345

Parsons, F. (1909). *Choosing a vocation*. Boston, MA: Houghton-Mifflin.

Patton, W., & Creed, P. A. (2001). Developmental issues in career maturity and career decision status. *The Career Development Quarterly*, *49*, 336–351.

Perry, R. P., Hechter, F. J., Menec, V. H., & Weinberg, L. E. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. *Research in Higher Education*, *34*, 687–723.

Peterson, S. L. (1993a). Career decision-making self-efficacy and institutional integration of underprepared college students. *Research in Higher Education*, *34*, 659–683.

Peterson, S. L. (1993b). Career decision-making self-efficacy and social and academic integration of underprepared college students: Variations based on background characteristics. *Journal of Vocational Education Research*, *18*, 77–115.

Peterson, G. W., Ryan-Jones, R. E., Sampson, J. P., Jr., Reardon, R. C., & Shahnasarian, M. (1994). A comparison of the effectiveness of three computer-assisted career

guidance systems: DISCOVER, SIGI, and SIGI-Plus. *Computers in Human Behavior, 10,* 189–198. doi:10.1016/0747-5632(94)90002-7

Phinney, J. S., & Alipuria, L. (1990). Ethnic identity in older adolescents from four ethnic groups. *Journal of Adolescence, 13,* 171–184.

Pinder, F. A., & Fitzgerald, P. (1984). The effectiveness of a computerized guidance system in promoting career decision-making. *Journal of Vocational Behavior, 24,* 123–131. doi:10.1016/0001-8791(84)90071-X

Post-Kammer, P., & Smith, P. L. (1985). Sex differences in career self-efficacy, consideration, and interests of eighth and ninth graders. *Journal of Counseling Psychology, 32,* 551–559. doi:10.1037/0022-0167.32.4.551

Prince, J. P., Most, R. B., & Silver, D. G. (2003). Self-help career assessment: Ethical and professional issues. *Journal of Career Assessment, 11,* 40–58. doi:10.1177/106907202237459

Pyle, K. R. (1984). Computers and student development: What are the possibilities? In C.S. Johnson and K. R. Pyle (Eds.). *Enhancing student development with computers* (pp. 5–28). San Francisco, CA: Jossey-Bass.

Quintana, S. M. (2007). Racial and ethnic identity: Developmental perspectives and research. *Journal of Counseling Psychology, 54,* 259–270. doi:10.1037/0022-0167.54.3.259

Rayman, J. R., & Harris-Bowlsby, J. (1977). Discover: A model for a systematic career guidance program. *Vocational Guidance Quarterly, 26,* 3–12.

Reardon, R. C., Lenz, J., & Strausberger, S. (1996). Integrating theory, practice, and research with the Self-Directed Search (Form R). *Measurement and Evaluation in Counseling and Development, 28*, 211–218.

Reardon, R. C., Peterson, G. W., Sampson, J. P., Ryan-Jones, R. E., & Shahnasarian, M. (1992). A comparative analysis of the impact of SIGI and SIGI PLUS. *Journal of Career Development, 18*, 315–322. doi:10.1007/BF01352156

Reese, R. J., & Miller, C. D. (2006). Effects of a university career development course on career decision-making self-efficacy. *Journal of Career Assessment, 14*, 252–266. doi:10.1177/1069072705274985

Reile, D. M., & Harris-Bowlsbey, J. (2000). Using the Internet in career planning and assessment. *Journal of Career Assessment, 8*, 69–84. doi:10.1177/106907270000800106

Rice, K. G. (1992). Separation-individuation and adjustment to college: A longitudinal study. *Journal of Counseling Psychology, 39*, 203–213. doi:10.1037/0022-0167.39.3.298

Robinson, N. K., Meyer, D., Prince, J. P., McLean, C., & Low, R. (2000). Mining the internet for career information: A model approach for college students. *Journal of Career Assessment, 8*, 37–54. doi:10.1177/106907270000800104

Rollins, V., & Valdez, J. N. (2006). Perceived racism and career self-efficacy in African American adolescents. *Journal of Black Psychology, 32*, 176–198. doi:10.1177/0095798406287109

Sampson, J. P., Jr. (2000). Using the Internet to enhance testing in counseling. *Journal of Counseling and Development, 78*, 348–356.

Sampson, J. P., Jr., & Lumsden, J. A. (2000). Ethical issues in the design and use of Internet based career assessment. *Journal of Career Assessment, 8*, 21–35. doi:10.1177/106907270000800103

Sampson, J. P., Jr., Peterson, G. W., & Reardon, R. C. (1989). Counselor intervention strategies for computer-assisted career guidance: An information-processing approach. *Journal of Career Development, 16*, 139–154. doi:10.1007/BF01353007

Sampson, J. P., Jr., Petersen, G.W., Reardon, R. C., Lenz, J. G., Shahnasarian, M., & Ryan-Jones, R. E. (1992). The social influence of two computer-assisted career guidance systems: DISCOVER and SIGI. *Career Development Quarterly, 41*, 75–83.

Sampson, J. P., Jr., Reardon, R. C., Humphreys, J. K., Peterson, G. W., Evans, M. A., & Domkowski, D. (1990). A differential feature-cost analysis of nine computer-assisted career guidance systems. *Journal of Career Development, 17,* 81–111. doi:10.1007/BF01321698

Sampson, J. P., Jr., Shahnasarian, M., & Reardon, R. C. (1987). Computer-assisted career guidance: A national perspective on the use of DISCOVER and SIGI. *Journal of Counseling and Development, 65*, 416–419.

Schinka, J. A. (1988). Self-Directed Search: Computer manual for use with Apple computers. Odessa, FL: Psychological Assessment Resources.

Scott, A. B., & Ciani, K. D. (2008). Effects of an undergraduate career class on men and women's career decision-making self-efficacy and vocational identity. *Journal of Career Development, 34,* 263–285. doi: 10.1177/0894845307311248

Singaravelu, H. D., White, L. J., & Bringaze, T. B. (2005). Factors influencing international students' career choice: A comparative study. *Journal of Career Development, 32*, 46–59. doi:10.1177/0894845305277043

Smith, E. P., & Brookins, C. C. (1997). Toward the development of an ethnic identity measure for African American youth. *Journal of Black Psychology, 23*, 358–377. doi:10.1177/00957984970234004

Spector, P. E. (1982). Behavior in organizations as a function of employee's locus of control. *Psychological Bulletin, 91*, 482–497. doi:10.1037/0033-2909.91.3.482

Spector, P. E. (1988). Development of the work locus of control scale. *Journal of Occupational Psychology, 61*, 335–340.

Spokane, A. R. (1990). Self-guided interest inventories as career interventions: The Self Directed Search. In C. E. Watkins & V. L. Campbell (Eds.), *Testing in counseling practice* (pp. 285–316). Hillsdale, NJ: Lawrence Erlbaum.

Spokane, A. R., & Catalano, M. (2000). The Self-Directed Search: A theory-driven array of self guiding career interventions. In C. E. Watkins, Jr. & V. L Campbell (Eds.), *Testing in counseling practice* (2nd ed., pp. 339–370). Hillsdale, NJ: Lawrence Erlbaum.

Spokane, A. R., & Cruza-Guet, M. C. (2004). Holland's theory of Vocational Personalities in work environments. *Career development and counseling: Putting theory and research to work* (pp. 27–41). New York, NY: Wiley.

Srsic, C. S., & Walsh, W. B. (2001). Person-environment congruence and career self-efficacy. *Journal of Career Assessment, 9*, 203–213. doi:10.1177/106907270100900207

Sue, D. W., & Sue, D. (1990). *Counseling the culturally different: Theory and practice* (2nd ed.).

New York, NY: John Wiley.

Sullivan, S. E., & Baruch, Y. (2009). Advances in career theory and research: A critical review and agenda for future exploration. *Journal of Management, 35*, 1542–1571. doi:10.1177/0149206309350082

Sullivan, K. R., & Mahalik, J. R. (2000). Increasing career self-efficacy for women: Evaluating a group intervention. *Journal of Counseling and Development, 78*, 54–62.

Super, D. E. (1951). Vocational adjustment: Implementing a self concept. *Occupations, 30*, 88–92.

Super, D. E. (1980). A life-span, life-space approach to career development. *Journal of Vocational Behavior, 16*, 282–298.

Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown & L. Brooks (Eds.), *Career choice and development: Applying contemporary theories to practice* (pp. 167–261). San Francisco, CA: Jossey-Bass.

Super, D. E., & Nevill, D. D. (1986). *The salience inventory*. Palo Alto, CA: Consulting Psychologists Press.

Swanson, J. L., Daniels, K. K., & Tokar, D. M. (1996). Assessing perceptions of career-related barriers: The Career Barriers Inventory. *Journal of Career Assessment, 4*, 219–244. doi:10.1177/106907279600400207

Szabo, Z. (2006). The influence of attributional retraining on career choices. *Journal of Cognitive and Behavioral Psychotherapies, 6*, 89–103.

Taber, B. J., & Luzzo, D. A. (1999). *A comprehensive review of research evaluating the effectiveness of DISCOVER in promoting career development* (ACT Research Report 99.3). Iowa City, IA: American College Testing Program.

Tang, M., Fouad, N. A., & Smith, P. L. (1999). Asian Americans' career choices: A path model to examine factors influencing their career choices. *Journal of Vocational Behavior, 54*, 142–157. doi:10.1006/jvbe.1998.1651

Taylor, K. M., & Betz, N. E. (1983). Application of self-efficacy theory to the understanding and treatment of career indecision. *Journal of Vocational Behavior, 22*, 63–81.

Taylor, K. M., & Popma, J. (1990). An examination of the relationships among career decision-making self-efficacy, career salience, locus of control, and vocational indecision. *Journal of Vocational Behavior, 37*, 17–31. doi:10.1016/0001-8791(90)90004-L

Tillar, T. C., & Hutchins, D. E. (1979). The effectiveness of the components of a model program of career exploration for college freshmen. *Journal of College Student Personnel, 20*, 538–545.

Tinsley, H. E. A. (2000). Technological magic, social change, and counseling rituals: The future of career assessment. *Journal of Career Assessment, 8*, 339–350. doi:10.1177/106907270000800403

Tirpak, D. M., & Schlosser, L. Z. (2009, August). *Career decision and coping self-efficacy: Counseling implications.* Poster presented at the 117th Annual Convention of the American Psychological Association, Toronto, Canada.

Trice, A. D., Haire, J. R., & Elliott, K. A. (1989). A career locus of control scale for undergraduate students. *Perceptual and Motor Skills, 69*, 555–561.

Triandis, H. (1995). *Individualism and collectivism.* Boulder, CO: Westview Press.

Trusty, J., Ng, K., & Plata, M. (2000). Interaction effects of gender, SES, and race-ethnicity on postsecondary educational choices of U.S. students. *Career Development Quarterly, 49*, 45–59.

Turner, C. F., Ku, L., Rogers, S. M., Lindberg, L. D., & Pleck, J. H. (1998). Adolescents sexual behavior, drug use, and violence: Increased reporting with computer survey technology. *Science, 280,* 867–873.

Uffelman, R. A., Subich, L. M., Diegelman, N. M., Wagner, K. S., & Bardash, R. J. (2004). Effect of mode of interest assessment on clients' career decision-making self-efficacy. *Journal of Career Assessment, 12*, 366–380. doi:10.1177/1069072704266651

U.S. Department of Defense (1992). *Counselor manual for the Armed Forces Vocational Aptitude Battery, Forms 18/19.* North Chicago, IL: U.S. Military Entrance Processing Command.

Waterman, A. (1981). Individualism and interdependence. *American Psychologist, 36*, 762–773. doi:10.1037/0003-066X.36.7.762

Watts, A. G. (1993). The politics and economics of computer-aided careers guidance systems. *British Journal of Guidance and Counseling, 21*, 175–187.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71,* 3–25. doi:10.1037/0022-0663.71.1.3

Weiner, B. (1985). An attribution theory of achievement motivation and emotion. *Psychological Review, 92,* 548–573.

Weiner, B. (1986). *An attributional theory of motivation and emotion.* New York, NY: Springer- Verlag.

Weisz, J. R., Rothbaum, F. M., & Blackburn, T. C. (1984). Standing out and standing in the psychology of control in America and Japan. *American Psychologist, 39,* 955–969. doi:10.1037/0003-066X.39.9.955

Whiston, S. C., Brecheisen, B. K., & Stephens, J. (2003). Does treatment modality affect career counseling effectiveness? *Journal of Vocational Behavior, 62,* 390–410. doi:10.1016/S0001-8791(02)00050-7

Whiston, S. C., & Rahardja, D. (2008). Vocational counseling process and outcome. In S. Brown & R. Lent (Eds.), *Handbook of counseling psychology* (4th ed., pp. 444–461). Hoboken, NJ: Wiley.

Whiston, S. C., Sexton, T. L., & Lasoff, D. L. (1998). Career-intervention outcomes: A replication and extension of Oliver and Spokane (1988). *Journal of Counseling Psychology, 45,* 150–165.

Zytowski, D. G., & Luzzo, D. A. (2002). Developing the Kuder skills assessment. *Journal of Career Assessment, 10,* 190–199. doi:10.1177/1069072702010002004

Appendix A

Demographic Questionnaire for Pre-Test

DEMOGRAPHIC INFORMATION

Below are a set of items and questions to gather information about your background for the purpose of the study. Please indicate the responses that best describes you. This information will be maintained in the strictest of confidence.

01.   Your Username (Please use a combination of letters and numbers at least six characters in length. Please do not use a username that will identify you, as this survey is anonymous and confidential. It is recommended that you write down your username so that you will remember it in the future for the second part of the survey).

_____

02.   Your Current Age (if you are under the age of 18, please exit this survey):

☐ 18   ☐ 19   ☐ 20   ☐ 21   ☐ 22   ☐ Other (please indicate) _____

03.   Gender:

☐ Male   ☐ Female

04.   Year in College:

☐ First-Year (Freshman)
☐ Sophomore
☐ Junior
☐ Senior
☐ Other (please indicate)

05.   How would you describe your current academic major?

☐ Undecided   ☐ Declared major
☐ Tracking a major   ☐ Declared major, but Uncertain

06.   Race/Ethnicity

☐ African American/Black
☐ Asian American/Asian/Pacific Islander
☐ Hispanic American/Latino/Latina
☐ European-American/White
☐ Other (please indicate) _____

Appendix B

Demographic Questionnaire for Post-Test

DEMOGRAPHIC INFORMATION

Below are a set of items and questions to gather information for the purpose of the study. Please indicate the responses that best describes you. This information will be maintained in the strictest of confidence.

01. Your Username [Please use the same username as before (i.e., use a combination of letters and numbers at least six characters in length that do not identify you, as this survey is anonymous and confidential)].

_____

02. How much estimated time did you spend using FOCUS-2?

- ☐ Less than one hour
- ☐ One hour
- ☐ Two hours
- ☐ Three hours
- ☐ Four hours
- ☐ Five hours
- ☐ Greater than five hours (please indicate) _____

03. Please indicate any other career-related activities (if any) you performed between when you completed the first questionnaire to completion of the post-test questionnaire (this survey)? Please check all that apply

- ☐ None
- ☐ Career Center individual appointment
- ☐ Career Center group appointment
- ☐ Career Center workshop
- ☐ Spoke with faculty/friend/family about careers
- ☐ Researched various careers and majors not through the means of FOCUS-2 (e.g., websites, books)
- ☐ Other – please describe _____.

Appendix C

Assessment of Attributions for Career Decision-Making (Luzzo & Jenkins-Smith, 1998)

Please indicate the degree to which you agree or disagree with each statement by indicating the corresponding numerical value

COMPLETELY DISAGREE = 1
DISAGREE SOMEWHAT = 2
NEUTRAL = 3
AGREE SOMEWHAT = 4
COMPLETELY AGREE = 5

		1	2	3	4	5
1.	The career decisions that I make are under my control.	1	2	3	4	5
2.	If my career decisions lead to success, it will be because of my skills and abilities.	1	2	3	4	5
3.	Many of the career decisions I am making these days differ from the kinds of career decisions I made in the past.	1	2	3	4	5
4.	Career decisions are made for me by other people.	1	2	3	4	5
5.	I have very little control over the forces that Influence my career decisions.	1	2	3	4	
6.	Career decisions often change over time.	1	2	3	4	5
7.	I make career decisions based on what is best for me.	1	2	3	4	5
8.	The recent career decisions I have been making are the same kinds of career decisions I have made in the past.	1	2	3	4	5
9.	I have control over the decisions I make about my career.	1	2	3	4	5

Note. Items 4, 5, and 8 are reverse scored.

Appendix D

Career Decision Self-Efficacy-Short Form (Betz, Klein, & Taylor, 1996)

For each statement below, please read carefully and indicate how much confidence you have that you could accomplish each of these tasks by marking by choosing the number that best expresses your feeling.

NO CONFIDENCE AT ALL = 1
VERY LITTLE CONFIDENCE = 2
MODERATE CONFIDENCE = 3
MUCH CONFIDENCE = 4
COMPLETE CONFIDENCE = 5

HOW MUCH CONFIDENCE DO YOU HAVE THAT YOU COULD:

1. Use the internet to find information about occupations that interest you.

            1   2   3   4   5

    No Confidence   Complete
        At All   Confidence

2. Select one major from a list of potential majors you are considering.

            1   2   3   4   5

    No Confidence   Complete
        At All   Confidence

3. Make a plan of your goals for the next five years.

            1   2   3   4   5

    No Confidence   Complete
        At All   Confidence

4. Determine the steps to take if you are having academic trouble with an aspect of your chosen major.

            1   2   3   4   5

    No Confidence   Complete
        At All   Confidence

5. Accurately assess your abilities.

            1   2   3   4   5

    No Confidence   Complete
        At All   Confidence

6. Select one occupation from a list of potential occupations you are considering.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

7. Determine the steps you need to take to successfully complete your chosen major.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

8. Persistently work at your major or career goal even when you get frustrated.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

9. Determine what your ideal job would be.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

10. Find out the employment trends for an occupation over the next ten years.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

11. Choose a career that will fit your preferred lifestyle.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

12. Prepare a good resume.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

13. Change majors if you did not like your first choice.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

14. Decide what you value most in an occupation.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

15. Find out about the average yearly earnings of people in an occupation.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

16. Make a career decision and then not worry whether it was right or wrong.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

17. Change occupations if you are not satisfied with the one you enter.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

18. Figure out what you are and are not ready to sacrifice to achieve your career goals.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

19. Talk with a person already employed in a field you are interested in.

| 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

20. Choose a major or career that will fit your interests.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

21. Identify employers, firms, and institutions relevant to your career possibilities.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

22. Define the type of lifestyle you would like to live.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

23. Find information about graduate or professional schools.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

24. Successfully manage the job interview process.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

25. Identify some reasonable major or career alternatives if you are unable to get your first choice.

| | 1 | 2 | 3 | 4 | 5 |

No Confidence   Complete
At All   Confidence

Appendix E

Pre-Test before Completing FOCUS-2

Dear Participant:

Purpose and Duration of Research
Each participant's time and willingness to take part in this survey research is much appreciated. The primary researcher is a graduate student in the Counseling Psychology Ph.D. program at Seton Hall University within the Department of Professional Psychology and Family Therapy. This study intends to assess the effectiveness of a computer-assisted career guidance system, FOCUS-2. Full participation in this voluntary study involves completion a brief pre-test measure, the completion of a computer-assisted career guidance system, FOCUS-2, and completion of a brief post-test measure. It is anticipated that each participant's involvement in this study will take approximately **10 minutes** to complete the pre-and post-test measures and approximately **1 – 2 hours** to complete the computer-assisted career guidance system, FOCUS-2.

Procedures and Voluntary Participation
Participants must be a first-year college student (18 years and older). The questionnaires for this survey consist of a Demographic form, a Career Decision Self-Efficacy Scale and an Assessment of Attributions for Career Decision-Making Scale. Participation in this study is completely voluntary. Participants may withdraw from the study at any time without consequence. **Please note that consent to participate is implied by clicking "Next" to enter the survey.** After you complete the pre-test measure, follow instructions for how to access FOCUS-2. After completion of FOCUS-2, please click on the provided hyperlink within the FOCUS-2 entitled, "Recommended Tools and Websites" to access the post-test survey.

Anonymity Preservation and Confidentiality Maintenance
Each participant should not include his or her name anywhere on the questionnaires. Participants' anonymity will be maintained throughout all aspects of the study. Any publication of the data from this study will in no way identify individual participants and results will be reported in combined form only. All material will be collected in the strictest confidence. Completed responses to surveys will be kept in a secure location and will be accessible only to the researcher and his academic advisor. The data will be stored electronically on a USB memory key and kept in a locked, secure physical setting.

Anticipated Risks and Discomfort
There is little to no foreseen risk or discomfort involved in the completion of the study. The likelihood of experiencing any form of risk or discomfort in this study is minimal. Should a participant experience any discomfort during or after completing the survey, please contact the researcher listed below with any concerns. To reduce this risk, participation is completely voluntary and participants have the right to discontinue participation at any time by exiting the survey.

Benefits to Research
Participants who take part in this study gain access to a computer-assisted career guidance system. Thus, participants may begin a process of self-discovery and career exploration, which may ultimately assist in identifying various occupations congruent with your interests, skills, and values. Regarding society at large, this research makes strides in better understanding a commonly used, but understudied computer assisted career guidance system with first-year college students and their career decision self-efficacy and attributional style for career decision-making. Consequently, this data provides useful information for administrators and career counselors regarding effective interventions for first-year college students in terms of their career development. However, no remuneration or compensation will be provided to participants for completion of this study.

Contact Information
Pertinent questions about the research and research subject's rights should be directed to the Director of the Institutional Review Board at Seton Hall University, Dr. Mary F. Ruzicka, Ph.D. at (973) 313-6314. Participants that have any questions regarding this study or what is expected regarding their voluntary participation, feel free to contact me, David Tirpak, david.tirpak@student.shu.edu., or my academic advisor, Dr. Lewis Schlosser, Lewis.Schlosser@shu.edu.

Sincerely,

David M. Tirpak, M.Ed.
Department Phone: (973) 761-9450
Email: david.tirpak@student.shu.edu

Appendix F

Post-Test after Completing FOCUS-2

Dear Participant:

Purpose and Duration of Research
Each participant's time and willingness to take part in this survey research is much appreciated. The primary researcher is a graduate student in the Counseling Psychology Ph.D. program at Seton Hall University within the Department of Professional Psychology and Family Therapy. This study intends to assess the effectiveness of a computer-assisted career guidance system, FOCUS-2. Full participation in this voluntary study involves completion a brief pre-test measure, the completion of a computer-assisted career guidance system, FOCUS-2, and completion of a brief post-test measure. It is anticipated that each participant's involvement in this study will take approximately **10 minutes** to complete the pre-and post-test measures and approximately **1 – 2 hours** to complete the computer-assisted career guidance system, FOCUS-2.

Procedures and Voluntary Participation
Participants must be a first-year college student (18 years and older). The questionnaires for this survey consist of a Demographic form, a Career Decision Self-Efficacy Scale and an Assessment of Attributions for Career Decision-Making Scale. Participation in this study is completely voluntary. Participants may withdraw from the study at any time without consequence. **Please note that consent to participate is implied by clicking "Next" to enter the survey. In order to complete this final survey, participants in this study should have completed an initial survey as well as all outlined modules within FOCUS-2.**

Anonymity Preservation and Confidentiality Maintenance
Each participant should not include his or her name anywhere on the questionnaires. Participants' anonymity will be maintained throughout all aspects of the study. Any publication of the data from this study will in no way identify individual participants and results will be reported in combined form only. All material will be collected in the strictest confidence. Completed responses to surveys will be kept in a secure location and will be accessible only to the researcher and his academic advisor. The data will be stored electronically on a USB memory key and kept in a locked, secure physical setting.

Anticipated Risks and Discomfort
There is little to no foreseen risk or discomfort involved in the completion of the study. The likelihood of experiencing any form of risk or discomfort in this study is minimal. Should a participant experience any discomfort during or after completing the survey, please contact the researcher listed below with any concerns. To reduce this risk, participation is completely voluntary and participants have the right to discontinue participation at any time by exiting the survey.

Benefits to Research
Participants who take part in this study gain access to a computer-assisted career guidance system. Thus, participants may begin a process of self-discovery and career exploration, which may ultimately assist in identifying various occupations congruent with your interests, skills, and values. Regarding society at large, this research makes strides in better understanding a commonly used, but understudied computer assisted career guidance system with first-year college students and their career decision self-efficacy and attributional style for career decision-making. Consequently, this data provides useful information for administrators and career counselors regarding effective interventions for first-year college students in terms of their career development. However, no remuneration or compensation will be provided to participants for completion of this study.

Contact Information
Pertinent questions about the research and research subject's rights should be directed to the Director of the Institutional Review Board at Seton Hall University, Dr. Mary F. Ruzicka, Ph.D. at (973) 313-6314. Participants that have any questions regarding this study or what is expected regarding their voluntary participation, feel free to contact me, David Tirpak, david.tirpak@student.shu.edu., or my academic advisor, Dr. Lewis Schlosser, Lewis.Schlosser@shu.edu.

Sincerely,

David M. Tirpak, M.Ed.
Department Phone: (973) 761-9450
Email: david.tirpak@student.shu.edu

Appendix G

Promotional Flyer

Call For Participants

FOCUS-2: a self-guided online career assessment that assists with discovery of your interests, personality, leisure activities, values, and skills. These characteristics are also matched with various occupations and academic majors. Within FOCUS-2 you can also research and explore over 1,200 different careers!

In order to participate in this study, before completing FOCUS-2, please be sure that you have already completed the initial survey at
http://asset.tltc.shu.edu/servlets/asset.AssetSurvey?surveyid=4044
Please use a username you will remember consisting of a combination of letters and numbers at least s characters in length that will not identify you. Use the same username throughout all aspects of the study
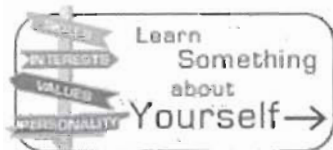
Next...

Visit https://www.FocusCareer2.com/Portal/Login.cfm?SID=391
First, click on the hyperlink to create an account.
Your Access Code = shucareer **Your Status** = Graduating 2014 - Study.
Use the same username from the first survey. You may revisit FOCUS-2 at any point, anytime by visiting the website above.

Complete ALL five assessments under **Self Assessment:**
1) Work Interest Assessment
2) Personality Assessment
3) Skills Assessment
4) Values Assessment
5) Leisure Interest Assessment

Explore ALL Search Features under
Explore The Possibilities:
1) Search by Occupation Name
2) Search by Industry
3) What Can I Do with a Major In...
4) Compare Two Occupations Side by Side

Lastly...

After you have completed these modules within FOCUS-2, please complete the final survey for full participation regarding to this study. Your username is the same username you have used for the initial survey and for FOCUS-2. Please visit
http://asset.tltc.shu.edu/servlets/asset.AssetSurvey?surveyid=4045
to complete this survey. Thank you very much for your participation! We hope that you found this time and your use of FOCUS-2 to be a beneficial career experience!