They found career decision-making self-efficacy and outcome expectations to be significant predictors of career exploratory intentions in both student groups. Nauta, Kahn, Angell, and Cantarelli (2002) investigated the SCCT assumption that changes in self-efficacy precede changes in interests. Using a cross-lagged panel research design and structural equation modeling, they found a reciprocal relationship between self-efficacy and interests but no clear pattern of temporal precedence. Flores and O'Brien (2002) conducted path analyses on data acquired from a sample of 364 Mexican American adolescent women to assess SCCT's propositions related to the influence of contextual and social cognitive variables on career aspiration, career choice prestige, and traditionality of career choice. These researchers found partial support for SCCT as nontraditional career self-efficacy, parental support, barriers, acculturation, and feminist attitudes predicted career choice prestige. In addition, acculturation, feminist attitudes, and nontraditional career self-efficacy predicted career choice traditionality. Finally, feminist attitudes and parental support predicted career aspiration. Gainor and Lent (1998) examined the relations among SCCT, racial identity, math-related interests, and choice of major within a sample of 164 African American first-year university students. They found that self-efficacy and outcome expectations predicted interests, and interests predicted choice intentions across racial identity attitude levels. Diegelman and Subich (2001) found that raising outcome expectations among college students considering pursuing a degree in psychology resulted in an increased interest in pursuing this degree option for their study participants.

Hsieh and Huang (2014) investigated the relationship of family socioeconomic status and proactive personality to career decision self-efficacy in a sample of 336 Taiwanese college students. Their findings indicate support for the person input variables (i.e., socioeconomic status and proactive personality) as being predictive of career decision self-efficacy. Hsieh and Huang recommend that career counselors teach proactive thinking training programs for clients. Helping clients build skills that equip them to recognize and seize new opportunities, defend themselves against threats, and translate core competencies into competitive advantages are specific competencies recommended to build self-efficacy.

A number of studies have demonstrated positive outcomes for SCCT-based interventions used with diverse client groups. This provides strong support for the robustness of this theory as it is applied across diverse populations. An additional, and related, strength of SCCT is that it addresses both intra-individual and contextual variables in career development. Clearly, incorporating these two dimensions increases the applicability of the theory for diverse career development issues and populations. A recent literature review conducted by Patton and Meltzer (2009) indicates that SCCT is generating substantial research, especially in comparison to other career theories.

**THE COGNITIVE INFORMATION PROCESSING APPROACH**

The cognitive information processing (CIP) approach (Peterson et al., 1996; Peterson et al., 2002; Sampson et al., 2004) is rooted in the three-factor Parsonsian model for making career choice (i.e., self-understanding, occupational knowledge, and bringing self-understanding and occupational knowledge together to make a choice). The CIP approach extends the Parsonsian model, however, by incorporating more recent developments related to how people engage in cognitive information processing. Peterson and his associates apply what is known about cognitive information processing to career counseling.
There are four assumptions underlying the theory. The first assumption is that career-decision making involves the interaction between cognitive and affective processes. Second, the capacity for career problem solving depends on the availability of cognitive operations and knowledge. Third, career development is ongoing and knowledge structures continually evolve. And fourth, enhancing information-processing skills is the goal of career counseling (Peterson et al., 2000).

The CIP approach to career intervention includes several dimensions: (a) the pyramid of information processing, (b) CASVE cycle of decision-making skills, and (c) the executive processing domain. First, the approach uses an information-processing pyramid to describe the important domains of cognition involved in a career choice. The first three levels of the pyramid reflect domains that are traditionally included in career theories: self-knowledge (values, interests, skills), occupational knowledge (understanding specific occupations and educational/training opportunities), and decision-making skills (understanding how one typically makes decisions). The fourth domain and top of the pyramid is metaknowledge and includes self-awareness and the monitoring and control of cognitions (Sampson, Peterson, Lenz, & Reardon, 1992). Knowledge of self and occupations forms the foundation of the pyramid, and then decision-making skills and metaknowledge build upon this foundation.

The second dimension of the CIP approach is labeled the CASVE cycle of career decision-making skills. The CASVE cycle represents a generic model of information-processing skills related to solving career problems and making career decisions. These skills are (a) communication, (b) analysis, (c) synthesis, (d) valuing, and (e) execution (CASVE).

The use of these skills is cyclical beginning with the realization that a gap exists between a real state and an ideal state (e.g., an existing state of career indecision and a more desired state of career decisionedness). Becoming aware of such gaps can occur internally through the existence of ego-dystonic emotional states (e.g., depression, anxiety); the occurrence of behaviors such as excessive tardiness, absenteeism, or drug use; or the existence of somatic symptoms (e.g., headaches, loss of appetite). Or, we can become aware of such gaps through external demands (e.g., the need to select a curriculum of study in high school or college, the need to make a decision to accept or reject a job offer). Career problems, therefore, involve cognitive, affective, behavioral, and physiological components. Interpreting these internal and external cues involves communication. Specifically, clients must ask themselves two questions: (a) “What am I thinking and feeling about my career choice at this moment?” and (b) “What do I hope to attain as a result of career counseling?” (Peterson et al., 1996, p. 436).

Once we recognize that a gap or career problem exists, we must analyze what is required for problem resolution. For example, do we need more information about ourselves (e.g., values, interests) and/or the situation (e.g., my supervisor’s expectations, job requirements)? What must we do to acquire the information or resources necessary to cope more effectively with the career problem (e.g., take an interest inventory, conduct an occupational information interview, seek counseling to understand our feelings related to our job situation)?

Synthesis involves two phases: (1) elaboration and (2) crystallization. During elaboration, clients seek to identify as many potential solutions to their career problems as possible (as in brainstorming, the focus is on quantity rather than quality solutions). During crystallization, clients identify those solutions that are consistent with their abilities, interests, or values. The outcome of these two phases that synthesis comprises is a manageable list of alternatives that are acceptable to the client.

Valuing involves examining and prioritizing each of the alternatives generated in light of one’s value system, the benefits to be gained and the costs incurred with each alternative, each
alternative's impact on significant others and society, and the probability that the alternative will result in a successful outcome (i.e., removing the gap). Once the alternatives have been prioritized, the optimal alternative is identified. The primary question for clients engaged in the process of valuing is “Which alternative is the best course of action for me, my significant others, and society?” (Peterson et al., 1996, p. 437).

The execution phase involves converting the optimal alternative into action. A plan of action is developed to implement the alternative and achieve its goal (e.g., I will enroll in psychology courses, study three hours per day, and take a course to improve my Graduate Record Examination scores in order to achieve my goal of gaining entry into a highly selective counselor education program). Thus, the execution phase requires clients to identify the specific steps necessary to operationalize the solution chosen in the valuing phase. The primary question in execution is “How can I transform my choice into an action plan?” (Peterson et al., 1996, p. 437).

Once the plan has been enacted, clients return to the communication phase to determine whether the alternative was successful in resolving the career problem. Once again, cognitive, affective, behavioral, and physiological states are assessed in evaluating the success of the alternative (e.g., Do I feel less anxious? Am I more content with my career situation? Has my class attendance improved?). If the evaluation is positive, then clients move on, but if the evaluation is negative, then clients recycle through the CASVE phases with the new information acquired from enacting the first alternative.

A third dimension of the CIP approach is the executive processing domain. The function of the executive processing domain is to initiate, coordinate, and monitor the storage of and retrieval of information (Peterson, Sampson, & Reardon, 1991). This domain involves metacognitive skills (Meichenbaum, 1977), such as self-talk, self-awareness, and control. Positive self-talk (e.g., “I am capable of making a good career choice”) is required for effective career problem solving. Negative self-talk (“I can’t make a good decision”) leads to career indecisiveness. Self-awareness is necessary in monitoring and controlling internal and external influences on career decisions. Effective problem solvers and decision makers are aware of their values, beliefs, biases, and feelings. They use this awareness in generating and selecting problem solutions. Control and monitoring are essential for deciphering the information needed to resolve a career problem and for knowing when one is ready to move to the next phase in the CASVE cycle. The “control and monitoring of lower-order functions ensures that an optimal balance is met between impulsivity and compulsivity” (Peterson et al., 1991, p. 39), thereby providing a “quality control mechanism to ensure a complete, orderly, and timely progression through the CASVE cycle” (Peterson et al., 1996, p. 439).

**Applying the CIP Approach**

The pyramid model can be used as a framework for providing career development interventions. For example, the self-knowledge domain can be addressed through standardized and nonstandardized assessments. The occupational knowledge domain can be addressed by engaging in job-shadowing exercises and by reading occupational biographies (as when Ronald was encouraged to conduct occupational information interviews). The five steps of the CASVE cycle can be used to teach decision-making skills, and the executing processing domain provides a framework for exploring and challenging clients’ dysfunctional metacognitions.

Peterson et al. (1991) have outlined a seven-step sequence for delivering individual, group, and classroom career development interventions. Step one involves conducting an initial
interview with the client. During this step, the counselor attempts to understand the context and nature of the client's career problem. The counselor develops an effective working relationship with the client by responding empathically to client statements and by using basic counseling skills (e.g., clarification, summarization, reflection of affect, immediacy, and self-disclosure).

Counselors introduce clients to the pyramid model and the CASVE cycle to clarify client concerns and to provide clients with a model for understanding the career decision-making and problem-solving processes (Sampson et al., 1992). During this step, counselors focus on questions such as “What are the client's perceptions of the extent of development in each of the domains? How does the client typically make career decisions? Which metacognitions, if any, are dysfunctional and need changing? At which phase is the client currently focused?” (p. 73).

In Ronald's case, he was feeling stuck because he was not clear about the process typically used in making career decisions. He was also stuck because he believed that there were no occupational options that would be suitable for him (although he had not really engaged in any systematic exploration of occupational options). Moreover, he doubted his ability to make an effective occupational choice. Using the pyramid model to explain the decision process could provide Ronald with a sense of control and structure, thereby lessening his feeling of being “overwhelmed.” Establishing an effective working relationship with Ronald and offering him a sense of hope that he could learn the skills necessary for managing his career could also help him to feel more confident and reassured that he could cope effectively with these career development tasks.

Step two involves conducting a preliminary assessment to determine the client's readiness for career decision making. The CIP approach uses the Career Thoughts Inventory (CTI) (Sampson, Peterson, Lenz, Reardon, & Saunders, 1996) to identify clients with dysfunctional career thoughts and, thereby, provide an indication of career development interventions that may be required to address the client's executive processing domain. For example, Ronald may be adhering to beliefs such as “I must be absolutely certain an occupation will be satisfying to me before I can take action,” “All teachers are paid poor salaries,” or “I must decide now what I want to do for the rest of my life.” Adherence to such beliefs will be problematic for Ronald as he engages in career planning. Thus, these beliefs need to be challenged and restructured for him to move forward (Lewis & Gilhousen, 1981).

In step three, counselors and clients work collaboratively to define the career problem(s) and to analyze potential causes of the problem. Here, counselors communicate nonjudgmentally their perceptions of clients' gaps between a real state of career indecision and the desired or ideal state of career decidedness (Cochran, 1997). Clients respond by agreeing with counselors' perceptions or by clarifying and restating the gap they are experiencing.

In step four, counselors and clients continue to collaborate by formulating achievable career problem-solving and decision-making goals. The formulation of goals leads to the development of an individual learning plan in step five. Individual learning plans provide clients with a guide concerning what activities they need to engage in and what resources they need to use to achieve their goals. Although individual learning plans provide a mechanism for monitoring and evaluating client progress, they may also be revised as clients acquire more information about themselves and their career concerns.

Step six in the CIP approach requires clients to execute their individual learning plans. Counselors can provide support, feedback, and assistance to clients as they complete their individual learning plans. Counselors can challenge clients with dysfunctional career thoughts to revise their thinking and then take action to complete their individual learning plans. Finally,
during step seven, counselors and clients conduct a summative review of client progress and then generalize new learning to other current and future career problems.

Interestingly, CIP is being used with diverse client populations. For example, Watson, Lenz, and Melvin (2013) provide an excellent case example in which they apply CIP to an adult client experiencing career transition. Stein-McCormick, Osborn, Hayden, and Van Hoose (2013) and Strauser (2013) also provide excellent descriptions of how CIP can be used in career counseling with veteran and rehabilitation populations, respectively. Ledwith (2014) describes how CIP can be collaboratively integrated into academic advising and career counseling.

Evaluating CIP

Although research investigating CIP theory is not extensive, the number of studies based on CIP theory is growing. The development of the CTI should serve as a catalyst for CIP researchers investigating theoretical propositions related to the executive processing domain. The workbook accompanying the CTI, titled Improving Your Career Thoughts: A Workbook for the Career Thoughts Inventory (Sampson et al., 1996), is an excellent example of the translation of theory into practice. This more recent extension of the CIP approach builds on what one reviewer noted as the major contribution of the theory—the executive processing domain (Helwig, 1992). Brown and Lent (1996) noted that the description of the decision-making process outlined in Peterson et al. (1996) is perhaps the clearest description of the variables involved in this process yet to emerge (p. 521). Clemens and Milson (2008) recommend using CIP with military families coping with transitions to new jobs in the civilian world. Hirsh and Lage (2008) used CIP as the theoretical framework for a career workshop delivered to 334 Swiss seventh-grade students. An evaluation of this workshop revealed that the students significantly increased their career relatedness, career planning, career exploration, and vocational identity. Osborn, Howard, and Leiterer (2007) examined the effect of a CIP-based career development course on dysfunctional career thinking. Osborn and her associates found that students decreased their dysfunctional career thoughts as they related to career decision-making confusion, commitment anxiety, and external conflict. They also found that neither gender nor race/ethnicity was related to dysfunctional career thoughts. In a sample of 340 Dutch and Belgian immigrants living in California, Ecke (2007) did find a significant relationship between a more secure attachment style and avoidance of career decision-making, as evidenced by less anxiety and less avoidance in response to attachment issues and lower career-thought dysfunction.

Strauser, Lustig, Cogdal, and Uruk (2006) investigated whether trauma symptoms in college students relate to dysfunctional career thoughts, vocational identity, and developmental work personality. Using a sample of 131 students, they found significant relationships between higher levels of trauma (e.g., parental divorce, death of a loved one) and higher levels of dysfunctional career thoughts and lower levels of developmental work personality (i.e., the degree to which an individual has successfully completed the tasks necessary for developing a healthy work personality, such as completing one's work on time in school). Among other things, this study highlights the personal-career connection and indicates that career counselors should be aware of post-traumatic stress disorder symptoms.

Strauser, Lustig, and Uruk (2004) examined career thoughts as measured by the CTI by comparing scores between college students with disabilities and students without disabilities.
Strauser and his associates found significant differences between individuals with disabilities and college students without disabilities on the CTI total and subscale scores. Specifically, individuals with disabilities had more negative thoughts than their non-disabled counterparts, pointing to the possible usefulness of the CIP model when providing career interventions to university students with disabilities.

Another study conducted by Yanckak, Lease, and Strauser (2005) explored the relationship between career thoughts and vocational identity using study participants diagnosed with cognitive and physical disabilities. Yanckak et al. found significant differences between individuals with cognitive impairments as compared to those with physical disabilities in their Decision-Making Confusion and External Conflict scores on the CTI. Individuals with cognitive impairments had more dysfunctional career thoughts than individuals with physical disabilities. A study conducted by Reed, Reardon, Lenz, and Leiterer (2001) examined the effectiveness of a career-planning course based on the CIP approach. Using the CTI, results of this study indicated a significant decrease in negative career thoughts from pretest to posttest. Saunders, Peterson, Sampson, and Reardon (2000) used the CTI to investigate depression and dysfunctional career thinking as components of the state of career indecision among a sample of 215 undergraduate university students. They found a significant positive correlation between dysfunctional career thoughts as measured by the CTI and career indecision and, thus, recommend using the CTI in career counseling to help identify appropriate treatment strategies for clients experiencing career indecision.

Osborn, Peterson, Sampson, and Reardon (2003) used CIP as the theoretical framework for investigating client anticipations prior to using a computer-assisted career guidance system. Clients' most frequent anticipations for computer use included increased career options, enhanced self-knowledge, and strengthened occupational knowledge. Reardon and Wright (1999) describe how the CIP approach can be used in conjunction with Holland's theory to help a 19-year-old college student become aware of negative thought patterns serving as obstacles to choosing a college major. Similarly, McLennan and Arthur (1999) describe how CIP is useful for helping women to cope effectively with structural and individual barriers in their career development. In this study, a path model was used to explore how client thoughts influenced career exploratory behavior. A verified path model shows CIP's negative career thoughts inversely predict SCCT's career problem-solving self-efficacy, which in turn predicts career exploratory behavior. The model suggests that attending to client thoughts about career decision making is an important antecedent to engaging in career exploration. The model's suggested intervention sequence of steps appears to include addressing negative career thinking followed by adequately enhancing career problem-solving self-efficacy in order to successfully foster career exploration. This model demonstrates that both CIP and SCCT function in complementary ways. A hypothetical case of Sue, a client seeking assistance with her job search, is used throughout the McLennan and Arthur article to highlight the relevant theories and the practical implications of the research findings.

As predicted in a previous edition of this book, the fact that the CIP research team (i.e., Peterson, Reardon, Lenz, and Sampson) built their theory upon a solid foundation of research in cognitive psychology, have developed clear definitions of the different dimensions of the theory, and are committed to translating theory into practice suggests a bright future for the CIP approach to career development interventions. It can be argued that prediction has proven to be accurate. Plus, the CIP approach demonstrates robustness in addressing a wide array of client concerns and client populations (e.g., college students with disabilities).