

BENEDICTINE UNIVERSITY

THE IMPACT OF A COGNITIVE INFORMATION PROCESSING
INTERVENTION ON STUDENTS IN FIRST-YEAR
NON-CAREER DEVELOPMENT COLLEGE COURSES

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DOCTOR OF EDUCATION

BY
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ABSTRACT

This study examined the impact of an intervention on students' dysfunctional thoughts toward career problem solving and decision making. Participants were 116 college students enrolled in freshman level core-college courses at a for-profit/proprietary university in Illinois, divided into two groups, an intervention group and a control group, based on their enrollment in core college coursework. The intervention group completed a pre-test, a workbook intervention, and a post-test, while the control group completed only the pre-test and post-test.

The Career Thoughts Inventory (CTI) (Sampson, Peterson, Lenz, Reardon, & Saunders, 1996a) was used for the pre-test and post-test, and the intervention was based on the Cognitive Information Processing approach (Sampson, Lenz, Reardon, & Peterson, 1999) and incorporated *Improving Your Career Thoughts: A Workbook for the Career Thoughts Inventory* (Sampson, Peterson, Lenz, Reardon, & Saunders, 1996b). Both the CTI and intervention were administered during regular scheduled classes by the researcher and a research assistant from the guidance services office of the institution trained in the use and interpretation of CTI in service delivery.

Results of this study indicate that dysfunctional career thoughts of the intervention group were significantly reduced, and examination of individual content areas for the intervention group revealed decreased scores, indicating improvement in all areas. Because the control group had only slightly decreased scores, the improvement can be attributed to the intervention.

CHAPTER ONE: INTRODUCTION

Statement of the Problem

Institutions of higher education often require a career development course during the senior year as preparation for the job search process. In these courses, students are taught how to create a resume, research a company, prepare for an interview, and often mock interviews are conducted with faculty and staff. While this may be valuable and appropriate for seniors anticipating graduation, there is also a need to assist students much earlier with making an informed career choice.

Because financial aid eligibility and other pressures require students to choose a major, many rush to make a decision and randomly select a major field of study, or make a career choice based on erroneous criteria and limited information. Super (1952) proposed that “work satisfaction and life satisfaction depend on the extent to which our work and our life provide adequate outlets for our abilities, interests, personality traits, and values” (p.190). However, quite often students may choose a major based solely on salary expectations without considering if the related career would provide them satisfaction or longevity; as a result of poor decisions, external influences, and various other factors, students may frequently change majors or withdraw from classes, extending time-to-degree (Cruce, Wolniak, Seifert, & Pascarella, 2006).

A good model for analyzing the benefits of establishing career decision making, linking personal motivation, interests, and competencies with acceptable career roles, is the Career and Technical Education (CTE) system—a process through which students establish a career goal during high school. Research in the area of CTE shows that as soon as students identify a career goal, they become more engaged in the learning process and the result is better academic achievement and higher retention. The Oregon Department of Education reports that due to career-related course content, success rates are higher for CTE students in the areas of mathematics and writing than non-CTE students (Roach, 2010). Content in the CTE courses typically includes technical skills, communication skills, teamwork, research skills, and problem-solving skills.

It is interesting to note that although success rates are consistently high, each year governmental funding for CTE programs is on the list of proposed financial cuts (Association of Career and Technical Education, 2011). Based on the 2011 findings of the U.S. Department of Education's Office of Vocational and Adult Education, if the CTE model were incorporated into first-year college coursework, student academic success rates may be improved. While some colleges require introductory college courses that teach study skills, critical thinking concepts, and introduction to college success, there is a need for content that puts more significant emphasis on teaching students to identify with a career choice, overcome barriers that prevent them from moving forward, and transform their choice into specific action steps. Unfortunately, for

many students, dysfunctional thinking—a pattern of negative thoughts—prevents them from effectively processing information related to career problem solving and decision making, and as a result, they are never able to identify a vocational match for their interests (Guay, Ratelle, Senecal, Larose, & Deschenes, 2006).

This study was designed to determine if an intervention to facilitate an individual's understanding of the nature of his or her dysfunctional career thoughts is one possible solution. Approximately 120 college students enrolled in freshman-level core college courses at an open enrollment, career oriented, regionally accredited, Midwestern proprietary university were assessed using the CTI—an assessment tool based on *cognitive information processing theory* (Peterson, Sampson, & Reardon, 1991). The students were randomly divided into two groups, one group that completed an intervention using an accompanying CTI workbook, and one group that served as the control group.

Research Question

The following research question was identified for this study.

Will a workbook intervention based on Cognitive Information Processing theory help improve CTI scores of first year college students when used in a non-career development classroom setting?

Significance of the Problem

Researchers have suggested that there is a reciprocal relationship between career interests, academic engagement, and performance. Based on their longitudinal study of college students enrolled in introductory psychology courses, Harackiewicz, Durik, Barron, Linnenbrink-Garcia, and Tauer (2008) determined that “students perform well on tasks that they find interesting and that they become more interested in activities when they have performed well on them” (p. 119). Understanding what stimulates student interest, how the material is emphasized, the use of active learning techniques, and identification of student learning styles such as visual, auditory, or kinesthetic are all variables that can be used for designing instructional contexts in order to maximize student interest and performance. By offering opportunities for involvement in occupational related projects through simulated activities or internships, a heightened level of student engagement can be achieved within the curriculum.

While assessments such as the *Campbell Interest and Skill Survey (CISS)* (Campbell, Hyne, & Nilsen, 1992) can assist students who are unclear about their career goals by helping them gain a more thorough understanding of suitable career options, they should be considered as one step of the career development or career counseling process. Komives and Woodard (2003) argue the weakness of using assessments alone in career advising is that they only provide information—almost always information that the student already knows but may not have placed into a career context, and believes he or

she can just “take a test and find out what I’m supposed to be” (p. 499). The *Community College Survey of Student Engagement (CCSSE)* shows that regardless of the importance of academic or career guidance, students have a tendency to avoid using academic or career advisors (Center for Community College Student Engagement, 2011). Ashburn, Bartlett, and Wolverston (2006) found that “26 percent of students doing remedial work and 41 percent of students taking college-level courses at two-year institutions nationwide rarely or never participate in academic advising” (p. A1).

Quite often, students encounter barriers that prevent them from making a career decision, and although career exploration activities are available, not all students participate. Student affairs professionals assume the primary responsibility for developmental goals (psychosocial, attitudes and values, and career choices), while academic affairs professionals assume the primary responsibility for achievement of academic goals (Upcraft & Schuh, 1996). However, the relationship between academic skills, personal development, and career decision making is often disregarded. Based on success with CTE programs, the Workforce Training and Education Coordination Board (2008) asserts: “Academics and job skills, when taught together, can focus a student’s attention on career goals and provide the tools to reach those goals” (p. 1). A comprehensive assessment approach that uses trained staff and appropriate follow-up related to student needs is a powerful tool to help students reach their goals. One possible method is the Career Thoughts Inventory assessment process (Sampson,

Peterson, Lenz, Reardon, & Saunders, 1996a) which is based on the cognitive information processing theoretical approach to career development and career services (Peterson et al., 1991).

Researchers at Florida State University linked cognitive information processing (CIP), the effective processing of information, to career decision making. They explained that effective career problem solving and decision making require the processing of information in the domains of the pyramid of information processing which includes self-knowledge, occupational knowledge, decision-making skills, and executive processing skills (Sampson, Peterson, Reardon, & Lenz, 2000). The group theorized that within the cognitive information processing approach, there are three major categories of career problem solving and decision making: decided, undecided, and indecisive. By assessing which category a student falls into, career counselors can determine the complexity of internal and external issues causing the level of indecision, and assign an intervention that will assist the student with making appropriate career choices.

Purpose of the Study

The purpose of this research was to determine if the Career Thoughts Inventory assessment and intervention, based on the cognitive information processing theoretical approach to career development and career services, could make a significant impact on the career problem solving and decision making of first-year college students when used in a non-career development classroom setting.

CHAPTER TWO: LITERATURE REVIEW

This chapter examines the literature regarding developmental growth, student success, interest, and persistence; cognitive information processing theory; and career assessments and interventions.

Developmental Growth, Student Success, Student Interest and Persistence

Developmental Growth of College Students

Though not as commonly used in relation to career development as cognitive development theories, psychosocial theories have been used to describe the changing characteristics of college students throughout their experience. Known for his psychosocial development theories, Chickering (1969) outlined *Seven Vectors of Student Development* to describe these changing characteristics. He termed the first vector *developing competence* and explained that there are three kinds of competence developed throughout the college years: intellectual competence, which is the ability to comprehend, analyze, and synthesize information; physical and manual skills competence; and interpersonal competence. The second vector is *managing emotions*. Chickering explained that most students are away from home for the first time and will experience an array of emotions. An awareness and understanding of these emotions will help to prevent them from becoming overwhelming. The third vector is what he explained as *moving through autonomy toward interdependence*, which involves learning to function with relative self-sufficiency, taking responsibility for pursuing self-chosen goals, and

becoming less influenced by the opinions of others. *Developing mature interpersonal relationships* is the fourth vector. This is where students develop mature relationships through tolerance and respect for differences in both intercultural and interpersonal contexts while building a capacity for intimacy. He termed the fifth vector *establishing identity*, and pointed out that this vector is dependent on the other vectors. The fifth vector involves comfort with appearance, gender, and sexual orientation; a sense of self in social and cultural contexts; clarification of self-concept through roles and life-style; a sense of self in response to feedback from others; self-acceptance and self-esteem; and personal stability and integration. The sixth vector, *developing purpose*, entails an ability to assess interests and options, clarify goals, make plans, and persist despite obstacles. Developing purpose requires formulating plans for action and a set of priorities through career aspirations, personal interests, interpersonal and family commitments, and the ability to link it all with a more meaningful purpose. Once students develop a purpose, they must go through the seventh vector called *developing integrity*, which is closely related to establishing identity and clarifying purposes, and helping them learn how to interpret experiences, guide behavior, and maintain self-respect.

In his *emerging adulthood* theory, Arnett (2000) focuses on the development period during ages 18–25. He proposes the idea that young people are now delaying marriage and parenthood, and entering and settling into long-term adult roles in their mid-to-late twenties. He states: “Sweeping demographic shifts have taken place over the

past half century that have made the late teens and early twenties not simply a brief period of transition into adult roles but a distinct period of the life course, characterized by change and exploration of possible life directions” (p. 469). He points out that today a college education is often combined with work “punctuated with periods of nonattendance” (p. 471), characterized by demographic diversity, and emphasized by change and exploration. Moreover, unlike traditional college students, for emerging adults, the characteristics of attaining adulthood are accepting responsibility for one’s self, making independent decisions, and becoming financially independent (p. 473). In exploring work possibilities, emerging adults also explore different views of the world, and because they are no longer constrained by the views of their parents and not yet limited by marital or parental responsibilities, they can pursue novel experiences more freely.

Student Success, Student Interest, and Persistence

Tinto (2004), one of the foremost authorities on retention, insists that for retention and persistence programs to be effective, advising within institutions must address the needs of the many students who enter college undecided about a major or career as well as identify and address the needs of those who change their majors during college. Although efforts to support students exist in institutions, Tinto states that a common problem in institutions is that academic support programs are often standalone efforts detached from the regular curriculum, and recommends these programs be linked more

closely to the curriculum in order to make meaningful connections between the skills and knowledge students are acquiring and those needed to succeed in their curriculum. In addition, “Students who are actively involved with peers, faculty, and staff—especially in learning activities—are more likely to learn, persist, and graduate” (p. 8). The problem is that the learning activities are typically voluntary in nature, and students who need help rarely participate.

In his research study focusing on career effectiveness skills, Brennan (2009) focused on the relationship between learner motivation and emotional effectiveness, and student success and persistence. He investigated demographic and socioeconomic data of college students, literature pertaining to college and career effectiveness skills, and common interventions used by academic and career counselors to address student persistence and success. His study concluded that both emotional intelligence and learner motivation play key roles in student success and persistence, and significantly increase student efficacy in relationship to learning outcomes. Recommendations from the research advised that both motivation and emotional intelligence planning should be addressed in curriculum design, classroom facilitation, and student problem-solving activities. The approach that has demonstrated the greatest efficacy is the “soft skills” approach to empowering students to become more effective in life and career roles. Brennan describes three general areas where interventions have had the most impact in improving student effectiveness: Academic skills (study and learning skills); College

management skills (negotiating financial aid, roommate challenges, and choosing a major); and life or effectiveness skills (assuming personal responsibility, self-awareness, goal setting, emotional intelligence, etc.) (p. 8).

Focusing primarily on adult students, Sandler (2000) studied student retention using three variables: career decision-making self-efficacy, perceived stress, and financial difficulty. He found that adult student retention is not only related to their confidence about their vocational futures, but also related to their perception of being a part of the academic and social life of the institution. His results indicated: “Most importantly and assuredly, the confidence adult students express about their vocational futures affects their attitudes about re-enrolling at the institution, as a direct effect, and to a lesser extent their actual persistence at the institution, as an indirect effect” (p. 564). Sandler suggested that the curriculum needs to address workplace reality by establishing more direct linkages with emerging professions, new technologies, and continuing professional education. He insisted that institutions should mirror the career expectations and the vocational futures of the diverse adult population, and “by attuning to the career self-efficacy beliefs of adult students, the faculty and administration can affect the attitudes and behavior of adult students about persistence” (p. 573).

Using college achievement (GPA after one year) and persistence (enrollment status after one year) as criteria for college success, Tracey and Robbins (2005) concluded that the relationship between academic major and personal interests was not a

predictor of persistence, but could be a predictor of academic success. They stated: “Having an interest in an area leads to spending more time in the activity which leads to greater self-efficacy which leads to more interest” (p. 85). From this, the researchers established that the same pattern could be expected in a major area, and that greater interest and self-efficacy would lead to increased academic success.

Based on their longitudinal study, Harackiewicz et al. (2008) believed: “Students who begin a class with higher levels of initial interest may be more likely to adopt mastery goals because they want to learn more about the domain that interests them” (p. 106). The researchers collected data from students enrolled in introductory psychology courses at five different points in time, measuring students’ initial interest in psychology as well as the individual differences in achievement orientation. The results of their study indicated that interest and mastery goals are related, suggesting that interest deepens over time because initial interest facilitates further development and engagement in the material, and as students become more engaged in the content, their attention increases. They stated: “Over time, this heightened attention may help students gain a greater appreciation of the topic more generally or see connections to their life. In other words, triggered situational interest may develop into a maintained situational interest if students discover the value or personal relevance of the material” (p. 118).

Graunke and Woosley (2005) concluded: “Commitment to an academic major and satisfaction with faculty interactions were both found to be significant predictors of grade

point average” (p. 367). Through their research, they found that much attention has been paid to first-year students and persistence, and that institutions have not sufficiently focused on the sophomore year of college, the time when students solidify their personal and career goals. The researchers focused specifically on the issues of interactions between faculty and students, involvement in activities, commitment to an academic major and institutional commitment, and found that interest and certainty in a choice of major was the highest predictor of academic success.

The University of Southern California National Resource Center for The First-Year Experience and Students in Transition has created a series of reports containing case studies of first-year seminars at various institutions. The most recent report published in 2008, *Exploring the Evidence, Vol. IV: Reporting Research on First-Year Seminars*, shows how the seminar has changed because it no longer is an isolated effort to help students through the transition to college, but instead tends to be an overall approach to the first year. Some institutions focus on GPAs and persistence, while others focus primarily on student engagement, intellectual development, career exploration and decision making, faculty-student interaction, and self-confidence. Researchers and institutions have been unable to pinpoint specific activities in the seminars that lead to overall success; however, one discovery common to several of the case studies is that first-year students often have feelings of alienation and disconnect from the larger population. As a result, institutions have been more deliberate about encouraging and

facilitating student involvement with the larger campus community (Griffin & Romm, 2008).

Jamelske (2009) researched the effects of a first-year experience (FYE) program at a medium-sized Midwestern U.S. public university. The program was designed specifically to infuse added curricular and extracurricular components into core courses in an effort to integrate students into the university community. The impact on GPA and retention after one year was also examined. The findings suggest a positive effect on retention only in the courses where the program goals were strictly followed, and on average, FYE students earned higher GPAs than non-FYE students. The positive impact on retention was larger for below average students, and smaller for above average students; however, the largest impact on retention was found to be from the positive influence of living on campus.

There is evidence that principles for good practice during the first year of college are positively linked to desired aspects of cognitive development, orientations to learning, and educational aspirations of students (Cruce et al., 2006). Principles for good practice were considered to be student-faculty interaction, cooperation among students, active learning practices, academic effort/time on task, prompt feedback to students, high expectations, and diversity experiences. In their study of the effects of three dimensions of good practice and the global effects of good practices on the cognitive development, orientations to learning, and educational aspirations of students during their first year of

college, Cruce, Wolniak, Seifert, and Pascarella found that student-faculty interaction had a direct effect on reading comprehension, critical thinking skills, openness to diversity and challenge, and internal locus of attribution to academic success. Cooperation among students had a direct effect on mathematics knowledge, openness to diversity and challenge, learning for self-understanding, and preference for higher-order cognitive tasks. Finally, high expectations had a direct effect on students' positive attitude toward literacy and an even more significant effect on students' plans to obtain a graduate degree. While the study was intended to investigate the general impact of good practices for all students, findings suggest that good practices may be particularly important for students who enter college with limited pre-college development, and the same interventions or experiences are likely to have a different impact for different types of students. With the American student body becoming increasingly diverse, principles of first-year practices may need to be tailored to students based on student background and pre-college development.

Given the increasing number of first generation students, it has become evident that equal emphasis must be given to both teaching and learning, with an additional emphasis on creating opportunities for student interaction. In the 2004 report, *Learning Reconsidered: A Campus-Wide Focus on the Student Experience*, the National Association of Student Personnel Administrators (NASPA) and the American College Personnel Association (ACPA) established an argument for the integrated use of all

higher education's resources in the education and preparation of the whole student. The report emphasizes the nature, characteristics, meaning, and application of the work of student affairs as a partner in the broader campus curriculum, and the ways in which it affects student outcomes. The utilitarian outcomes of general education courses intended to expose students to diverse cultural perspectives have lost their meaning. "Experiences with out-of-classroom learning can, however, be as centrifugal as any general education sequence. On many campuses, students may perceive little coherence between the student affairs curriculum and academic coursework" (Keeling, 2004, p. 8). The solution presented by NASPA and ACPA in this report is called *transformative education*, which places the student's reflective processes at the core of the learning experience.

Transformative education produces learners who can adapt to new environments, and rather than relying on information transfer, it focuses on identity development which involves the cognitive, affective, behavioral, and spiritual development of the student. "Therefore learning, as it has historically been understood, is included in a much larger context that requires consideration of what students know, who they are, what their values and behavior patterns are, and how they see themselves contributing to and participating in the world in which they live" (p. 9). To achieve the goal of education and preparation of the whole student, learning development and identity formation must be interactive, a new configuration of learning processes and outcomes must be created, and the campus must be transformed into a learning community.

In 2006, NASPA and ACPA were joined by several partner associations to transform educational objectives by writing a follow-up report titled *Learning Reconsidered 2: A Practical Guide to Implementing a Campus-Wide Focus on the Student Experience* (Keeling, 2006). The focus was to report the actual experiences of student affairs educators who have attempted transformative education, and to explore in greater depth the concepts proposed in the original 2004 Keeling report.

Student demographics can assist in determining interventions that could help students overcome issues and meet their goals, however, it would be beneficial to expand the interventions into the classroom so that students can better connect their interests with the curriculum. Identifying a student's interest and linking it to classroom content, so the student finds personal relevance in the material, may have the greatest impact on retention and student success.

Cognitive Information Processing Theory

At the Center for the Study of Technology in Counseling and Career Development at Florida State University, researchers developed the cognitive information processing (CIP) approach to career development and services to help individuals learn improved problem-solving and decision-making skills needed for career choices (Sampson et al., 1998). They felt that previous theories lacked an adequate connection between career theory and the employment decision-making process, and believed the same disconnect also exists in career services within educational settings. Sampson and

his colleagues made two determinations from their review of literature: “First, dysfunctional career thinking compromises the effectiveness of career problem solving and decision making. Second, effective cognitive restructuring strategies exist for identifying, challenging, and altering dysfunctional career thinking” (p. 116). They based their theory on cognitive therapy and the theoretical approach to: a) problem solving and decision making; b) understanding the positive and negative impact of metacognitions on career problem solving and decision making; and c) a conceptual basis for instruction designed to enhance skills in career problem solving and decision making (Sampson et al., 1996a, p. 4). The underlying rationale for cognitive therapy is that an individual’s behavior is largely determined by his or her cognitions. Cognitions are based on beliefs formed from past experiences, and can become dysfunctional if incoming stimuli is distorted to fit one’s systematic thinking. The use of dysfunctional thinking over time leads to faulty information processing and errors in reasoning.

In their approach, the Florida State researchers define an individual’s career problem by identifying the gap between where a person is and where the person wants to be, and then applying cognitive therapy to monitor and restructure negative thoughts. “Problem solving involves acquiring information and learning cognitive strategies that enable them to remove the gap between their existing and desired state of affairs...Decision making involves transforming the choice into specific action steps” (Sampson, Lenz et al., 1999, p. 5). They outlined four information processing domains

that students encounter during the decision-making process, and conceptualized these as the pyramid of information processing domains, or the *knowing* element of decision making, illustrated in Figure 1. Figure 2 illustrates the student version used in career counseling.

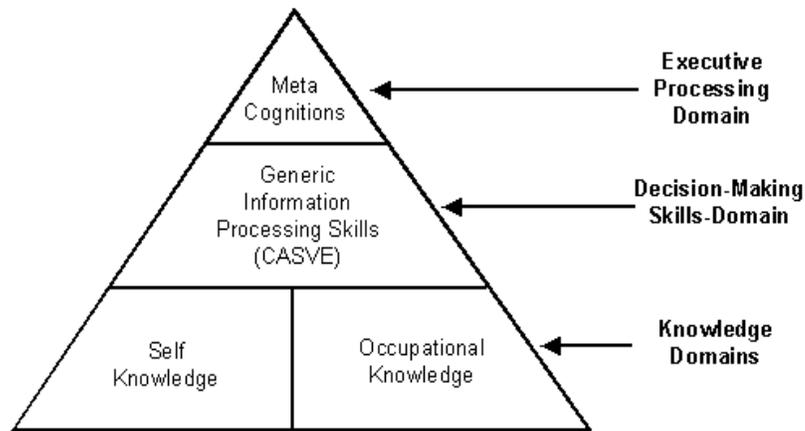


Figure 1. Pyramid of Information Processing, Counselor Version. (Peterson, Sampson, Reardon, & Lenz, 2003, p. 7)

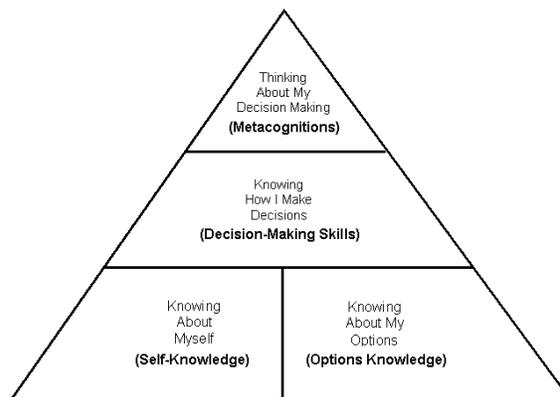


Figure 2. Pyramid of Information Processing, Student Version (Peterson et. al., 2003, p.89).

There are three levels of domains within the pyramid. At the bottom of the pyramid are the knowledge domains—self-knowledge and occupational knowledge. In the middle is the decision-making skills domain, and at the top is the executive processing domain which controls metacognitions such as self-talk and self-awareness. Within the *self-knowledge domain*, the individual answers questions relating to knowledge of self (values, interests, skills). Within the *occupational knowledge domain*, the individual answers questions relating to knowledge of occupations (programs of study, job training requirements, and categories of employers). Within the *decision-making skills domain*, the individual answers questions related to the steps required to choose an occupation, programs of study that will meet individual needs, and the process for making important decisions. Within the *executive processing domain*, the individual investigates metacognitions such as self-talk and self-awareness, and the amount of assistance needed to make a decision. Through improved self-awareness, individuals can learn to reframe negative self-talk into positive self-talk, freeing themselves to apply their own effective problem-solving and decision-making skills, and in the process, enhance self-knowledge and occupational knowledge (Sampson et al., 1996a).

By improving decision-making skills, students can increase the likelihood of making effective career choices; therefore, the researchers focused on the decision-making skills domain. Within this domain is the CASVE cycle, illustrated in Figure 3. Figure 4 shows the student version of the cycle.

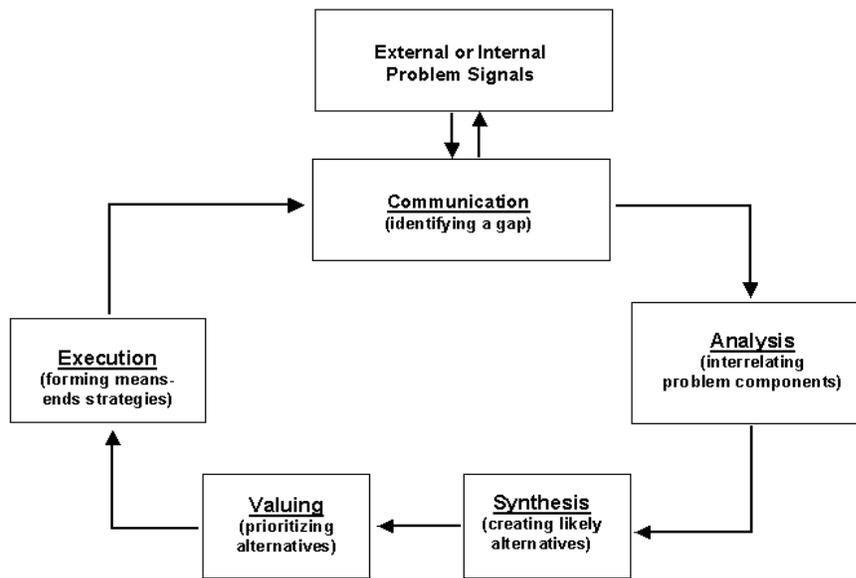


Figure 3. The CASVE Cycle, Counselor Version (Peterson et al., 2003, p. 8).

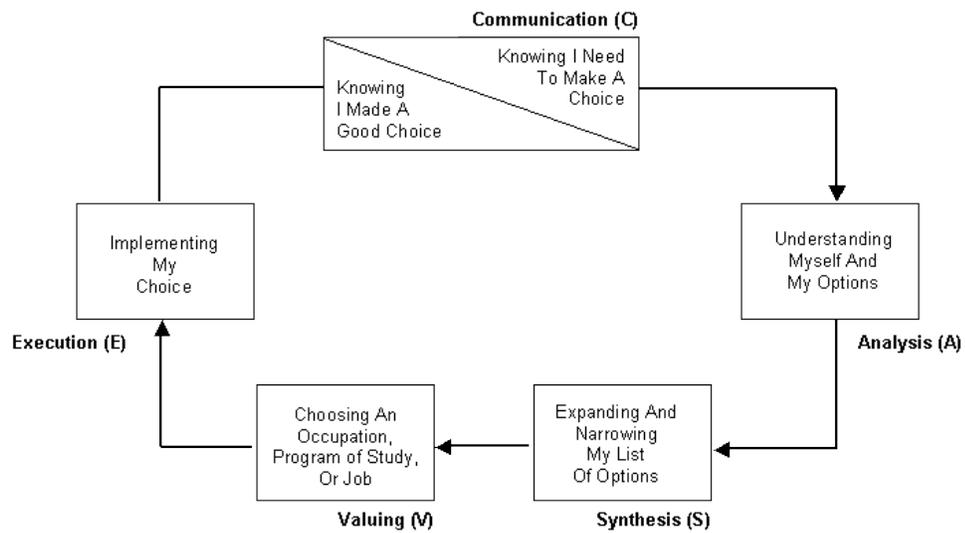


Figure 4. The CASVE Cycle, Student Version (Peterson et al., 2003, p. 91).

CASVE is an acronym for five stages of information processing that should be used by career counselors when assisting students. The first is the *Communication phase*, where an awareness of the gap between the existing and desired state of affairs is identified. The next phase is the *Analysis phase*, where a mental model of the problem and perceived relationships among the elements is created (such as relating self-knowledge with their knowledge of options). Soon students move into the *Synthesis phase*, where options are expanded (elaborate) and narrowed (crystallize). The fourth phase is called the *Valuing phase*, when the costs and benefits of options, to themselves and to others, is analyzed. Finally, students experience the *Execution phase*, where the creation of and commitment to an implementation plan for the tentative choice is made. Upon completion of the execution phase, students resume the communication phase to find out if there is still a gap between where they are and where they want to be, and if so, they repeat the CASVE cycle.

This cycle is intended to make a relatively complex process simple so that it is less overwhelming to students. External variables may influence the student's progression through the CASVE cycle; however, successful application of the approach requires assistance from career counseling sources. By reducing dysfunctional career thinking, students will be more likely to effectively process information related to career decision making. Dysfunctional thinking does not just occur in the executive processing domain though; it is possible across all elements of the pyramid of information

processing and CASVE combined. For the purpose of developing an assessment tool and workbook to implement the concepts in the theory, the four domains and CASVE subcomponents were organized into eight cognitive information processing dimensions: self-knowledge, occupational knowledge, communication, analysis, synthesis, valuing, execution, and executive processing (Sampson et al., 1996a, p. 11). The cognitive restructuring process in the workbook is designed to have the user identify, challenge, and alter negative career thoughts, then follow up with action (p.16).

Dysfunctional thinking compromises the effectiveness of problem solving and decision making, and can hinder students from setting goals. Understanding how information is processed is essential in identifying, challenging, and reframing negative thoughts, setting appropriate goals, and creating an action plan to achieve those goals. Through the use of the Pyramid of Information Processing and the CASVE Cycle, counselors and students can work together to apply cognitive restructuring.

Assessments and Interventions for Career Decisions

Assessing Levels of Indecision

Using *self-determination theory* (SDT) as a theoretical framework, Guay, Ratelle, Senecal, Larose, and Deschenes (2006) studied the possible correlation between SDT and the two types of career indecision categorized as *developmental indecision*, a lack of information on the self and the world of work, and *chronic indecision*, a pervasive inability to make a decision about one's career. Students were contacted in their

classrooms and asked to complete a questionnaire at home which measured five different areas. The areas included career indecision, self-efficacy, perceived autonomy, parental control and autonomy support, and peer control and autonomy support. The *Career Decision Scale*, *Career Decision-Making Scale*, and *Career Decision-Making Autonomy Scale* were used to measure the results and categorize the students as developmentally or chronically undecided. Results of the study showed that for the developmentally undecided group, the strongest correlation was between self-efficacy and career indecision, followed by autonomy and career indecision. The researchers interpreted this as meaning, “the more college students felt undecided with respect to their career choice, the lower were their perceptions of autonomy and self-efficacy in relation to decision-making activities” (pp. 242–243). Additional results of this study suggested that “those students who were at risk of having chronic career indecision were those who, at the beginning of college, had high levels of career indecision that were accompanied by low levels of autonomy” (p. 248). They believed that the high level of autonomy in the developmentally undecided group contributed to their ability to research careers, and as a result, increased their self-efficacy. In contrast, the low level of autonomy in the chronically undecided group prevented them from seeking career information, and as a result, impeded the development of their self-efficacy beliefs.

Career Thoughts Inventory and Workbook

James Sampson and his associates at Florida State University believed that while a number of instruments designed to assess readiness for career decision making are conceptually related to dysfunctional career cognitions, few provide a specific measure of dysfunctional career cognitions. Using cognitive information processing as a theoretical basis, they developed an assessment tool called the Career Thoughts Inventory (CTI) (Sampson et al., 1996a). The researchers define career thoughts as “outcomes of one's thinking about assumptions, attitudes, behaviors, beliefs, feelings, plans, and/or strategies related to career problem solving and decision making” (Sampson, Peterson et al., 1999, p. 2). The CTI is designed to address the eight cognitive information processing content dimensions: self-knowledge, occupational knowledge, communication, analysis, synthesis, valuing, execution, and executive processing. They tested their assessment using 320 undergraduate students at Florida State University, and found that the analysis yielded three scales: Decision-Making Confusion (DMC), Commitment Anxiety (CA), and External Conflict (EC). All participants fell into one of the three scales, which helped career counselors to determine their level of need (Sampson, Peterson et al., 1999).

To accompany the CTI, the Florida State researchers also developed a workbook, *Improving Your Career Thoughts: A Workbook for the Career Thoughts Inventory* (Sampson et al., 1996b) to integrate the functions of assessment and intervention within a career services context. The workbook contains five sections:

Section 1: Identifying Your Total Amount of Negative Career Thoughts: The CTI Total Score. This is designed to help clients understand that as negative career thinking increases, the level of practitioner assistance increases.

Section 2: Identifying the Nature of Your Negative Career Thoughts. This is designed to help clients gain insight into how their negative thinking developed, and to help clients increase their self-awareness.

Section 3: Challenging and Altering Your Negative Career Thoughts and Taking Action. This is designed to improve client ability to monitor and control negative self-talk, facilitate the cognitive restructuring of negative career thoughts through completing an exercise, and facilitate the development of an Individual Action Plan for using career resources and services.

Section 4: Improving Your Ability to Make Good Decisions. This is designed to enhance clients' present and future decision-making skills through decision-making instruction.

Section 5: Making Good Use of Support from Other People. This is designed to help clients better understand how support resources can be used to

assist with cognitive restructuring, career exploration, and decision making (Sampson et al., 1996b, pp.16–19).

The intended result of the workbook is cognitive restructuring, where dysfunctional cognitions are replaced with functional cognitions, resulting in positive emotional and behavioral changes. The researchers defined *dysfunctional thinking* as any assumptions, attitudes, behaviors, beliefs, feelings, plans, or strategies that inhibit effective career problem solving and decision making (Sampson, Lenz et al., 1999).

At a large research institution in the Southeast, Saunders (1997) investigated the effects of depression and dysfunctional career thoughts, and compared these to the variance in career indecision of 215 undergraduate students enrolled in an introductory psychology course. The Career Decision Scale (CDS) and Occupational Alternatives Question (OAQ) were used to measure career indecision; the Beck Depression Inventory (BDI) was used to measure depression; and the CTI was used to measure dysfunctional career thinking. It was determined that depression accounted for 5% of career indecision, while dysfunctional career thinking accounted for 71% of career indecision. There was also a significant positive relationship between depression and dysfunctional career thinking. Findings of the study suggest the need to fully explore dysfunctional career thinking that may inhibit clients from effectively engaging in the career decision-making process. Age, classification, and gender contributed to the limitations of the study since the majority of participants were freshmen males. A limitation that was also identified

was the use of the BDI in measuring depression since it is an indicator of symptoms rather than the cognitive component of depression (pp. 90–91).

In another study using the CTI, Wright, Reardon, Peterson, and Osborn (2000) investigated the relationship between the Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC) typology structure (Holland, 1966) as measured by the Self-Directed Search (SDS) (Holland, 1989), and the presence of dysfunctional career thoughts as measured by the CTI. After testing students seeking career planning assistance at a liberal arts university, the researchers discovered that, although there is a relationship between RIASEC types and dysfunctional career thoughts, it was not what they had expected. They found that clients with high Realistic scores had high Decision-Making Confusion (DMC) scores and low Commitment Anxiety (CA) scores, whereas, clients with high Enterprising scores had low DMC but high CA scores. They realized that a liberal arts education offers few majors that provide outlets for Realistic tendencies, so individuals with Realistic interest types may struggle to find an appropriate course of study and, therefore, may experience difficulty in making career decisions. The researchers summarized that students who fall within the Realistic or Enterprising typologies would benefit from early career interventions tailored to their particular DMC and CA needs (Wright et al., 2000). Determining the student's typology may help in the initial process of selecting an institution. An institution that offers clubs and organizations related to student interests may be a better institutional fit than one that

does not offer activities outside of the classroom experience. Based on the level of student anxiety, the researchers proposed that instruments such as the SDS and CTI could be helpful in facilitating the career problem-solving and decision-making process (p. 115).

Henderson (2009) investigated the impact of a career intervention on the dysfunctional career thoughts, locus of control, and career decision self-efficacy of 48 underprepared college students enrolled in a first year experience course at a small, open-enrollment, public institution in Georgia. The intervention was based on cognitive information processing theory, using the CTI as a screening tool to help identify dysfunctional thinking. Results of the study showed no significant change in locus of control and career decision self-efficacy, however, there was a significant decrease in dysfunctional career thoughts from pre-test to post-test total CTI scores. Changes were specifically within the decision-making confusion variables, while commitment anxiety and external conflict variables did not have statistically significant differences from pre-test to post-test (p. 90). Summary of these findings suggest that it is possible to provide effective career interventions to underprepared college students using the CIP approach and the CTI workbook as an intervention (p. 101). Recommendations from the study include a replication of the study using a larger sample size to see if similar results are obtained, a longitudinal study to examine the continuing effects of the career intervention, the use of a control group, and use of treatment groups that utilize only CIP theory and the CTI workbook as an intervention.

Although the CTI and related workbook were chosen for this research, there are several other instruments and methods that are widely used to assist students with the difficult task of choosing a career.

High School Programs

Career and Technical Education (CTE). The National Research Center for Career and Technical Education conducted Career Development Interventions and Academic Self-Efficacy and Motivation: A Pilot Study (Dykeman, et al., 2003) to examine the relationship between career development interventions and academic motivation and academic self-efficacy. The researchers studied a sample of 293 high school seniors, age 18 and over, from 20 schools using 44 clearly defined career development interventions that measured academic motivation and academic self-efficacy. They found that there was no predictive relationship between the interventions and academic motivation and academic self-efficacy, however, the research also revealed that intervention was minimal among all participants.

In Oregon, “CTE concentrators met or exceeded the state's assessments on mathematics (55.2%) and writing (59.3%) at higher rates than the general student population” (Roach, 2010, p. 2). Programs provide students with rigorous and coherent content that teaches students to identify their career choice. Content typically includes technical skills for a successful career, workplace basics such as communication skills, problem solving, teamwork, the ability to use technology, the ability to find and use

information, and real-world contexts in which academic skills can be made more relevant to students. Washington State has determined: “In well-designed models of CTE, students have lower dropout rates, higher test scores, higher graduation rates, higher postsecondary enrollment rates, and higher earnings than students who do not enroll in CTE” (Workforce Training and Education Coordinating Board, 2008, p.2).

Career Trek. Researchers from the University of Winnipeg and the University of Manitoba observed students in *Career Trek*, a program designed to promote school engagement by developing positive self-esteem. The purpose of the study was to examine the impact of participation in the program on academic motivation (Sutherland, Levine, & Barth, 2005). At the beginning and at the end of the program, 33 high school students completed questionnaires related to academic motivation and self-esteem; a control group of ten non-participants was also used. The Career Trek program is an intervention designed to expose inner-city ninth grade high school students to post-secondary programs and the range of careers available. Students were divided into groups and rotated through three participating institutions where they experienced 45-minute career programming sessions that focused on degree requirements and college courses associated with a career. Departments that participated in the program were vocational/career oriented and included Native Studies, Engineering, Building Construction, Graphic Arts, Criminal Justice, Law, Education, Aeronautics, Physical Education and Recreational Studies, and Political Science. Connections were made

between liberal arts courses and student career interests to emphasize the relationship between basic skills and career aspirations, such as how math skills are used during building construction. Results of the study showed that Career Trek participants positively increased in measures related to academic motivation, while the control group showed a decrease in academic motivation.

College Programs

Campbell Interest and Skill Survey. The *Campbell Interest and Skill Survey* (CISS) measures self-reported vocational interests and skills that reflect an individual's attraction for specific occupational areas, and provides an estimate of an individual's confidence in his or her ability to perform various occupational activities. The assessment has an accompanying test management system for counselors as well as a career planner to assist students with career decision-making after they receive the results of the assessment. The 6th grade reading level instrument is administered through paper and pencil or accessed through the Internet, contains 200 interest items and 120 skill items, and is measured on a 6-point response scale. The assessment also has 7 “Orientation Scales” which measure Holland’s RIASEC personality types, and 29 “Basic Scales” which measure parallel interest and skills categorized as Influencing, Organizing, Helping, Creating, Analyzing, Producing, and Adventuring. Each category lists related occupations (Campbell et al., 1992).

In a study to assess the level of agreement between assessed interests and declared college majors of undergraduates, Pendergrass, Hansen, Neumann, and Nutter (2003) used the CISS to demonstrate the efficacy of interest inventories with student athletes. The participants included 82 athletes in both revenue-generating and non-revenue-generating sports, and 55 non-athlete students enrolled in an introductory psychology course at the same institution. The results indicated that the athletes in revenue-generating sports had a lower percentage of matches between the chosen major and the CISS occupational score than did either the athletes in non-revenue-generating sports or the non-athlete students, but the differences were not statistically significant.

American College Testing DISCOVER Program. The American College Testing's DISCOVER program includes a comprehensive assessment tool that measures career readiness, student interests, abilities, and values. One of the primary purposes is to help users successfully progress through the stages of career development. Based on the individual's results, the program builds a student profile, recognizes strengths and needs, and identifies career options using the World of Work (WOW) Map shown in Figure 5. The student is provided with information regarding possible majors and schools as well as scholarship and financial aid information, and assistance with the occupational search, including resume preparation.

The DISCOVER computerized career guidance system (CCGS) and the WOW map are based on Holland's six occupational types, expanded into 26 career areas related

to work-relevant tasks, with items chosen to assess basic interests while minimizing gender-based roles. Psychometric functioning of assessment items and scales is periodically reviewed, and research is conducted to support revisions that enhance the functioning of the assessment which helps to maintain quality of the assessment over time (American College Testing, 2011).

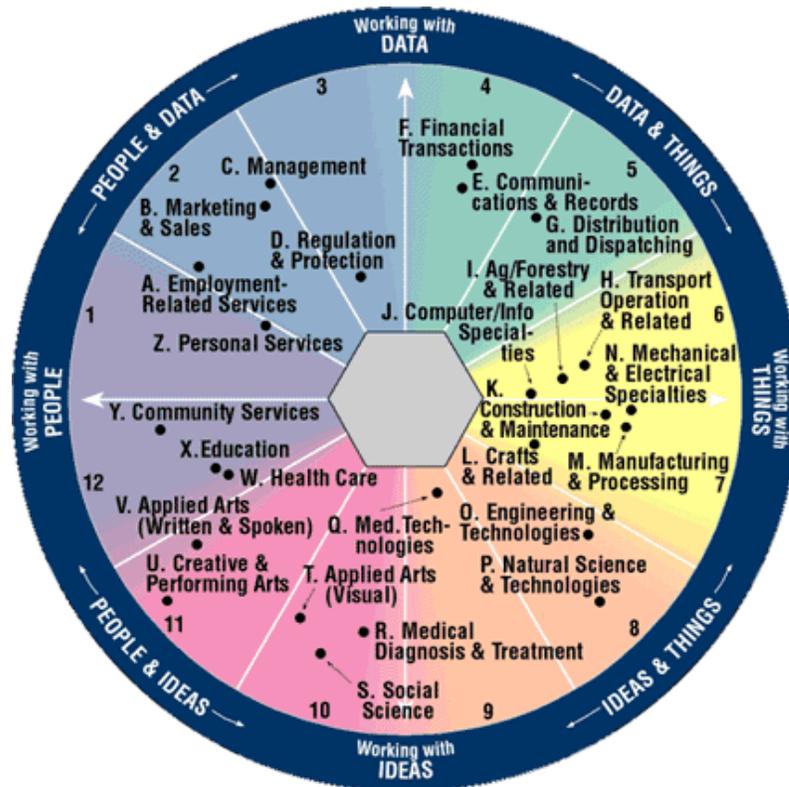


Figure 5. American College Testing World of Work (WOW) Map (American College Testing, 2011).

In a study using DISCOVER and cognitive restructuring, participants were exposed to Holland's scheme of occupational organization in the world of work prior to

using DISCOVER. The effect of prior structuring was assessed in terms of the participant's representation of the world of work, occupational certainty, and vocational identity. The researchers found that prior cognitive structuring appears to help individuals when they possess too few or too many alternatives, and for those individuals who have three to five alternatives, the DISCOVER alone may be beneficial.

By randomly assigning students to either a DISCOVER-only group, a career exploration workshop and DISCOVER group, or a control group with no career guidance system interaction, Campbell (1983) found that students who participated in either the DISCOVER-only group or the career exploration workshop and DISCOVER group exhibited significant gains in their level of career development as compared to the control group. Garis and Bowsbey (1984) compared the effects of using DISCOVER to receiving individual career counseling on the career maturity of college students, and found that persons who use DISCOVER are likely to increase in career maturity at the same rate as those who receive one-on-one counseling. In a more recent study, Barnes and Herr (1998) evaluated the combined effects of DISCOVER and counseling on the career development of college students as measured by career planning progress. They found that DISCOVER users who met with a career counselor exhibited an increase in vocational identity, experiencing significant gains in career decision making self-efficacy as well as an enhanced sense of control over the career decision making process.

Self-Directed Search. Commonly used in research studies, *Self-Directed Search* (SDS) was developed by John Holland in accordance with National Career Development Association (NCDA) guidelines. The assessment supports Holland's theory that most people can be loosely categorized into six types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional, and people whose careers match their type tend to be successful and satisfied. The assessment is self-administered and takes approximately 30 minutes to complete. Individuals answer questions about their aspirations, activities, competencies, occupations, and other self-estimates, and identify occupations that best fit their interest skills. The results are provided in a report which includes the *Occupational Finder* (Holland, 1989), an up-to-date alphabetical list of 1,309 occupations and fields of study from which occupations that most closely match the individual's interests are identified.

LifeMap. Valencia College has created a developmental advising model called "LifeMap" which is a student-centered approach intended to foster advising alliances among students, faculty, and other college professionals through mutual trust and shared responsibilities. It is designed to be an ongoing growth process used throughout life when needed which assists in the exploration, clarification, communication, and implementation of realistic choices based on self-awareness of abilities, interests, and values. The model, shown in Figure 6, is very simple, with A representing Advisor, S

representing Student, and the capital letter representing which person is driving the process.



Figure 6. The LifeMap Process at Valencia College (Valencia College, 2011).

The LifeMap process enables students to meet five objectives: 1) learn how to make a plan and implement goals; 2) achieve educational and career goals in a shorter time; 3) understand how courses relate to personal goals and chosen career; 4) maximize use of Valencia's college resources; and 5) stay in college and complete a degree. Valencia has created resources, such as an online assessment and planning system, to help students benefit fully from this process (Valencia College, 2011).

Career Decision-Making and Career Planner. At The Centre for Student Careers & Skills at The University of Warwick, career counselors use a *Career Decision-Making and Career Planner*, shown in Figure 7, which maps out key elements of making a career decision. The planner includes steps that guide the individual through self-exploration (Who am I?), career exploration (What am I going to do with who I am?), and seeking employment (How can I get there?).



Figure 7. Career Decision-making and Career Planner (The University of Warwick, 2011).

Career Interest Game. The Web site for the University of Missouri Career Center directs students to play the *Career Interest Game* which is based on Holland's six career types. When students click on a category within the hexagon that interests them, a description of related interests and possible occupations appears as well as resources for gathering additional information.

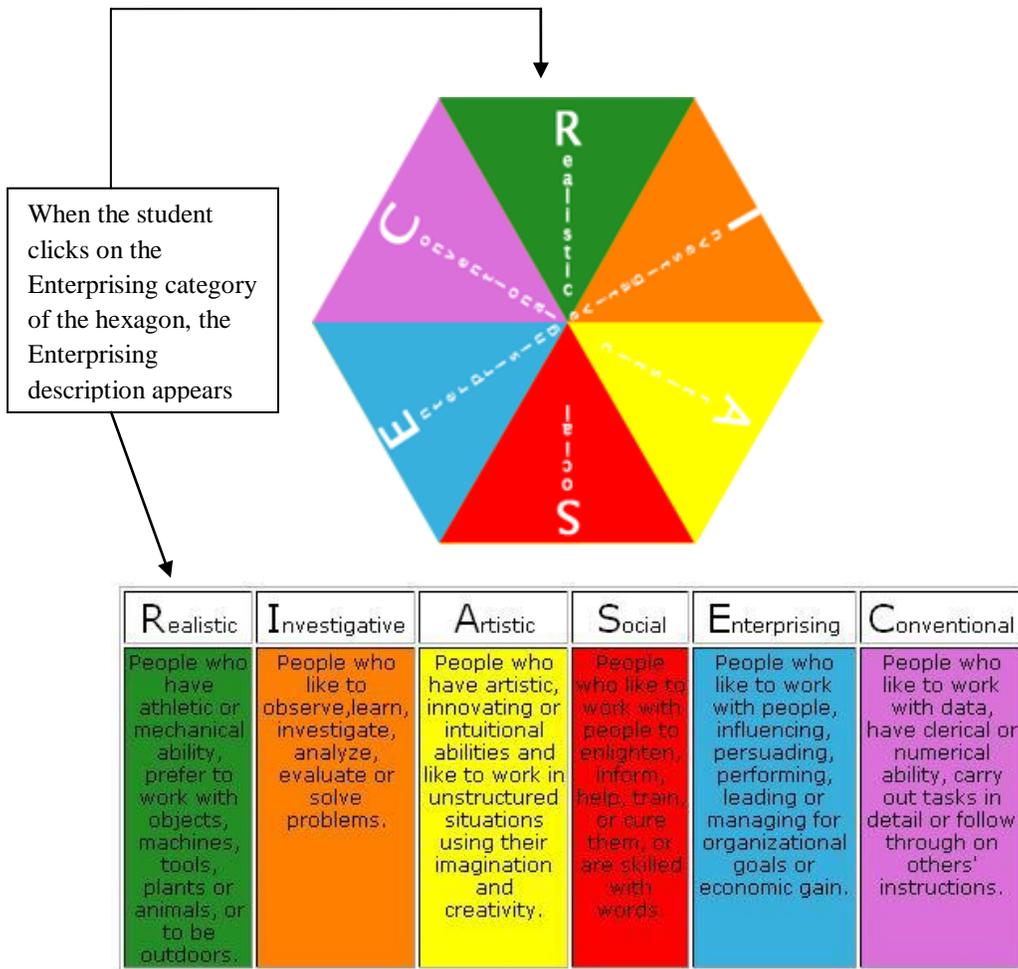


Figure 8. The University of Missouri Career Interest Game (University of Missouri, 2011).

The Career Interest Game is designed to help users match their interests and skills with similar careers, recognizing how their personality will fit in with specific work environments. It encourages students to look for a career path or major that will capture their interests, utilize their strengths, and match their values.

Career Development Courses

Career development courses offered by higher education institutions have been proven to have a positive impact on students, increasing occupational awareness, self-esteem, and vocational identity, and ultimately, increasing graduation rates. In their study of freshman students in a program for alternate admits (students whose GPA suggested the potential for success but whose test scores did not meet the university admission requirements), Osborn, Howard and Leierer (2007) examined the impact of a six-week, one credit hour career course on student career thoughts. They specifically wanted to determine if student gender and ethnicity were associated with the nature of career thoughts. The CTI was used as a pre- and post-test which allowed the researchers to determine whether career thoughts related to decision-making confusion, commitment anxiety, and external conflict changed from the beginning to the end of the course. The course was designed to teach students to understand the world of work; reframe negative thoughts; implement career development theories and decision-making skills; identify personal interests, skills, abilities, and values; explore and assess career options; relate personal characteristics and career goals to academic majors; and create a customized career action plan. Students' levels of competence were measured through tests and homework assignments. Results of the study revealed post-test scores significantly lower than the pre-test scores, indicating that such career courses might prove to be an efficient tool for reducing career indecision among college freshmen, and can change students'

negative thinking, allowing them to persist to graduation. The results of the research showed that students who completed an undergraduate career planning course had higher graduation rates as compared with the general student population (81% compared with 69%) and graduated with fewer credit hours on average than the general student population (p. 365). One limitation of the study was the inability to specify which of the interventions, or combination of interventions, within the course had the greatest effect on reducing dysfunctional career thoughts. A second limitation was the lack of a control group which would have allowed for a comparison of results (p. 374).

Previous literature has addressed ways to recognize, and possibly reduce, the internal and external barriers that impede student progress toward a career goal. For many students, dysfunctional thinking hinders their ability to effectively process information related to career problem solving and decision making, preventing them from identifying a vocational match for their interests. Research, such as that of Sutherland, Levine and Barth (2005) and Osborn, Howard and Leierer (2007), confirms that assessments can assist students with reducing negative thought patterns, identifying a career choice, overcoming barriers, and transforming their choice into specific action steps. Various interventions such as first-year seminars, career counseling, vocational programs, simulated experiences, and career planning have proven successful in academic and research settings, showing that career counseling can be effective if structured properly. For decades, educators have tried to improve the student experience

both within the classroom and within student life. When students identify personal relevance in the course content, an increase in learner motivation is possible (Brennan, 2009), and student interest facilitates further development and engagement in the course material (Harackiewicz et al., 2008). Linking together student affairs and the academic curriculum is a logical solution, but how to do so is still a concern as evidenced through case studies (Griffin & Romm, 2008). This study was designed to determine if the Career Thoughts Inventory assessment and intervention, to facilitate an individual's understanding of the nature of his or her dysfunctional thoughts, could make a significant impact on the career problem solving and decision making of college students when used in a non-career planning course.

CHAPTER THREE: METHODOLOGY

An experimental design was used to examine the impact of an assessment and intervention process. Approximately 120 college students enrolled in freshman-level core college courses at an open enrollment, career oriented, regionally accredited, Midwestern proprietary university were assessed using the CTI. The courses were divided into two different groups, one group of participants that completed an intervention using an accompanying CTI workbook, and a control group. The workbook was designed to use the eight cognitive information processing content dimensions to categorize participants using three different constructs: decision-making confusion (DMC), commitment anxiety (CA), or external conflict (EC). The participants who completed the workbook were then led through methods to overcome barriers to career problem solving and decision making, and take action steps to implement a career choice.

Research Question and Hypothesis

The following research question was identified for this study.

Will a workbook intervention based on Cognitive Information Processing theory help improve CTI scores of first year college students when used in a non-career development classroom setting?

The hypothesis is CTI scores for subjects who complete the workbook intervention will be lower than for those who do not.

Data Collection

Four freshman-level core college courses were selected for the study, with the courses randomly divided into two groups, an intervention group and a control group. The CTI and the workbook intervention were administered during regular scheduled classes by the researcher and a research assistant from the guidance services office of the institution trained in the use and interpretation of CTI in service delivery. Because the workbook intervention is based on the results of the CTI total score and content scores, the groups completed both a pre-test and a post-test. A comparison of post-tests for each group was made. Figure 9 illustrates the structure that was used throughout the study.

| GROUPS | PRE-TEST | INTERVENTION | POST-TEST | DATA ANALYSIS |
|-------------------------|--|---------------------|--|--|
| Test Group IG | CTI total score and breakdown of content scores: DMC, EC, CA | Intervention | CTI total score and breakdown of content scores: DMC, EC, CA | Pre-test vs. post-test results for IG |
| Control Group CG | CTI total score and breakdown of content scores: DMC, EC, CA | No Intervention | CTI total score and breakdown of content scores: DMC, EC, CA | Pre-test vs. post-test results for CG IG vs. CG post-test results |

Figure 9. Data Collection Structure.

Participants

The participant sample was drawn from an open enrollment for-profit/proprietary university in Illinois, and was comprised of 116 first-year college students enrolled in freshman-level courses during the 2011–2012 academic year. Entering students at the campus, 18 years of age or older, participated in the study via their mandatory core coursework. All participating students were given an informed consent form approved by the Institutional Review Board (IRB) at the researcher’s university. The consent form specifies the purpose of the study: to determine if cognitive information processing can significantly improve the career readiness of first-year college students. Students were informed that the results of the study were intended to evaluate the effectiveness of using an intervention in improving career decision making and career readiness, and all data would be reported as aggregate data.

Variables in the Study

1. Independent Variables: a) CTI workbook intervention; b) Student questionnaire
2. Dependent Variables: a) CTI Total scores; b) CTI construct scores—decision-making confusion (DMC), commitment anxiety (CA), and external conflict (EC)

Instrument

The Career Thoughts Inventory (CTI) was chosen because it is both a diagnostic and a treatment product designed to help individuals identify, challenge, and alter dysfunctional thinking that impairs their ability to effectively solve career related issues. It can serve as a screening measure for individuals experiencing career choice problems, as a needs assessment to identify the specific nature of individuals' dysfunctional thinking, and as a learning resource to challenge specific dysfunctional thoughts. The inventory, answer sheet, and profile form were included in a booklet, and the first three pages contained a brief explanation of the purpose of the inventory, instructions for the participant, and spaces for entering demographic information. The CTI readability level is 7th grade, and it is intended for use with 11th and 12th grade high school students, college students, and adults choosing a field of study, seeking employment, reentering the labor market, or considering an occupational change. It is self-administered, uses paper and pencil, and contains 48 items which are objectively measured. Items were scored using a four point Likert scale ranging from strongly agree (3.00) to strongly disagree (0.00), and the CTI can be completed in 7 to 15 minutes (Sampson et al., 1996a, p. 22).

Each item on the CTI addressed at least one of the eight cognitive information processing content dimensions: self-knowledge, options knowledge, communication, analysis, synthesis, valuing, execution, and executive processes. The CTI yields a Total score as well as scores in three construct scales: 14 items are assigned to Decision-

Making Confusion Scale, 10 items are assigned to Commitment Anxiety Scale, and 5 items are assigned to External Conflict Scale. Decision-making confusion (DMC) refers to inability to initiate or sustain the decision-making process as a result of disabling emotions and/or a lack of understanding about the decision-making process itself. Commitment anxiety (CA) reflects inability to make a commitment to a specific career choice, accompanied by generalized anxiety about the outcome of the decision-making process which perpetuates indecision. External conflict (EC) reflects inability to balance the importance of one's own self-perceptions with the importance of input from significant others, resulting in a reluctance to assume responsibility for decision making (Sampson et al., 1996a, pp.28–29). The CTI workbook, *Improving Your Career Thoughts: A Workbook for the Career Thoughts Inventory* (Sampson et al., 1996b), is used to facilitate an individual's understanding of the nature of his or her dysfunctional thoughts based on construct score results.

Reliability of the Instrument

Since the survey instrument has several constructs, and each construct consists of sub-items that are included in a composite score or summated scale for the specific construct, the most commonly used and appropriate type of measure to determine internal consistency is Cronbach's coefficient alpha for each assessment construct (Leech, Barrett, & Morgan, 2005). Gliner and Morgan (2000) indicate that this measure of reliability takes only one administration, and is a suitable method for multiple-choice

instruments such as the Likert scales used in my research. According to Fontain (2010) at the Buros Institute of Mental Measurements who evaluated the CTI instrument adopted in my research, the Cronbach's alphas for CTI total score range from .93–.97; the Cronbach's alphas for DMC range from .90–.94; the Cronbach's alphas for CA range from .79–.91; while the Cronbach's alphas for EC range from .74–.81, showing that all instrument items have good to very good internal consistency reliability.

Stability of the CTI Total score and construct scales was determined by the CTI authors by having 73 college students and 48 high school students complete the CTI twice over a four week period, as shown in Figure 10. For the college student sample, test-retest CTI Total score was high ($r = .86$), indicating there was little change in responses over a four week period. The same pattern was observed for the high school student sample, with the CTI Total at ($r = .69$) and the construct scales ranging from .72 for DMC, .70 for CA, and .52 for EC, showing that adequate stability exists (Sampson et al., 1996a, p. 51).

| | College Students | High School Students | Total Sample |
|------------------|-------------------------|-----------------------------|---------------------|
| CTI Total | .86 | .69 | .77 |
| DMC | .82 | .72 | .77 |
| CA | .79 | .70 | .75 |
| EC | .74 | .52 | .63 |

Figure 10. Stability of the CTI Total Score and Construct Scales adapted from Sampson et al., 1996a, p. 51.

Validity of the Instrument

Content validity was built into the development strategy for the CTI items and scales. Individual items and construct scales are directly linked to CIP theory through content dimensions. Because the test authors are also the developers of the CIP theory, expert content analysis is adequate (Fontain, 2010).

Evidence of construct validity (DMC, CA, and EC) for the instrument was established through a series of factor analyses. The CTI Total score is highly correlated ($r = .89$ to $.94$) with DMC for all groups. These correlations suggest that a general predisposition toward dysfunctional thinking strongly influences subsequent aspects of dysfunctional career thinking such as commitment anxiety. External conflict (EC) appears to be less related to general dysfunctional thinking as represented by the lower correlation of EC with the CTI Total score ($r = .23$ – $.80$) (Sampson et al., 1996a, p. 52).

The authors of the CTI established evidence of convergent validity by administering four other instruments with similar concepts to 50 adults, 152 college students, and 151 eleventh- and twelfth-grade high school students. Assessments included *My Vocational Situation* (Holland, Daiger, & Power, 1980), *The Career Decision Scale* (Osipow, Carney, Winer, Yanico, & Koschier, 1987), *The NEO PI-R* (Costa & McCrae, 1992), and *The Career Decision Profile* (Jones, 1989). CTI scales were directly correlated with indecision, and consistently inversely correlated with positive constructs such as career goals. The CTI Total score was consistently directly

correlated with neuroticism and vulnerability. As was expected, only career choice importance exhibited inconsistency in relationships across groups (Sampson et al., 1996a, p. 58).

Data Analysis

Data was analyzed using linear regression and analysis of variance. Linear regression was used to determine the degree of relationship between CTI Total scores and content scores from pre-test to post-test for each individual group. One-way analysis of variance (ANOVA) was used to determine if there was a significant difference between the post-test CTI total, DMC, CA, and EC mean scores of the intervention group (IG) and the control group (CG), and was used to determine if the hypothesis about effects of the intervention was accurate.

CHAPTER FOUR: PRESENTATION OF DATA

Comparison Between Groups

This study examined the impact of using cognitive information processing (CIP) as a classroom intervention in an effort to improve career decision making and problem solving. The CIP-based intervention included the use of *Improving Your Career Thoughts: A Workbook for the Career Thoughts Inventory* (Sampson et al., 1996b). The Career Thoughts Inventory (Sampson et al., 1996a) was used as both a pre-test and a post-test. There were two groups in the study: an intervention group ($n = 61$) that completed the pre-test, the workbook intervention, and the post-test; and a control group ($n = 55$) that completed only the pre-test and post-test. This chapter presents the results of the statistical analysis using a significance level $p = .05$ and shows pre-test comparisons between groups, pre-test to post-test comparisons within each group, and post-test comparisons between groups to show the impact of the intervention. Scores represent the level of dysfunctional thinking. Figure 11 shows the overall group mean comparisons for pre-test and post-test Total Score and content area results with standard deviations.

| | <i>Group</i> | <i>N</i> | <i>M</i> | <i>SD</i> |
|----------------------|--------------------|----------|----------|-----------|
| Pre-test TS | Control Group | 55 | 42.42 | 24.618 |
| | Intervention Group | 61 | 37.79 | 22.058 |
| Pre-test DMC | Control Group | 55 | 8.53 | 7.722 |
| | Intervention Group | 61 | 6.90 | 5.764 |
| Pre-test CA | Control Group | 55 | 11.69 | 6.277 |
| | Intervention Group | 61 | 10.64 | 6.442 |
| Pre-test EC | Control Group | 55 | 3.58 | 2.865 |
| | Intervention Group | 61 | 4.18 | 3.191 |
| Post-test TS | Control Group | 53 | 39.11 | 25.352 |
| | Intervention Group | 47 | 27.34 | 22.215 |
| Post-test DMC | Control Group | 53 | 8.26 | 7.440 |
| | Intervention Group | 47 | 5.17 | 6.236 |
| Post-test CA | Control Group | 53 | 10.45 | 6.638 |
| | Intervention Group | 47 | 7.94 | 6.526 |
| Post-test EC | Control Group | 53 | 3.89 | 3.011 |
| | Intervention Group | 47 | 2.51 | 2.685 |

Figure 11. Overall Mean Comparisons Between Groups

Pre-test Comparisons Between Groups

Using one-way Analysis of Variance (ANOVA), pre-test comparisons were made between the group dependent variables, the CTI Total Score, and the three content area scores: Decision-Making Confusion (DMC), Commitment Anxiety (CA), and External

Conflict (EC). As shown in Figures 12 and 13, analysis of pre-test data showed there were no significant differences ($p \leq .05$) between group means for any of the variables.

| | Control Group (<i>n</i> = 55) | | Intervention Group (<i>n</i> = 61) | | Sig. |
|-------------|-----------------------------------|-----------|--|-----------|------|
| | <i>M</i> | <i>SD</i> | <i>M</i> | <i>SD</i> | |
| Pretest TS | 42.42 | 24.618 | 37.79 | 22.058 | .287 |
| Pretest DMC | 8.53 | 7.722 | 6.90 | 5.764 | .199 |
| Pretest CA | 11.69 | 6.277 | 10.64 | 6.442 | .376 |
| Pretest EC | 3.58 | 2.865 | 4.18 | 3.191 | .292 |

Figure 12. Means and Standard Deviations for Pre-test CTI Scores.

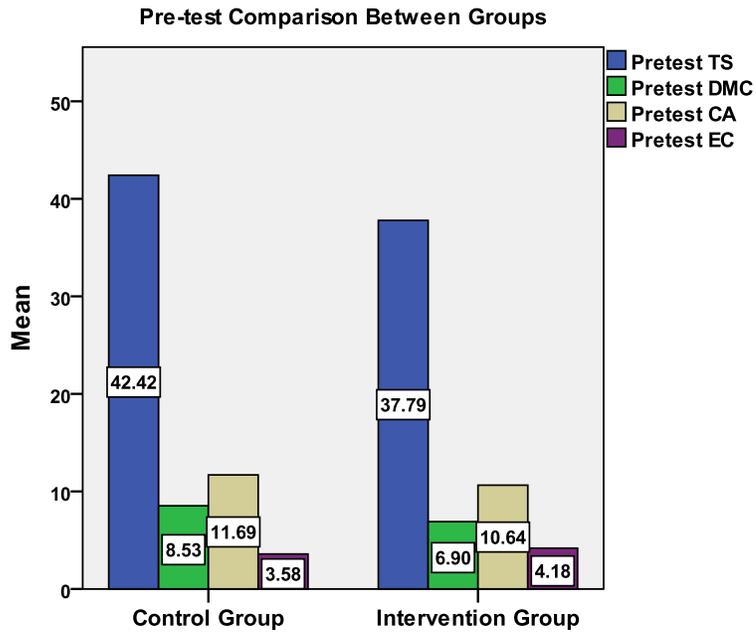


Figure 13. Pre-test Comparisons Between Groups.

Pre-test to Post-test Comparisons

Using linear regression, comparisons were made to determine the impact of the intervention on the Total Score and content area scores for each group. As shown in Figure 14, the post-test scores for the intervention group were significantly lower than the control group, supporting the hypothesis that CTI scores for subjects who complete the workbook intervention will be lower than for those who do not. For the intervention group, the CTI Total Score mean decreased from 37.79 ($SD = 22.06$) at pre-test to a mean of 27.34 ($SD = 22.22$) at post-test. The Decision-Making Confusion mean decreased from 6.90 ($SD = 5.76$) at pre-test to a mean of 5.17 ($SD = 6.24$) at post-test. The Commitment Anxiety mean decreased from 10.64 ($SD = 6.44$) to a mean of 7.94 ($SD = 6.53$) at post-test, and it is interesting to note that the CA score for the control group actually increased from pre-test to post-test, although it was not significant. Finally, there was a significant decrease in the External Conflict mean from 4.18 ($SD = 3.19$) at pre-test to 2.51 ($SD = 2.69$) at post-test. All content areas contributed significantly to the Total Score; however, regression analysis revealed that Commitment Anxiety had the greatest impact, with Decision Making Confusion following, and External Conflict contributing the least. Figures 14 through 18 illustrate the group mean comparisons from pre-test to post-test scores. While the control group shows a slight change from pre-test to post-test, it is not statistically significant, as compared to the intervention group whose scores show a significant decrease from pre-test to post-test.

| | Control Group (n = 55) | | | Intervention Group (n = 61) | | |
|--------------------|---------------------------|------------------|-------------|--------------------------------|------------------|-------------|
| | <i>Pre-test</i> | <i>Post-Test</i> | <i>Sig.</i> | <i>Pre-test</i> | <i>Post-test</i> | <i>Sig.</i> |
| Total Score | 42.42 | 39.11 | .570 | 37.79 | 27.34 | .002 |
| DMC | 8.53 | 8.26 | .938 | 6.90 | 5.17 | .074 |
| CA | 11.69 | 10.45 | .398 | 10.64 | 7.94 | .015 |
| EC | 3.58 | 3.89 | .509 | 4.18 | 2.51 | .000 |

Figure 14. Pre-test to Post-test Score Comparisons for Groups.

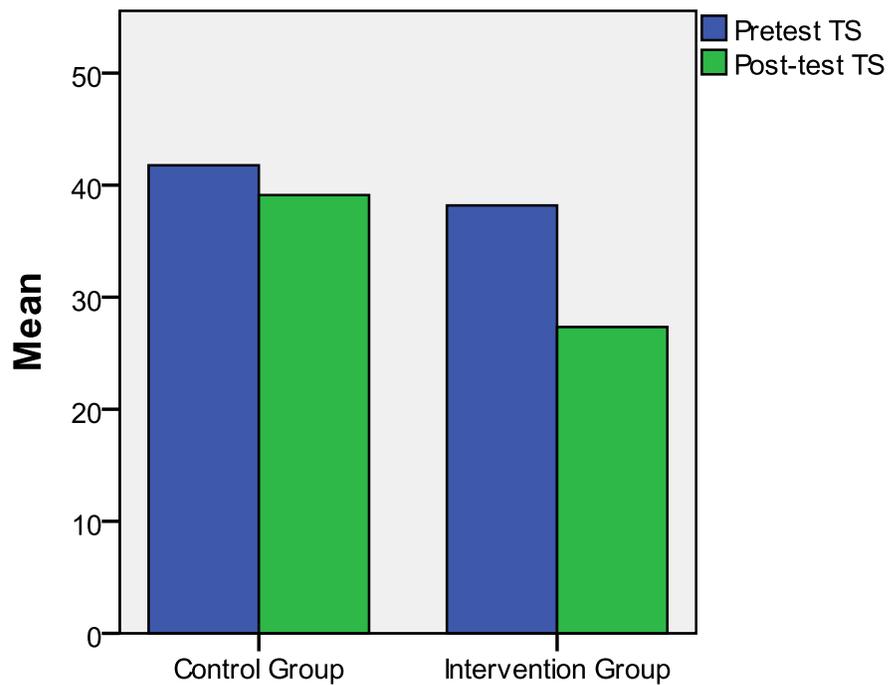


Figure 15. Pre-test to Post-test Total Score Comparisons.

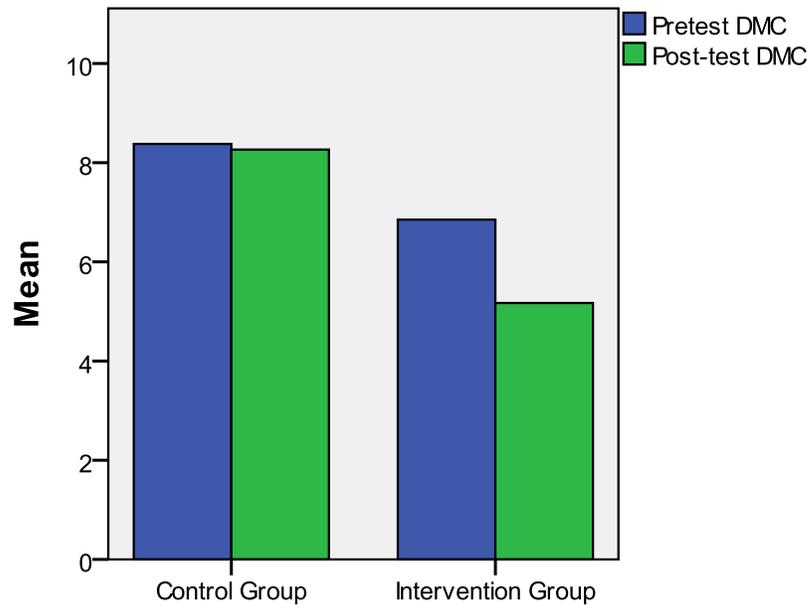


Figure 16. Pre-test to Post-test DMC Comparisons

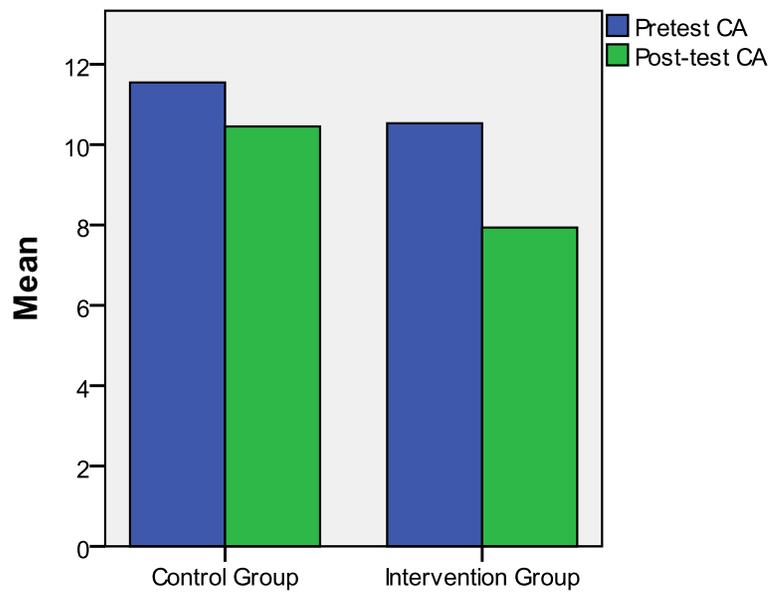


Figure 17. Pre-test to Post-test CA Comparisons

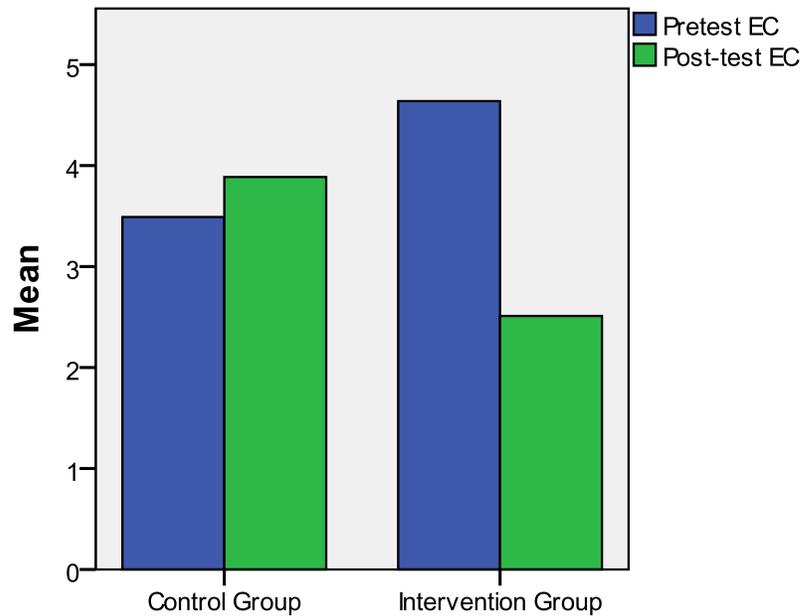


Figure 18. Pre-test to Post-test EC Comparisons

Post-test Comparisons Between Groups

Using one-way Analysis of Variance (ANOVA), post-test comparisons were made between the group CTI Total Scores and the content area scores. Results of the analysis support the hypothesis, with statistically significant differences in the mean post-test scores for the intervention group versus the control group, as shown in Figures 19 and 20. Post-test scores for the group that completed the intervention are significantly lower, showing a decline in negative thinking toward career decision-making.

| | Control Group (n = 53) | | Intervention Group (n = 47) | | Sig. |
|--------------------|---------------------------|--------|--------------------------------|--------|-------------|
| | M | SD | M | SD | |
| Total Score | 39.11 | 25.352 | 27.34 | 22.215 | .016 |
| DMC | 8.26 | 7.440 | 5.17 | 6.236 | .028 |
| CA | 10.45 | 6.638 | 7.94 | 6.526 | .059 |
| EC | 3.89 | 3.011 | 2.51 | 2.685 | .018 |

Figure 19. Means and Standard Deviations for Post-test CTI Scores

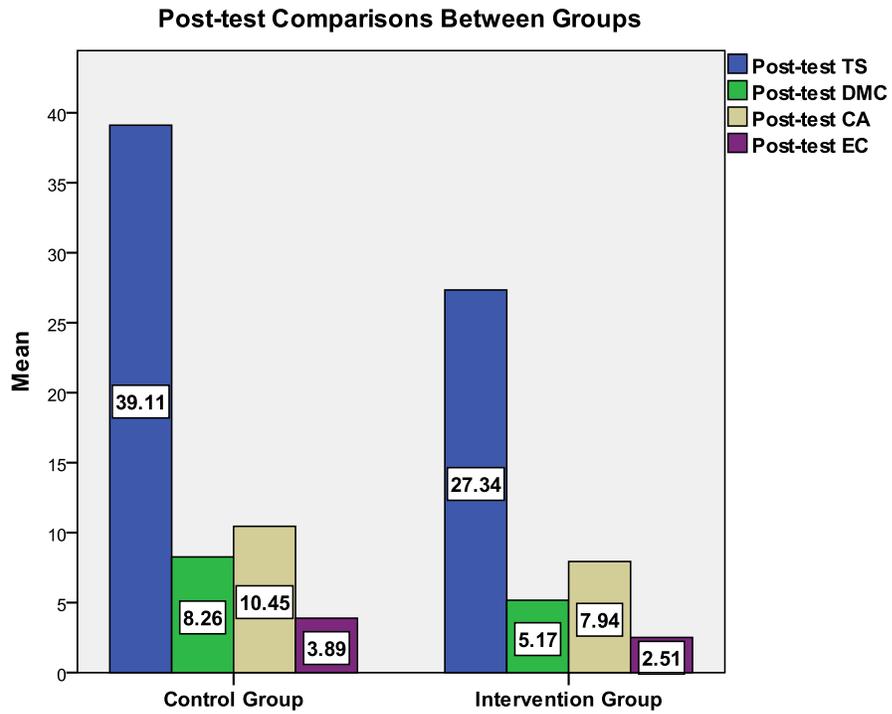


Figure 20. Post-test Comparisons Between Groups

Career Questionnaire

All student participants filled out a questionnaire (see Appendix B) designed to determine the level of occupational preparation experienced prior to the study. Both the intervention group and the control group had similar results, ranging from 6–7% of group participants stating that they had clearly established goals that met their occupational interests, and 32–34% had considered changing their major. None of the participants had been enrolled in a career development course, had met with a career services staff member for the purpose of discussing career goals, or completed an assessment to help determine possible careers.

Summary of Results

At the start of the study, there were 61 students in the intervention group and 55 students in the control group. At the time the post-tests were administered, through attrition, the groups were reduced to 47 students in the intervention group, and 53 students in the control group. The groups began the study with no significant differences between their pre-test scores; however, post-test result comparisons between the groups exhibited statistically significant improvements ($p \leq .05$) in every area for the intervention group. All data were compiled as aggregate group data in an effort to maintain student anonymity and, therefore, individual participant comparisons could not be made.

CHAPTER FIVE: CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

Conclusions

The results of this study suggest that the CIP intervention reduced the dysfunctional or negative career thoughts of college students enrolled in freshman-level coursework. Individual content area results for the intervention group also verified that using an assessment and intervention process during the first year of college can improve how students feel about areas of personal concern such as career opportunities, conflicts that interrupt their studies, and personal anxieties related to setting career goals. Results for the control group showed only a slight decrease in negative thoughts, except for the content area that focused on conflicts that interrupt their studies and results showed an increase in negative thoughts. This increase may be attributed to various external factors related to student demographics, work status, or family issues.

Outcomes from the career questionnaire for the intervention group indicated that 32–34% of the students have considered changing their selected major, which is consistent with results for the Decision-Making Confusion content area. However, the same percentage of students (6–7%) in the intervention group who expressed confidence in their selected major on the questionnaire showed a low overall score for negative career thoughts on the CTI.

Institutions can work to eliminate uncertainty by using classroom content that puts more significant emphasis on teaching students to identify with a career choice, to overcome barriers that prevent them from moving forward, and to transform their choice into specific action steps to achieve their goals.

Based on previous literature, assessments and interventions are helpful and can be successful ways to help students eliminate barriers. However, if they are not mandatory for all students, institutions are forced to wait until the student recognizes the need for assistance and acts on that need. When students enroll in college programs, it should be the responsibility of the institution to create a climate that makes students feel comfortable and secure, to assist them with accessing and interpreting assessments they may have previously completed, to explain programs and requirements, and to help them identify a career goal. This can be achieved through a partnership between academics and student affairs, and by creating curricula with instructional contexts designed to identify and maximize student interest and performance as well as interventions to identify barriers to their success. Projects related to occupations, simulated activities, self-reflection exercises, and internships should be incorporated into the curriculum, and as a result, a heightened level of student engagement can be achieved. More specifically, introductory college courses should use CIP in the classroom to identify barriers to goal setting and then trained student affairs professionals could apply personalized interventions based on assessment results. Finally, students should be evaluated using an

assessment such as the CISS or DISCOVER to identify suitable career options. When this process is implemented in a classroom setting, the institution is no longer in a position to be reactive, but rather is positioned to be proactive.

In conclusion, the results of this study indicate that an assessment and intervention process can be beneficial to career problem solving and decision making for first-year college students. By identifying the barriers that prevent students from making a career choice, possible methods of assistance can be identified to improve or eliminate dysfunctional thought patterns. Levels of intervention would be determined from CTI scores, with targeted attention to content areas with higher scores. When career guidance is incorporated into the classroom setting, as in a first-year career development course, students will have a structured environment in which to make a career choice, overcome barriers, and take action steps to implement that choice, making them less likely to extend time-to-degree by changing majors or withdrawing from classes. Establishing a connection between the curriculum and student interest facilitates engagement in the material, increases personal relevance, and fosters commitment to an academic major, ultimately improving academic success, persistence, and graduation rates.

Limitations of the Study

Limitations associated with this study must be considered. Although the results show improvement from pre-test to post-test for the intervention group compared to the

control group, the participant sample is nevertheless relatively small. At the start of the study, there were 61 students in the intervention group and 55 students in the control group, and through class attrition, the groups were reduced to 47 students in the intervention group and 53 students in the control group. Possible factors causing attrition within the classes selected for this study include: academic under preparedness, difficulty transitioning to college life, lack of commitment, lack of financial support, schedule conflicts, lack of engagement in the subject matter, lack of student-faculty interaction, failure to make meaningful connections between the skills and knowledge students are acquiring and those needed to succeed in their curriculum, and student uncertainty regarding educational goals. Efforts to replicate these results might use larger samples.

The anonymity of the participants and limited demographic information prevented the researcher from making comparisons from pre-test to post-test scores for individual participants. The level of impact of the intervention could have been measured by analyzing content area results from pre-test to post-test for each participant.

There was only one form of intervention used in this study. Using additional interventions, such as counseling, workshops, and self-directed career research, could be helpful in reducing scores in specific content areas as well as helping students determine which career most closely matches their interests.

This study was conducted at a for-profit/proprietary institution and sample results may differ at other types of post-secondary institutions.

This was strictly a quantitative study comparing students who completed a career assessment and intervention to those who did not. The study did not explore the personal experience of the student, based on the assessment and intervention process.

Finally, the study was conducted over a period of eight weeks. Conducting the same study over a longer period of time, possibly as part of a first-year experience program with assistance from the counseling or career services staff, would allow all levels of intervention to be implemented based on content areas scores.

Recommendations for Future Research

Based on the findings of this study, additional research is suggested in the following areas:

1. Replicating this study using a larger sample size could yield additional information pertaining to patterns within content areas.
2. Conduct a study using coded identifiers so that individual pre-test to post-test comparisons can be made and personalized interventions assigned based on content area results.
3. Conduct exploratory research on possible relationships between content areas (DMC, CA, EC) and participant's demographics, specifically employment status and high scores.
4. Design and execute a longitudinal study to determine if the Cognitive Information Processing approach has long-term impacts on persistence and graduation rates.

5. Conduct a qualitative study in an effort to gain insight into the personal experience of the student, related to career assessments and decision making.
6. Replicate this study at not-for profit institutions to determine whether the results generalize to other types of post-secondary institutions.

APPENDIX A: DEFINITION OF TERMS

Appendix A

Definition of Terms

Career and Technical Education (CTE): Educational system that prepares youth and adults for careers

Career decision making: Includes problem solving, while also encompassing the cognitive and affective processes needed to develop a plan for implementing the solution to a problem and taking risks to follow the plan to completion

Career problem solving: A series of thought processes in which information about a problem is used to arrive at a course of action needed to remove the gap between an existing and a desired state of affairs

Career readiness: The ability to make a career choice, overcome barriers, and take action steps to implement that choice

Career Thoughts Inventory (CTI): An instrument based on cognitive information processing and cognitive therapy that helps identify negative thinking that may be impeding career problem solving and decision making

Chronic career indecision: Pervasive inability to make a decision about one's career

Cognitive information processing (CIP): The process of making an effective decision, including: defining the gap between where one is and where one wants to be, gaining a better understanding of oneself and one's options, expanding and narrowing a list of options, prioritizing remaining options resulting in a first choice, developing a plan of action for implementation, and executing the choice

Cognitive therapy: An active, directive, time-limited, structured approach for resolving a variety of mental health issues through cognitive restructuring

Commitment anxiety (CA): The inability to commit to a specific career choice and the presence of generalized anxiety about the consequences of making a career decision

Decision making confusion (DMC): An inability to begin or to continue the decision-making process because of impairing emotions or a lack of knowledge, or both, about the process of decision making

Developmental career indecision: Inability to make a decision due to a lack of information

Dysfunctional career thoughts: A pattern of thinking about one's assumptions, attitudes, behaviors, beliefs, feelings, plans, and/or strategies that inhibits effective career problem solving and decision making (Sampson, Lenz et al., 1999)

External conflict (EC): Represents negative thinking regarding balancing one's own perceptions against the perceptions of significant others as these relate to making career choices

First-year college students: Students of any age who fall within the first 30 hours of college credit

Intervention: An action taken to improve a situation

Vocational identity: Linking personal motivation, interests, and competencies with acceptable career roles

APPENDIX B: CAREER QUESTIONNAIRE

Appendix B

Career Questionnaire

Name _____ Date _____

- 1) Do you have clearly established educational and career goals that meet your occupational interests? Y N
- 2) Have you ever been enrolled in a career development course? Y N
If yes, was it beneficial? Y N
- 3) Have you ever met with a career services staff member to discuss career goals? Y N
If yes, was it beneficial? Y N
- 4) Have you ever consider changing majors? Y N
- 5) Have you ever completed an assessment to help determine possible careers? Y N

APPENDIX C: CONSENT FORM

Appendix C

Consent Form

You are invited to participate in a study regarding the impact of cognitive information processing on career problem-solving and decision-making as a classroom intervention. You were selected as a possible participant because of your enrollment in this course. We ask that you read this form and ask any questions you may have prior to agreeing to participate in this study. If you are under 18 years of age, you are not eligible to participate in this study. Please inform the investigator that you will not be participating in this study.

Background Information: The purpose of this study is to determine the impact of *cognitive information processing* on career problem-solving and decision-making when used as a classroom intervention.

Procedures: Upon your agreement to participate, you will be asked to complete an assessment at the start of the study and another at the end of the study, which will take approximately 15 minutes to complete. You may also be asked to complete a workbook intended to develop career decision-making skills. All participation will take place during the regular scheduled class time.

Risks and Benefits Associated with this Study: There are no foreseeable risks involved. As a result of participating, it is hoped that students will learn to make informed career decisions.

Confidentiality: Every attempt will be made to keep all materials confidential. The consent forms and results of the study will be kept in a locked cabinet in the office of the researcher. Should the study ever become published material, your name will not be linked to the study. The personal information area of the assessment shall be left blank, in an effort to maintain confidentiality. All assessments and workbooks will be destroyed three years after the completion of the study.

Voluntary Participation: Participation in this study is voluntary. Your decision whether or not to participate will have no impact on your grades. If you decide to participate, you are free to withdraw at any time without affecting your course status.

Contacts and Questions: If you have any questions or concerns regarding this study, please contact xxxx xxxxx. You may also contact xxxxxxx xxxxx, Director of the Institutional Review Board (IRB) at Benedictine University, at xxx-xxx-xxxx.

By signing below, I verify that I have read this consent form, I am 18 years of age or older, and that I freely consent to participate in this study. I realize that if I have any questions about this study, I can contact xxxx xxxxx via telephone or email.

Name of Participant (print)

Signature of Participant

Date

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