# Chapter 6
# Decision-Making Models and Career Guidance


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**Abstract** Career choices are among the most important decisions people make during their lifetime. However, many individuals experience difficulty in making such decisions, and changes in the world of work in the twenty-first century have only increased the complexity involved in exploring career alternatives and choice. The aim of this chapter is to demonstrate and analyse procedures for making career decisions using the concepts of decision theory. In the proposed approach, the goal of career guidance and counselling is helping clients make *better* career decisions. The first section of this chapter focusses on the unique features of career decisions. The second section briefly describes three major types of decision models. To highlight the advantages of the using decision theory, the third section demonstrates the utility of prescriptive decision-making models as a way to facilitate career-decision-making. In the fourth section, the applicability and potential benefits of prescriptive models are illustrated by the PIC model (Prescreening, In-depth exploration, and Choice; Gati I, Asher I: The PIC model for career decision making: prescreening, in-depth exploration, and choice. In: Leong FTL, Barak A (eds) Contemporary models in vocational psychology, Erlbaum, Mahwah, pp 7–54, 2001a. Mahwah: Erlbaum.). The fifth section addresses the often-heard criticism that decision theories are "too cognitive" by discussing how non-cognitive factors have been integrated into the career-decision-making approach and applied to career guidance and counselling. The chapter concludes by exploring the implications of decision theories for career guidance and counselling.

**Keywords** Career adaptability · Career indecision · Career decision making · Decision theory · Decision models

Career choices are among the most important decisions people make during their lifetime. These decisions involve selecting a major, an internship, or special training, as well as what jobs to apply for and what offers to accept, and whether and when to

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quit one's job or take a new position (within as well as between organisations). These choices have significant long-term implications for individuals' lifestyles, emotional welfare, economic and social status, as well as their sense of personal productivity and contribution to society. For these reasons, individuals are preoccupied with career choices during many stages of their lives (e.g., Campbell and Cellini 1981; Di Fabio et al. 2015; Gati et al. 2001; Super 1980). However, whereas most people are capable of making career choices without too much difficulty, many do report some difficulties (e.g., Amir et al. 2008; Brown and Rector 2008; Gati 2013; Gati and Levin 2014; Osipow 1999; Rounds and Tinsley 1984; Tinsley 1992).

The complexities of the twenty-first century's world of work, with its frequent changes, have made career paths multi-decisional, unpredictable, and unstable (Blustein 2006; Bright and Pryor 2005; Gelatt 1989; Krieshok et al. 2009; Mitchell et al. 1999; Savickas 2000, 2005; Van Esboreck et al. 2005). In today's world of work, the empowerment of individuals as autonomous decision-makers is fundamental for successful career development. This often involves helping individuals acquire decision-making skills that can facilitate their transition decisions.

In this chapter, we present the view that the goal of career guidance and counselling is helping clients make *better* career decisions. To achieve this goal, it is essential to have a theory that focuses on understanding the career decision-making *process*. We therefore conceptualise career decision-making from a decision-theory approach, which regards career choices as the outcome of a process. This chapter shows the importance of designing procedures for making career decisions in situations requiring choices among alternatives throughout individuals' life span and demonstrates how the goal of making satisfying career choices can be better achieved if a systematic decision-making model is adopted. If this is done, and this theory is adapted to the special features of career decisions, researchers can transform theoretical knowledge into practical interventions, providing career counselors with tools for helping deliberating individuals carry out the career-decision-making process actively, effectively, and efficiently.

Decision theory has been reviewed and recognised as a potential frame of reference for career-decision-making for more than half a century (e.g., Brown 1990; Gati 1986, 2013; Gelatt 1962; Jepsen and Dilley 1974; Kaldor and Zytowski 1969; Katz 1966; Mitchell and Krumboltz 1984; Pitz and Harren 1980; Sauermann 2005). Nevertheless, these theoretical discussions and conceptualisations have rarely been translated into specific practices aimed at guiding counselees towards making effective decisions. Hence, one of the goals of this chapter is to contribute to the ongoing dialogue between decision theories and the actual needs of counselees, as they are described by experienced career counsellors.

The first section of this chapter focuses on the unique features of career decisions, highlighting the features of twenty-first-century world of work and their effects on the complexity of the process and the challenges it involves. The second section briefly describes three major types of decision-making theories, discussing their advantages and disadvantages. It is suggested that one of the reasons that decision theory has not yet been embraced as a framework for career guidance and counseling is that normative decision-making models, which were dominant in decision theories for many decades, assume overly rational decision-makers and are

often too abstract to be applicable to actual, real-life career-decision making. To highlight the potential of the career decision-making approach, the third section demonstrates the utility of prescriptive decision-making models, which minimise the disadvantages and maximise the advantages of decision theory as a framework for facilitating career-decision-making. In the fourth section, the PIC model (Prescreening, In-depth exploration, and Choice; Gati and Asher 2001a) is presented to demonstrate the applicability and potential benefit of prescriptive models. The fifth section addresses the often-heard criticism of decision theories as being "too cognitive" by discussing how non-cognitive factors have been integrated into the career-decision-making approach and applied to career guidance and counselling. The chapter concludes by exploring the implications of decision theories for career guidance and counselling.

## The Special Features of Career Decision Making

Decision theories are applicable to situations with (a) an individual who has to choose a course of action, (b) a set of objectives the individual seeks to achieve, (c) a set of courses of action or alternatives to choose from, and (d) a set of attributes and factors that the individual takes into account when comparing and evaluating the alternatives. These general features are present in most career-decision situations (Gati 1986; Gati and Asher 2001a; Katz 1966; Pitz and Harren 1980). Harren (1979), for example, defined a decision-making model as "a description of a psychological process in which one organises information, deliberates among alternatives, and makes a commitment to a course of action" (p. 119). Career decision-making models focus on analysing the various ways that individuals make career decisions.

Decision situations differ in many ways, including (a) the importance of the decision, (b) the amount, complexity, and accuracy of the information needed for it, and (c) the type and complexity of the information processing required. Accordingly, different decision situations require different processes to reach an optimal decision (Gati and Levin 2014; Levin and Gati 2014). Decision situations also differ across one's life span. Insufficient cognitive maturation, for example, limits individuals' ability to choose the best major in high school compared with college (Levin et al. 2018). This section discusses these properties as they bear on career decisions. Describing the special features of career choice is of major interest because it can help us find ways to overcome the difficulties involved in making these choices.

### *The Importance of the Decision*

Career decisions are regarded as important because they express individuals' identities and have a long-term impact on many life domains. When people make important decisions (e.g., to accept a job that involves moving to another city), the consequences associated with the various courses of action may vary significantly, in

contrast to the smaller variance in the consequences of the alternatives in less-important decisions (e.g., going to work by car or train). On this continuum, many career decisions may be found at one pole, as most career choices affect several aspects of life, including aspects that are not directly related to one's work, such as one's ability to actualise one's desired lifestyle, relations with significant others, social networks and environment, as well as one's sense of meaning and well-being.

The emphasis, in Post-modern Western culture, on values such as self-fulfilment and personal satisfaction enhances individuals' awareness of the impact of their choices on their general well-being. Savickas (2000) referred to the post-modern world of work as a setting for personal meaning-making and self-management. The consequences of making an inappropriate career decision may therefore be significant, both financially (e.g., one's investment in the training) and psychologically (e.g., the difficulty of making a change in a significant aspect of one's life and the frustration deriving from an unsatisfying job). Hence, it is not surprising that career-decision-making is a stressful process for many people and is often associated with increased levels of anxiety (Gati and Levin 2014; Lipshits-Braziler 2018).

## *The Information Needed for Career Decisions*

**Information About Career Alternatives** Career decisions involve making a choice among (many) alternatives, with the outcomes often uncertain. Indeed, the most prominent feature of career choice in today's world of work is the large variety of alternatives from which to choose. Furthermore, in the twenty-first century, a career is a lifelong process with many steps and numerous transitions (Hirschi 2018; Lent 2018), which are not necessarily focused on attaining a specific goal, but rather on coping with unpredictable changes and opportunities (Blustein 2006; Bright and Pryor 2005; Pryor and Bright 2011; Savickas 2000; Van Esboreck et al. 2005). Instead of the traditional linear, progressive image of a career path, the post-modern career path can be described as a path with many junctions, each offering multiple directions to be considered.

On the one hand, the variety of occupations and jobs gives individuals the freedom to look for the alternative most compatible with their preferences, interests, and needs, as well as their skills, abilities, and competencies. On the other hand, the large number of alternatives and the unpredictability of the changes in the work of work increase the complexity of decisions. Schwartz (2004) described this paradox as "sometimes more is less"; instead of benefiting from the abundance of options, individuals often face an overload of choice, requiring a vast expenditure of effort (Schwartz 2004). Therefore, prescreening aimed at compiling a short list of promising alternatives worth further exploration is desirable (Gati and Asher 2001b). Indeed, a list of 7 (±2) such alternatives was regarded as optimal by deliberating individuals (Gati et al. 2003) as well as career counselling experts (Gati and Ram 2000; Shimoni et al. 2018).

The large number of potential career alternatives, the nuances distinguishing them, and the frequent changes they undergo, require collecting a vast amount of information about many alternatives and then processing it. Moreover, the challenge of dealing with this overload of information is compounded by the within-occupation variance (i.e., the variations in the attributes of jobs in the same occupation). A marketing expert, for example, can work at an office analysing consumer markets, or travel and meet customers face to face. Furthermore, organisational characteristics (e.g., organisational culture) can also significantly affect the attributes of a particular job (Sauermann 2005). Thus, individuals must weigh the advantages and disadvantages of occupational alternatives after a detailed exploration of the promising alternatives, based on in-depth information gathering (Gati and Asher 2001a; Germeijs et al. 2012).

Finally, most occupational information is subjective, vague, and difficult to define or quantify (e.g., the degree of prestige of a given occupation or job). The various sources of information (e.g., television, Internet) differ significantly in quality and credibility, and can often further increase the complexity of using the information, leading to difficulties in making career decisions (Gati et al. 1996b). The ongoing changes in the world of work, as well as in the individual's preferences, make it more difficult to retrieve reliable information from various sources, thereby increasing the uncertainty involved in career decision-making and development (Gelatt 1989).

**Information About Individuals' Career Preferences** The aim of career decision making is to locate the alternative that best matches the individual's goals and characteristics. Therefore, in addition to collecting occupational information, the process also requires people to clarify their preferences and their capabilities. This is a challenging task that poses a significant difficulty for many deliberating individuals (Gati et al. 1996b). Unlike occupational information, which can be obtained by exploring the environment, clarifying one's career-related preferences requires intensive introspection, and it is only rarely that individuals begin their career-decision process with a set of well-defined, crystallised, and cohesive career preferences. Furthermore, biases impact individuals' perceptions of the world of work as well as of their preferences and abilities (Gati et al. 2006a; Levin and Gati 2015). People's preferences are constrained at least to some extent and are highly influenced by situational components (Payne et al. 1993), including the methods used for eliciting interests (Crites 1969) and preferences (Payne et al. 1999).

Indeed, one of the major challenges of career counselling is to help clients define their preferences (Mitchell et al. 1999; Osipow 1999). To do so, counsellors first need to choose among competing theoretical models describing different ways of conceptualising preferences. Among the terms used for this purpose are vocational interests (e.g., Savickas 1999), personality types (e.g., Holland 1997), work values (Katz 1966; Zytowski 1970), needs (Dawis and Lofquist 1984), and occupational attributes (Prediger and Staples 1996) and career-related or work-aspect preferences (Gati 1986; Pryor 1981). Counsellors can use various techniques to elicit preferences, such as helping the client transform past experiences (successes and failures, satisfying and frustrating experiences) into specific preferences (or dislikes) for

work activities and an awareness of their skills, capacities, interests, and values (Van Esboreck et al. 2005). Self-exploration is a life-long activity that requires individuals to engage in active exploration to develop vocational and self-schemas (Krieshok et al. 2009).

Using the individual's preferences for the decision-making process assumes that these preferences are stable and coherent. Sauermann (2005), for example, suggested that individuals' articulated preferences have three components (based on Payne et al. 1999): (a) their relatively stable preferences called *core preferences*; (b) *situational components*, which are the systematic effects of specific contexts on expressed preferences; and (c) *random error*, which can also affect expressed preferences. Although much research on career choices is focused on the first category—core preferences—there is evidence that situational components of preferences may also have significant effects on career decisions (see Sauermann 2005, for an extended discussion). Recently, however, there have been indications that young adults' aspect-based career preferences are quite stable after two years (Gati and Gutentag 2015), and the fact that recommendations derived from them have predictive validity after six years (Gati et al. 2006b) provides additional, although indirect, support for the informativeness of aspect-based career preferences.

## *The Adaptability of Different Approaches to Information Processing*

Obtaining relevant information is the first step towards making a career decision. The next step, processing the information (called "true reasoning" by Parsons 1909), is a multifaceted, complex process as well, and a source of difficulty for many deliberating individuals (Amir et al. 2008; Kleiman and Gati 2004). Individuals, however, differ in the ways they make career decisions (Gati et al. 2010; Harren 1979).

Gati and his colleagues postulated 12 dimensions along which each individual's unique way of making career decisions can be described (Gati and Levin 2012). These include, for instance, holistic vs. analytical information processing, speed of making the final decision, tendency to procrastinate, dependence on others, and the use of intuition. Six of the 12 dimensions are associated with adaptability in career decision-making: comprehensive information gathering, internal locus of control, little procrastination, greater speed in making the final choice, less dependence on others, and little desire to please others (Gati and Levin 2012). Cross-cultural studies have validated these findings and have shown that individuals with a more adaptive decision-making profile had significantly fewer career decision-making difficulties and were at a more advanced career decision status (Guan et al. 2015a, b; Willner et al. 2015).

Moreover, there is increasing evidence that individuals' cognitive abilities to make decisions are constrained in various ways. This phenomenon, called *bounded rationality* (Simon 1981, 1990), refers to human beings' limited ability to solve problems, which is manifested in their ability to solve only one problem at a time

and process only a limited amount of information, so that they perceive and process information selectively and in a biased manner (e.g., Kahneman and Tversky 1984; Tversky and Kahneman 1974, 1981). These cognitive limitations have a significant effect on the individual's functioning as a decision-maker, especially in complex decision situations (Bendor 2004), which include most career decisions.

One cause of complexity is the process of comparing alternatives, due to the difficulty of collecting the relevant information about occupations. Since both occupational alternatives and individuals' preferences can be described by numerous attributes (e.g., level of income, level of physical activity, mathematical ability required, level of independence, prospects for professional advancement), comparing the alternatives and assessing their compatibility with personal attributes is a cognitively demanding task. To deal with this complexity, decision theories propose facilitating the decision-making process by dividing it into well-defined, concrete steps.

### *Contextual Factors*

Contextual factors can influence individuals' career decisions by shaping their career-related preferences or by constraining the available occupational information. Social-learning approaches to career-decision-making emphasise the importance of social variables in shaping occupational preferences, as well as limiting career opportunities (Krumboltz 1979). According to Krumboltz's instrumental learning model, individuals learn by noticing the positive or negative consequences of their actions, and hence their self-perception and preferences are dependent on the experiences, information, and feedback provided by their social surroundings (Mitchell and Krumboltz 1984). Indeed, social constructionism and psychological constructivism have been widely recognised and emphasised in recent career theories (Savickas 2011; see Chap. 2 of Mark Savickas in this book).

Bright et al. (2005) demonstrated that four distinct categories capture the factors perceived by individuals as highly influential in their career decisions. These include media, teachers, family and friends, and chance events. Their findings support the claim that both proximal and distal contextual factors influence individuals' career decisions. Among the influences of one's broader social setting are social stigmas and biases, which can be a source of perceived and actual social constraints on an individual's career choice. For example, research shows that stereotypic gender roles are still evident in the differences between the career choices of women and men (e.g., Anker 1998, 2001; Badgett and Folbre 2001; Gadassi and Gati 2009; Gati and Perez 2014; Gottfredson 1981).

In the immediate social context, significant others (e.g., nuclear family, friends) also have an important impact on individuals' career choices (Phillips et al. 2001). These people are among the providers of information for adolescents and young adults about occupations in general and specific jobs in particular. The information they contribute may promote the decision-making process, but it may also be selective, based on a limited variety of occupations and jobs, and biased by partial

and subjective knowledge. This may affect individuals' occupational preferences and increase their tendency to remain in their original socio-economic status (Sauermann 2005). In some cases, significant others put pressure on an individual to choose the occupation they think is best (Phillips et al. 2001). In other cases, however, the deliberating individuals themselves might have an excessive need for others' approval, and actively look for their input and guidance in the decision-making process (Sauermann 2005).

## Models of Decision Making

Career-decision-making models focus on particular decision points along the developmental continuum. These models provide a defined framework for decision-making that can fit relevant situations. Whereas career development theories tend to focus on developmental changes in individuals' preferences, self-efficacy perceptions, and decision skills, career decision-making models focus on the actual processes involved in making a career choice (i.e., "true reasoning", Parsons 1909). From this perspective the outcomes of previous decisions and the developmental changes are the inputs for subsequent decisions.

General decision-theory-based models have been adapted to the unique features of career choices on the basis of the assumption that disassembling the complex decision problem into its basic components allows the individual to focus on each component separately and thus respond more adequately, leading to a better choice (Pitz and Harren 1980). Three types of decision-making models have been proposed for this purpose: normative, descriptive, and prescriptive (Bell et al. 1988). In this section, the advantages and disadvantages of each type are discussed.

### *Normative Models*

Normative models of decision-making are intended to describe procedures for making optimal choices. Normative models are based primarily on evaluating each possible alternative according to two variables. The first one is the *subjective utility* (i.e., the value) of the outcomes associated with each alternative in terms of the expected benefits and costs attributed to it in line with each individual's goals and preferences. The second is the estimated *probability* or likelihood that choosing a specific course of action will lead to a particular outcome (Brown 1990; Mitchell and Krumboltz 1984; Pitz and Harren 1980). Different procedures can be used for estimating these two variables and aggregating them to locate the alternative with the highest expected utility. Most normative models share the assumption that the advantages of an alternative can compensate for its disadvantages, a trade-off that led to calling them "compensatory models" (e.g., Katz 1966; Pitz and Harren 1980; Zakay and Barak 1984).

There are two widespread compensatory models (Mitchell and Krumboltz 1984; Pitz and Harren 1980; Sauermann 2005). In the Weighted Additive Model, or Multi-Attribute Utility Theory (MAUT), an importance weight is assigned to each attribute of the different alternatives; the sum of the products of the weights multiplied by the utilities of the attributes represents the overall value of the alternative. In the Subjective Expected Utility (SEU) model, the utilities associated with the alternatives are weighted by the probabilities of achieving these utilities, so as to locate the most rewarding alternative.

Normative models entail not only mathematical assumptions but also significant philosophical and psychological assumptions about human nature. In particular, normative models describe the behaviour of perfectly rational decision-makers: they strive to choose the most beneficial alternative and obtain all information relevant to the decision, and they are capable of considering all possible outcomes of the choice, estimating the value of each alternative and aggregating these values into a composite variable. However, empirical evidence demonstrates that human beings are not perfectly rational decision makers. When the number of potential alternatives is large (as is the case in many career decision-making situations), normative models require collecting extensive information and making many computations, and thus are often inapplicable without a computerised system and database (Janis and Mann 1977; Pitz and Harren 1980).

In addition, in the case of important decisions, not everything can be compensated for. For example, individuals who believe that they have no artistic talent are unlikely to want to become artists even if all the other aspects of the occupation perfectly match their preferences (e.g., independence, flexible hours, prestige). Indeed, people find making explicit tradeoffs emotionally uncomfortable (Hogarth 1987). Moreover, assumptions that are critical for the validity of the computation outcomes (e.g., that the attributes used for comparing the alternatives are independent of one another) are often violated (Gati and Asher 2001a). Therefore, normative models may serve as reference points for a perfect theoretical decision process but are irrelevant for everyday decisions as well as for effective decision counselling. Indeed, one of the major reasons counsellors often avoid using decision models is the difficulty of applying these models, which demand time and effort for mastering the mathematical calculations involved (Mitchell and Krumboltz 1984).

### *Descriptive Models*

A second type of decision theory-based models, *descriptive models*, investigate and document the ways people actually make decisions, and highlight the gaps between the ideal, normative decision-making procedure and the actual process in real-life situations. Considering the various types of decisions people make, and the great individual differences in the ways people make decisions (e.g., Gati et al. 2010; Guan et al. 2015a, b), it is not surprising that there is no single, generally-agreed-upon theory for describing the ways people actually do so. Instead, various findings have emerged from different studies, shedding light on the principles that guide everyday human decision-making.

Herbert Simon (1955) was granted the Nobel Prize for his *satisficing* theory, which refuted the basic criterion for rational decision-making: the assumption that people strive for maximisation (i.e., selecting the best option). According to Simon, maximisation requires complex information processing, which people's mental resources cannot cope with. Therefore, they often settle for an alternative that is "good enough", in the sense that it meets or exceeds their threshold requirements for the factors most important to them. Simon suggested that people consider their alternatives one at a time, and choose the first option that is regarded as satisficing. One implication of this strategy is that the chosen alternative, although it may be adequate, is often not the best one.

Interestingly, empirical evidence shows that individuals guided by maximising strategies (according to the normative models) are often less satisfied with the outcomes of their decision than the users of satisficing strategies (Iyengar et al. 2006). Dahling and Thompson (2013) reported similar findings on the detrimental effect of maximising on satisfaction, the degree of perceived fit, and turnover intentions. One explanation that Iyengar and her colleagues offered for this finding is that, as individuals are cognitively unable to compare a large number of alternatives without help, the pursuit of the "best" alternative induces them to rely on external rather than internal standards for evaluating the alternatives. Thus, a maximiser will eventually choose an alternative with the highest objective or perceived utility (e.g., income), rather than subjective utility. An alternative explanation is that maximisation creates unrealistically high expectations, leading to a greater likelihood of disappointment and regret (Iyengar et al. 2006).

Another widely researched aspect of human decision behaviour are the heuristics and biases inherent to many decision behaviours, which contribute to a systematic deviation from normative-rational predicted choices (e.g., Tversky and Kahneman 1974, 1981). Montgomery (1983, 1989) proposed that one of the methods people consistently use to simplify the decision-making process is framing it as a *search for dominance*, in which one alternative can be seen as dominant over the others (i.e., it is as good as the other alternatives in some aspects and better than the others in at least one aspect). The search for a dominance structure is in fact a process of hypothesis testing, in which the dominance of a promising alternative is tested. If this alternative is found to be dominant, it is chosen, and the decision process is complete. If, however, the decision-maker finds that the dominance structure is violated, he or she will restructure the given information by neutralising, de-emphasising, or counterbalancing the disadvantage(s) found for the promising alternative so as to create a dominance structure (Montgomery 1983, 1989).

Gati and his colleagues' recently developed a model of career decision-making profiles, presented in the previous section, designed to represent the various aspects involved in career decisions. Findings about individual differences in the degree of endorsement of adaptive decision-making behaviours reveals that people do not employ purely rational decision procedures. Indeed, individuals are subject to consistent cognitive biases that simplify complex decisions and often lead to less than optimal choices. It is important to realise this because it indicates the problems and

biases that should be addressed in career guidance. Nevertheless, as descriptive models are unable to serve as a reference point for justifiable decisions, natural decision behaviours cannot be used as a basis for adequate decision-making. This explains why descriptive decision models, like normative models, have not been embraced by either career counsellors or theorists about career decisions.

## *Prescriptive Decision Models*

Although normative decision-making models outline procedures for optimal decision making, as reviewed above, they have been shown to be inapplicable to many real-life situations due to the partial information and limited cognitive resources of people coping with decision situations. In contrast, descriptive models, which focus on understanding the ways people actually make decisions, reveal biases, inconsistencies and limited rationality, which lead to less than optimal decisions. Prescriptive models incorporate the advantages of the normative and descriptive models, while minimising or circumventing their disadvantages. They outline a method of making better decisions, while acknowledging human limitations and corresponding with the intuitive ways individuals make decisions. While descriptive models are evaluated by their empirical validity and normative models by their theoretical adequacy, prescriptive models are evaluated by their pragmatic value—their ability to facilitate individuals' decision-making (Bell et al. 1988). Prescriptive models give up the unattainable goal of making an optimal rational decision (maximising the expected utility; e.g., Pitz and Harren 1980; Zakay and Barak 1984), and aim for the realistic goal of making satisficing choices (Phillips 1994). In the context of career decision making, the goal of prescriptive models can be summarised as providing a systematic process for *making better career decisions*, instead of striving for completely rational ones (e.g., Gati 1996, 2013; Gati and Levin 2015).

**Prescriptive Models for Facilitating Career Decision Making** To be useful for deliberating individuals and career guidance counsellors, a prescriptive model should have the following desirable features. First, it should be attractive and intuitively appealing—straightforward and comprehensible. Second, it should be feasible—compatible with the counsellor's and counselee's finite cognitive ability as well as limited resources, including time, financial means, and effort. Third, it should avoid complicated calculations on the one hand and fuzzy abstractions on the other. Fourth, the model should strive for maximal simplification and minimal effort, but at the same time minimise the potential loss resulting from a non-comprehensive search process, which may lead to a gap between the expected utilities of the chosen alternative and the optimal one. Fifth, to satisfy the needs of different decision-makers, the prescriptive model should offer multilevel complexity, allowing each individual to modify the process so as to arrive at the most suitable level of complexity (e.g., focusing on only a few relevant factors for comparing the alternatives, skipping steps).

To demonstrate the potential usefulness of prescriptive models for facilitating career decision-making, we briefly review the PIC model (Prescreening, In-depth exploration, Choice; Gati and Asher 2001a, b) in the next section. This prescriptive model encompasses the entire career-decision-making process, starting from a large number of potential career alternatives to the point of making a decision. The PIC model was designed to possess the desirable features for an applicable prescriptive model, as outlined above, by offering a systematic method of making career decisions that is adapted to the unique features of such decisions.

## The PIC (Prescreening, In-depth Exploration, and Choice) Model

One major element of the complexity involved in career decision-making is the large amount of potentially relevant information. A goal of a prescriptive model could thus be reducing the amount of information to be collected and processed, thereby helping individuals focus on relevant information. One way to reduce this complexity is to divide the process into distinct stages. Research indicates that, when dealing with decisions, having a large number of potential alternatives, people often intuitively divide the process into two stages: (a) screening, where the unacceptable alternatives are screened out; and (b) choice, where the best alternative is chosen from the remaining ones (Beach 1993; Beach and Potter 1992; Paquette and Kida 1988; Potter and Beach 1994). A similar pattern has been observed in the way deliberating individuals actually collect information required for making career decisions (Gati and Tikotzki 1989).

Gati and Asher (2001a) proposed refining the division into stages by dividing the process into three main stages, each with different goals and strategies: (a) *Prescreening* the potential set of career alternatives based on the individual's preferences, to locate a small and thus manageable set of promising options; (b) *In-depth exploration* of the promising alternatives, resulting in a short list of suitable ones; and (c) *Choice* of the most suitable alternative, based on a detailed comparison among all the suitable ones (Gati and Asher 2001a). Individuals can begin the process at any of the stages of the model, in accordance with their progress and status in the process. Nevertheless, the model promotes a dynamic and flexible decision process and encourages moving back and forth between stages in order to reflect on and update previous decisions. In the following sections the rationale underlying these stages and the processes involved in each one are detailed.

### *Prescreening the Alternatives*

The goal of the first stage, prescreening, is reducing the number of potential alternatives and identifying a manageable set of promising ones (i.e., seven or less; see Miller 1956; Gati et al. 2003) that deserve further, in-depth exploration.

The prescreening process suggested here is based on the elimination-by-aspects strategy (Tversky 1972), which has been shown to be compatible with the ways people actually make career decisions (Gati and Tikotzki 1989). This model was adopted as a prescriptive framework for career decisions and, after being adapted to the unique features of career decisions, was called *sequential elimination* by Gati (1986).

In accordance with the sequential-elimination model, the first stage of the PIC model for career decision-making process is introspective and involves self-exploration. The search for promising career alternatives is initiated on the basis of individuals' preferences in the career-related aspects that are most important to them. The term *career-related aspects* (Gati 1986, 1998; Pryor 1981, 1982) refers to variables that can be used to describe individuals' preferences and abilities for career alternatives (e.g., income, length of training, physical work, mathematical skills). However, due to cognitive and material limitations, it is impractical to consider all possible aspects; rather, the individual must choose a subset of aspects to focus on. The list of important aspects for guiding the prescreening process should include objective constraints (e.g., disabilities), personal competencies (e.g., creativity, technical skills), and core personal preferences (see also Brown 1990; Mitchell 1975). The use of a large set of career-related aspects for prescreening is recommended for eliciting an accurate refinement of each individual's occupational preferences. It should therefore lead to a better person-environment fit than fit based on vocational interests alone (Gati 1998; Gati et al. 1998a).

The first step of the sequential elimination process is to elicit the relative importance ranking of the career-related aspects. An aspect may be considered important because the individual prefers either a high or a low level of this aspect in his/her occupation. For example, the aspect "work environment" might be chosen as important either because of the individual's preference for working "only outdoors" or because the individual does not want to work outdoors and so prefers "only indoors". The next step in the sequential elimination process will be carried out according to the rank orders of the aspects' importance.

In the second step of the sequential elimination process, individuals shift their focus to within-aspect preferences. Each career-related aspect refers to a feature that occupational alternatives possess in different amounts (e.g., length of training). Descriptive labels can be used to represent within-aspect qualitative variations (e.g., for "amount of travel", a great deal, a lot, somewhat, a little, hardly ever), allowing the individual to express her preferences in the particular aspect with a higher resolution. Once these levels have been elicited, they can be compared to the features of occupations, but only if the same qualitative levels are used for describing occupations. Occupations can also be described by a range of levels (instead of a single most representative level) to include within-occupation variations (e.g., variations in working at unconventional hours for a private-practice family physician vs. an emergency-room physician).

The sequential elimination model also distinguishes among three facets of the individual's preferences: (a) the importance of each aspect, (b) the level regarded as *optimal*, and (c) additional, less desirable but still *acceptable* level(s), representing the individual's willingness to compromise, with all the other levels considered

*unacceptable*. An individual might think, for example, that it would be ideal to have a job that does not require working with tools and instruments but might be willing to compromise on a job that requires such work only a small percentage of the time. This explicit elicitation of additional acceptable levels is important. First, it explicitly guides the individual to consider his or her willingness to compromise in that aspect, thus directing his attention to a more realistic perspective on the world of work and career choice (Gati 1993; Gati and Asher 2001a, b; Gati et al. 1998b). Due to the importance of career choice in life, many people find it difficult to consider alternatives different from their image of the ideal career (Gati 1993; Gati and Winer 1987; Gottfredson 1981). Accordingly, Gadassi and Gati (2009) found that using career-aspect-based preferences and a sequential elimination model for prescreening can reduce gender bias in occupational choices.

Theoretically, compensatory normative models can also be used for narrowing the list of promising occupations at the prescreening stage. However, using compensatory models at this stage has several major shortcomings. First, compensatory models are based on comparing all alternatives across all aspects; thus, if they are applied in the prescreening stage, they would require collecting and processing of an enormous amount of information, an impossible task when dealing with a large number of career alternatives without a computerised database and a friendly search module. Second, as discussed earlier, in important decisions such as career decisions, not all disadvantages can be compensated for. This claim was supported by a recent longitudinal study which found that the reported occupational choice satisfaction of individuals who chose an occupation recommended to them by a system based on a sequential-elimination-based search six years earlier was significantly greater than that of those whose present occupation was not included in the recommended list (Gati et al. 2006b). However, choosing an occupation from a recommended list derived from a compensatory-model-based search was not correlated with greater occupational choice satisfaction.

The outcome of the prescreening stage is a short list of promising options. Although sequential elimination seems adequate for this stage descriptively, empirically, and theoretically (Gati 1986, 1996; Gati et al. 2006a, b; Gati and Tikotzki 1989), it also has some shortcomings. Its major disadvantage is the risk that a potentially suitable alternative might be eliminated because of a slight mismatch in a single aspect. This risk can be reduced by adding a safety-check mechanism, namely, *sensitivity analysis*. This means re-examining the implications of changes in the individual's inputs to the prescreening process (i.e., preferences) on the outcome—the list of promising career options. Such re-examination involves (a) rethinking and confirming the range of acceptable levels reported for each aspect ("What if..."), (b) understanding why certain alternatives considered intuitively appealing before the systematic search were eliminated during the sequential elimination process ("Why not..?"), and (c) locating alternatives that were discarded due to only a small discrepancy in a single aspect and considering the possibility of compromising in that aspect ("almost compatible options"). This important opportunity to re-examine and adjust the inputs to the decision process is possible only because the process has been divided into distinct stages.

### *In-depth Exploration of the Promising Alternatives*

The goal of the second stage of the PIC model is to identify a few alternatives that are not only promising but actually suitable for the individual, in two ways: first, that the alternative indeed fits the individual's preferences, and second, that the individual can meet its requirements and actualise it (Gati and Asher 2001a). In this stage, the individual redirects his or her attention and focuses on the exploration of occupational/career alternatives. The decision-maker zooms in on one promising alternative at a time, and collects additional, comprehensive information about it. It is important that the individual focus on the *core aspects* of the occupation, which are the crucial factors for describing its essence (Gati 1998; Gati et al. 1996a). For example, "physical treatment of people" and "working in shifts, at unconventional hours" are among the significant aspects of working as a paramedic and are therefore considered the core aspects of this occupation, whereas "using verbal ability" is not an essential part of the job and therefore is not considered a core aspect.

Once the attributes of the alternative have been found suitable to the individual's preferences, the second goal of the in-depth exploration stage is to investigate the probability of actualising the occupational choice, by considering the individual's previous studies, grades, and achievements, as well as time and financial constraints, to see if they fit the prerequisites of the occupation and its requirements for success. If an occupation does not meet one or more of the above conditions, it should be removed from the list of suitable alternatives. Consequently, the in-depth exploration stage should result in a short list of alternatives that are not only promising, but indeed suitable.

### *Choice: Locating the Most Suitable Alternative*

The in-depth exploration stage usually results in more than one alternative, so that a third stage is required for choosing the most suitable one. It is important to be aware of the uncertainty involved in actualising the preferred option. It is therefore highly recommended that the individual concludes the decision-process not by choosing a single most suitable alternative, but rather by rank-ordering the most suitable alternatives, so as to have a fall-back plan if obstacles emerge in the implementation of the most suitable one.

The choice stage involves a detailed, refined comparison among the alternatives under consideration, focusing on both the differences among them and the trade-offs between the advantages and disadvantages of each. The small number of relevant alternatives at the choice stage makes it possible and desirable to use models that aim at identifying the optimal—most suitable—alternative, using compensatory-model-based estimates. Clearly the number of alternatives affects people's choice strategy; when faced with a small number of alternatives, people tend to use compensatory decision strategies, unlike the situation of facing multi-alternative decision tasks, when they prefer non-compensatory strategies (for a review, see Payne et al. 1993).

Since the alternatives under consideration at this stage are all suitable, the compromises involved in a trade-off between the desirable and the undesirable features of the alternatives (the essence of compensation) are subtler. In addition, as the number of alternatives under consideration is small, the decision-maker can now carry out a detailed evaluation of each alternative across all aspects without facing an overload of information. A number of compensatory-based models have been developed for individuals deliberating about career-related decisions, but none of them is free of shortcomings. A brief review of three of these models is presented to demonstrate their potential contributions to the choice stage, and the drawbacks of each are discussed to highlight the need to design a better procedure for this stage. Katz's (1966) adaptation of the weighted additive model to career decisions is an example of a quantitative compensatory model, based on work values as representing the individual's career preferences. The alternative with the highest score is regarded as the best. Despite the comprehensible systematic method it offers, the numerical estimates required of the decision-maker and the complex sequence of calculations the model involves, some of which may appear arbitrary, decrease its appeal (Gati and Asher 2001a). In addition, the highest score, which is supposed to indicate the best occupation for the individual might be misleading because a small change in even a single factor considered, or the consideration of an additional factor or aspect, might change the rank order (Gati 1986).

Janis and Mann's (1977) decisional balance sheet is an example of a qualitative compensatory model (Brown 1990; Mitchell and Krumboltz 1984) that may be used for comparing career alternatives. It involves listing the factors to be considered when evaluating an alternative, assigning qualitative labels (+ for advantage and − for disadvantage) to the attributes of each alternative, and choosing the one with the highest overall evaluation. Janis and Mann's balance sheet method can be particularly efficient when the comparison involves more than two alternatives. Its simplicity, however, necessitates the omission of some significant aspects of the comparison, such as the differential importance of the various factors and differences in the size of the gaps between the desirable attributes and the characteristic level of the alternative under consideration. A more sophisticated method is therefore recommended.

One method of this type is based on Montgomery's (1983, 1989) description of the *cancellation* operation, included in his *search for dominance* descriptive model, described earlier in this chapter. Montgomery assumed that when a small number of alternatives described along multiple aspects are compared, the chance for the emergence of absolute dominance by one of the alternatives is small. To arrive at dominance, individuals use different operations, taking into account the dependency among the attributes. Specifically, attributes that the individual perceives as advantageous and as related to one another (e.g., "teaching and instructing" and "using verbal ability") are grouped and used to counterbalance an advantage of the other alternative for a different combination of attributes, which are equivalent in desirability (e.g., "higher salary" and " better fringe benefits").

Montgomery's (1989) approach can be adapted to create a systematic comparison process based on three components: (a) the resemblance among aspects within

an alternative, which is used to create a within-alternative grouping of the aspects; (b) the relative importance of each aspect for the individual (using three categories—high, medium and low); and (c) the size of the gap between the two alternatives for a specific attribute (again, divided into three categories—small, medium, and large). For example, the advantage of alternative X over Y in income and economic security can be counterbalanced by the advantage of Y over X in job prospects and promotion opportunities. After the decision-maker cancels out combinations of aspects, the net advantages of one alternative will show that it is more desirable (Gati and Asher 2001a).

## *Using the PIC Model in Career Guidance and Counselling*

The PIC model integrates descriptive models with compensatory normative models by assigning them to different stages of the decision process with appropriate adaptations, turning the complex process of career choice into a sequence of well-defined tasks resulting in a rank-order of alternatives that best fit the individual. Despite the systematic, structured prescription for career decision-making provided by the PIC model, implementing this model is still a non-trivial task without the support of a counsellor or a computerised system. The rationale for the model was therefore used for developing an Internet-based career guidance system called Making Better Career Decisions (MBCD, Gati 1996). MBCD supports the user during the prescreening stage and includes various options for sensitivity analysis. It also includes a database with occupational descriptions (and videos) for assisting the individual at the in-depth exploration stage. The system provides continuous guidance and personal feedback based on monitoring the user's input, allowing the user's reported preferences to be reconsidered and revised, thus creating an interactive dialogue.

*MBCD* is now available both as a self-help tool and as a tool to be used between counselling sessions at career counselling centres (e.g., Gati and Asher 2001b; Gati and Levin 2014). In the latter case, the counsellor evaluates the client's readiness to use the system, prepares the client for it, and analyses the entire dialogue and its outcomes (all of which are included in the printed summary provided by the system) with the client. Empirical evidence has shown the effectiveness of *MBCD* for decreasing individuals' decision-making difficulties (Gati et al. 2001), facilitating the career-decision-making process (Gati et al. 2003), and a six-year follow-up study found that following *MBCD*'s recommendations about promising occupations increased occupational choice satisfaction (Gati et al. 2006b). The Internet is flooded with career-related self-help sites differing in quality (e.g., Grupe 2002), so empirical validations such as those carried out for *MBCD* are crucial for providing the deliberating individuals surfing those sites with the high-quality help they need.

### *Evaluating Prescriptive Decision Models*

When theoretical models are used for guiding career decisions, it is very important to evaluate their adequacy beyond empirical validation. Whiston (2011) proposed evaluating interventions in terms of their validity and their effectiveness, as well as their cost-benefit ratio. Two approaches are particularly useful in evaluating the quality of the decisions. The first argues that a decision model should be evaluated according to the individual's degree of satisfaction with the outcomes of the decision based on the model, namely occupational choice satisfaction. The second approach claims that as an individual's eventual occupational satisfaction is affected by many unpredictable and uncontrollable factors, decision models should not be evaluated by their outcomes but rather by the quality of the process that led to these outcomes (Katz 1979; Mitchell and Krumboltz 1984; Phillips and Jome 2005). Thus, the goal should not be making the right decision, but rather making the decision right.

As prescriptive models are process-centred, a process-oriented evaluation seems to be the better approach. However, assuming that the right process increases the probability of making the right choice, a comprehensive evaluation of the validity and utility of a model can involve three complementary issues: (a) Does the model facilitate and improve individuals' decision-making processes? (b) Does it lead to greater occupational satisfaction in the future? (c) Do individuals generalise the model and apply it to future career decisions? A review of the research supporting the PIC model from these three perspectives can be found in Gati and Asher (2001a) and Gati and Levin (2014).

## Going Beyond the Models: The Role of Non-cognitive Factors

One of the major criticisms of decision-making models is that they over-emphasise the cognitive components of career choices, while neglecting the emotional factors that play a major role in decisions of this kind. Indeed, decision theories, which emerged within the field of cognitive psychology, tend to focus on the deliberate, conscious processes involved in making decisions. Nevertheless, non-cognitive, non-conscious, emotional aspects of career-decision-making are also considered integral to the decision process, both theoretically and in counselling. These factors may be manifested particularly in (a) the role of intuition in the decision-making process, (b) the interaction between decision models and decision-making styles, and (c) the integration of the cognitive and the non-cognitive components in counselling interventions, regarding them as complementary rather than as competing factors. These issues are discussed in the following sections.

## *The Role of Intuition*

One of the most controversial issues associated with career-decision-making is whether it is an intuitive process or a conscious, mostly rational one. Krieshok's anti-introspective view (1998, 2001) typifies the claim that most human decision-making occurs at a non-conscious level and cannot be reconstructed or reflected upon by introspection (Krieshok et al. 2009). Krieshok claimed that decision models that require individuals to articulate their preferences and values often lead to errors, confusion, and even a false description of these preferences, resulting in the exploration of inappropriate alternatives during the decision process. A more efficient method for improving career decisions, according to this approach, is relying on intuition. When information is collected during active experience, thus enriching the content on which the individuals' judgments rely, it generates intuitions that are likely to lead to better-informed decisions.

Nonetheless, intuition and systematic exploration can be viewed as complementary rather than contradictory. Appropriate career decisions should be made actively, systematically, and consciously, yet intuition does have an important role to play in several phases of the process. Intuition affects individuals' sensitivity to the importance of each aspect, their preferred levels in the aspect, and their willingness to compromise. Intuition can also serve for the overall evaluation of the final decision (i.e., the individual's confidence in it). It is particularly important at the choice stage of the *PIC* model. Congruence between the outcomes of the systematic decision process and the intuitively appealing occupational alternatives can strengthen the individual's confidence in her choice, while incongruity should call for a re-examination of the decision process and the intuitive choice to locate the reason(s) for the incompatibilities, reconcile reason and intuition, and arrive at a confident decision. Future research should test the relative informativeness of the outcome of the systematic process and that of intuition, in cases of incongruence.

According to this approach, criticism of decision-making models (e.g., Krieshok 1998, 2001) can be regarded as reflecting the challenges and intricacies involved in adopting decision models for use in career decisions. While purely rational decision processes are insufficient for the purpose, we suggest that career guidance counsellors should encourage a *systematic* process of career decision-making. The challenge is to explore and refine the prescriptive models and tailor interventions to each individual's traits and decision-making style.

## *Embracing Uncertainty and Ambiguity*

The outcomes of career decisions are rarely perfectly predictable. They are typically made under uncertainty in the sense that individuals are not guaranteed that they will be able to actualise all their choices. In general, there is some likelihood that the

chosen alternative will not be satisfying. Career decisions are also made under ambiguity in the sense that individuals typically do not know what their chances of success are. Thus, whereas uncertainty relates to the probability of success, ambiguity relates to the decision-makers' knowledge of this probability.

Gelatt (1989) highlighted the unpredictability and ambiguity of the post-modern information society, claiming that they can be dealt with only if decision-makers embrace uncertainty and demonstrate flexibility in response to change. Under such circumstances, rational decision-making strategies are insufficient, and intuitive thinking is required for acting adaptively. Bright and Pryor (2005) later adopted the notion of uncertainty and highlighted the complexity of the range of influences on career development and the incompleteness of our knowledge at the time a decision is made. Building upon studies that show that unplanned events influence career behaviour more than previously thought (Krumboltz and Levin 2010), and understanding that individuals are complex, ever-changing, dynamic systems, Pryor and Bright (2011) highlighted the value of dynamic adaptations and continual change throughout individuals' career development.

Indeed, uncertainty is involved in many components of the career decision-making process, including the individual's preferences—the relative importance of the aspects, the optimal level, as well as one's willingness to compromise (as reflected in the range of levels regarded as acceptable), which might change in the future. Occupations are likely to be different—certain occupations will disappear, while others, unimagined at present, may emerge (Hirschi 2018; Lent 2018). Moreover, the attributes of typical jobs in many occupations may very well change (e.g., ICT may decrease the need for travelling).

Uncertainty is generally regarded as undesirable but unavoidable; hence individuals tend to take measures to minimise it as much as possible. During prescreening, uncertainty concerning one's future preferences can be taken into account by considering not only the optimal level (e.g., *no travel*), but also additional acceptable levels (e.g., *little or moderate travel*). During in-depth exploration, the information gathered can be used to decrease uncertainty about one's fit with a promising alternative. Finally, during the choice stage, uncertainty about actualisation can be dealt with by selecting a second-best alternative(s) and, if possible, planning to pursue several suitable alternatives simultaneously (e.g., applying to several universities or jobs).

## *Career Decision-Making Styles*

A common factor in the use of different decision models in career counselling is framing the decision problem analytically and dividing the decision task into stages, thus allowing the client to focus on one task at a time (Pitz and Harren 1980). Clearly, the deliberative analytic procedure involved in this approach may be more appealing to individuals with a more rational-analytical decision-making style than to those with a more intuitive or impulsive one. Indeed, decision-making style applies to individuals' behaviour throughout the career decision-making process and not only at the final choice stage (Phillips and Pazienza 1988). Models of career

decision-making *styles* describe the unique way each individual typically approaches and makes career decisions (Harren 1979). Information about this style allows tailoring the intervention to the needs of each individual.

Several classifications have been suggested to describe the different types of decision-makers along a continuum ranging from spontaneous, intuitive decision-making to a rational, systematic style. Harren (1979) distinguished among three career-decision-making styles: rational, intuitive, and dependent. Scott and Bruce (1995) distinguished among five styles—rational, avoidant, intuitive, dependent, and spontaneous—while Sagiv (1999) distinguished between those seeking tools and those seeking answers. Bettman et al. (1998) and Sauermann (2005) proposed that individuals can also be classified by their choice goals (maximising decision accuracy, minimising cognitive effort, minimising negative emotions, and maximising the justifiability of the decision). Additional measures for strategies and typologies include those proposed by Arroba (1977), Johnson (1978), Krumboltz (1979), and others; see Table 1 in Gati et al. (2010).

Gati et al. (2010) suggested an alternative, multidimensional model for describing individuals' typical career decision-making behavior. Instead of *style*, Gati et al. (2010) used the term "career decision-making *profiles*" to indicate a complex construct describing an individual's decision-making behaviour, with several distinct dimensions. A 12-dimensional model was proposed for this purpose, with the continuous dimensions (Gati et al. 2010; Gati and Levin 2012) of *information gathering*, (minimal vs. comprehensive), *information processing* (holistic vs. analytic), *locus of control* (external vs. internal), *effort invested in the process* (little vs. much), *procrastination* (high vs. low), *speed of making the final decision* (slow vs. fast), *consulting with others* (rare vs. frequent), *dependence on others* (high vs. low), *desire to please others* (high vs. low), *aspiration for an ideal occupation* (low vs. high), *willingness to compromise* (low vs. high), and *using intuition* (little vs. much). Each dimension sheds light on the individual's way of making career decisions from a different angle.

This diversity in decision styles helps us choose the guidance practices and decision strategies different people will benefit from most. Career counsellors need to use flexible and varied decision models and counselling interventions to best satisfy each client's particular needs and tailor the intervention to the client's personal career-decision-making style (Amit and Gati 2013). By understanding how the client usually makes decisions, the counsellor can better predict the benefit the client may derive from being instructed in various models or procedures. If the client agrees to explore a new style, a coaching role on the part of the counsellor may be appropriate (Chung et al. 2003).

**Applying Career-Decision-Making Models** Decision-making models can be used for facilitating better career decisions in three complementary ways: (a) by the counsellor in face-to-face situations; (b) as a blueprint for computer-based career guidance systems; and (c) as a learned systematic method for independent implementation. These options are briefly described here.

## *Face-to-Face Individual Counselling*

In their role as decision advisors, career counsellors have the goals of facilitating their clients' decision-making process and helping them arrive at an optimal and feasible choice. To tailor the counselling sessions to the counselee's particular needs, counsellors should begin by assessing each client's current stage in the decision process and the roots of his or her difficulties in making the decision. A variety of theory-based instruments are available for this assessment. The *Career Decision Scale* (Osipow et al. 1976) can be used for an overall assessment of the individual's career indecision. The *Career Decision-making Difficulties Questionnaire* (CDDQ, Gati et al. 1996b), which is based on a well-defined and empirically validated taxonomy stemming from decision theory, can be used for locating the specific focuses of an individual's difficulties in making career decisions. The *Indecisiveness Scale* developed by Germeijs and De Boeck (2002) can be used for measuring the clients' general indecisiveness. The *Emotional and Personality-related Career Difficulties* (EPCD) scale has been developed by Saka and Gati (2007), Saka et al. (2008) to assess the emotional and personality-related causes of difficulties in making career decisions, which are postulated as underlying more prolonged career indecisiveness.

The difficulties arising during the decision-making process can be divided into those stemming from emotional sources involving general indecisiveness (e.g., pessimistic views, anxiety, uncrystallized self-concept and identity; Saka and Gati 2007; Saka et al. 2008) and those from cognitive sources involving more normative developmental indecision (e.g., lack of information about how to make the decision or how to obtain occupational information). Accordingly, different types of counselling intervention can be tailored to focus on treating these emotional and personality-related difficulties (Saka et al. 2008) or addressing cognitive, difficulties associated with information processing. Systematic decision-making models are of the latter type. The counsellor's role is to guide clients through the stages of the decision-making process, encouraging them to play an active and dominant role at each stage. A decision model can be used by the counsellor in two ways: as a way of facilitating a dynamic counsellor-client dialogue and as a way of monitoring the client's advancement in the process (Gati and Asher 2001a; Gati and Levin 2014).

These two types of counselling technique are mutually dependent and complementary; the decision-making process cannot be completed without dealing with the emotional difficulties hindering it, or referring to emotional considerations involved in it, and at the same time it requires a cognitive process of information processing and choice.

## *Decision Aids: Computer-Assisted Career-Guidance Systems (CACGSs)*

Despite the extensive knowledge of expert counsellors, career decisions require the synthesis of vast amounts of information that no person can retain. Now, in the second decade of the twenty-first century, this information can be stored and processed

and easily retrieved from Internet-based career information and guidance systems. The rapid development and spread of computer and information technologies in recent decades has made digital information widely accessible, offering interactive systems that can support the decision-making process 24/7. First, by incorporating relevant, evidence-based tools, computers can help assess individuals' needs, including the difficulties they face in making career decisions (Gati et al. 1996a, b), their dysfunctional beliefs about career decision making (Hechtlinger et al. 2018), and the adaptiveness of the way they make career decisions (Gadassi et al. 2012; Gati and Levin 2012). Second, they can provide clients with recommendations and guidance on how to best proceed in the career decision-making process (which may include a recommendation for face-to-face career counselling; Amir et al. 2008). Finally, computers can compensate for the limitations of human cognition by offering vast computational abilities as well as immense databases and efficient search engines (Katz 1993). This permits the presentation of information in a friendly, comprehensible format, using graphics, audio, and video technologies. Most presently available CACGS can be used for both the prescreening stage of locating promising options and the in-depth exploration stage of collecting comprehensive information about these options (Payne et al. 1993). More recently, decision-support systems were developed also for the choice stage (e.g., www.cddq.org). The benefits and the pitfalls of the use of the Internet for career guidance and counselling were reviewed by Gati 1994; Osborn et al. (2011).

Although CACGS have many advantages, they have significant disadvantages as well. The self-help CACGSs found on the Internet vary greatly in quality. With their claim of guiding the individual through an important and meaningful career decision, unreliable and biased systems may mislead the user and even cause harm. In this context it is important to be aware of clients' tendency to regard computer output as objective and "absolutely true". The utility and empirical validity of the system are therefore extremely important, especially when it is used without the monitoring of an expert counsellor. The increased use of self-help systems makes it important to define standards for quality career-guidance systems, thus reducing the disadvantages of CACGS (Gati 1994, 1996; Offer and Sampson 1999; Sampson et al. 2001).

One of the important challenges for the future development of CACGS is to upgrade interactivity by developing systems that will be able to monitor not only the user's inputs (e.g., the degree of cohesiveness of one's career preferences; Shimoni et al. 2018), but also the system's recommendations (Gati and Ram 2000; Gutentag et al. 2018). An ideal CACGS should be able to provide a personal diagnosis that resembles a counsellor's initial diagnosis: the system should identify the user's career maturity and readiness to use it, assess the client's decision-making style, cognitive level and specific needs, and accordingly provide the individual with a personally tailored dialogue.

Importantly, most CACGS do not aim at supplanting professional career counsellors, but rather at supporting and facilitating the counselling process. Such systems are typically used between face-to-face counselling sessions. A printed output that summarises the outcome of the interaction between the client and the system, and the recommendations received, can be very useful in facilitating the integration of this type of instrument into the counselling process. Empirical evidence indicates

that CACGS are most effective when used with the guidance of a counsellor, rather than as stand-alone self-help tools (Osborn et al. 2011; Harris-Bowlsbey and Sampson 2001). As CACGSs focus on the cognitive aspects of the decision rather than the affective ones, face-to-face counselling is not redundant.

### *Decision-Making Models as a Systematic Method for Self-Help*

This chapter focused on the notion of career development as a continuous process including multiple decisions. The necessity of dealing with a variety of decisions along one's career path, as well as other multi-alternative decision situations, calls for acquiring and internalising decision skills. Promoting informed career-decision-making is a generally-agreed-upon goal (Phillips 1992). This challenge has two components—increasing access to relevant information and increasing the individual's ability to process the information for making the decision. Formal educational systems, counselling programs at universities, and training programs for unemployed individuals can and should contribute to this purpose by including strategies for dealing with complex decision situations among the basic skills they teach. Indeed, people have increasingly become aware of the need to teach decision-making strategies (e.g., Baron and Brown 1991). Thus, CACGS, face-to-face counselling, and instruction in systematic decision-making complement rather than compete with one another; combining them seems to be the most effective and beneficial way to promote career decision making.

## Conclusion

This chapter discussed the potential of the decision-theory perspective to help us better understand the career-decision-making process and facilitate better career decisions. Recent reviews and discussions (e.g., Gati 2013; Gati and Levin 2014, 2015; Krieshok et al. 2009; Sauermann 2005; Van Esboreck et al. 2005; Phillips and Jome 2005) have highlighted the increasing awareness and acknowledgment of the need to focus on specific aspects in the career decision-making process, in addition to the developmental circumstances in which they are made (which is the focus of the career-development theories; Osipow and Fitzgerald 1996), and the notion of person-environment congruence (elaborated by P-E Fit theories). Thus, the three perspectives—decision theory, development theories, and P-E fit—appear to complement each other from both the theoretical and the practical point of view. The unique contribution of the decision-making perspective is in presenting a systematic tool for a flexible process that can increase the individual's ability to make the decision right.

Career counsellors and deliberating individuals have access to a profusion of instruments that can provide important information relevant for both. However, there is still a need for further developments of the theoretical foundations of career

decision-making, and for strengthening the mutual enrichment between theoretical knowledge and the hands-on experience of career counsellors, to better reveal the actual processes involved in making career decisions and suggest designs for decision aids. The objective, as discussed in the chapter, should not be the unattainable goal of helping clients make purely rational decisions, but rather helping them make better career decisions through a systematic process. The combination of theoretical knowledge, the experience of professional counsellors, and the newly available information and communication technologies, should lead to a promising future for the development of innovative models, procedures, and instruments for assisting individuals in becoming adaptive decision-makers while getting ahead along the multi-forked, twisting career paths of the twenty-first century.

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